LDC 3926

16-Channel High Power Laser Diode Controller

Product Features

- 16 independent, isolated channels for laser and TEC control
- Up to 6A laser control per channel for higher power laser diodes with 48W of TEC control
- Compatible with all ILX LDC-3916 modules
- Low noise, high stability constant current and constant power laser operation with all modules
- 4-wire laser voltage measurement with all modules
- High stability temperature control
- TE voltage measurement
- GPIB/IEE-488 and RS-232 serial interface

The LDC-3926 16-Channel Laser Diode Controller offers 16 channels of high power laser diode current source and temperature control in a space saving rack mountable instrument. ILX Lightwave designed the LDC-3926 to meet the increasing pump laser control demands of high power optical amplifiers. With up to 6A available per channel, the LDC-3926 offers the only 16-channel modular instrument for development and production testing of high power optical amplifiers and pump lasers. Two high current output modules were specifically developed for the LDC-3926. A 42W, 6A laser current control module offers 4-wire forward voltage measurement, independent modulation, and enhanced laser diode protection with adjustable forward voltage. A 48W, 6A TEC control module offers precise temperature control with high stability and TE voltage measurement. For even more flexibility, the LDC-3926 accepts all ILX LDC-3916 control modules. For automated control of all sixteen channels, the LDC-3926 Laser Diode Controller comes with a GPIB/IEEE-488 compliant remote control interface and an RS-232 serial interface.

16 Channels of High Power Laser Diode Control

ILX Lightwave
Laser Diode Instrumentation & Test Systems

LDC 3926

16-Channel High Power Laser Diode Controller

The LDC-3926 16-Channel Controller was developed specifically for controlling the current and temperature of multiple high power laser diode pumps used in optical amplifier tests, simplifying system setup and control. Up to 16 laser diodes can be precisely controlled with one mainframe including temperature control using high stability current source modules or temperature control modules.

The modules slide easily into the back of the instrument with standard connectors for laser and TE control connections.

All sixteen lasers can be controlled from the front panel or through the GPIB/IEEE-488 bus or RS-232 interface.

Front Panel Interface Provides Simple Operation

The bright vacuum fluorescent display is readable from almost any angle. Status screens show four channels at once and scroll both directions to easily view any channel. You can monitor operations, change setpoints, and turn any output on or off from the status menu. Plus, you can define any two parameters displayed on the status screen for each channel.

For initial or detailed setup, simple and intuitive menus supported by screen-specific soft keys quickly configure and operate each channel. Menu depths have been limited to keep the front panel operation concise, while more sophisticated operations are reserved for the GPIB interface. An “All Channel” menu facilitates initial setup, and 10 storage bins allow you to save and recall all instrument settings. Setpoints and other values can be entered through a numeric keypad, up/down arrow keys, or the rotary adjustment knob.

Powerful GPIB Interface

A powerful master processor platform drives the LDC-3926 controller, communicating with all sixteen microprocessor-controlled modules. When coupled with the HS488TNT chipset GPIB technology from National Instruments®, the LDC-3926 provides all of the necessary processing capabilities for automated production testing. With microprocessors on each module, the mainframe master manages 16 independent control channels quickly and reliably. Free LabVIEW® instrument drivers are available at www.ilxlightwave.com.

High Performance Modules

Two high power modules are available specifically for the LDC-3926. The LDC-3926339 module provides up to 6A of laser current control per channel, and the LDC-3926559 provides up to 48W with 6A for TEC temperature control. High compliance voltage assures performance over long cable runs. These modules have the highest power available for high density controllers.

In addition to these high-power modules, all of the standard ILX LDC-3916 modules are compatible with the LDC-3926 High Power Laser Diode Controller. These modules include controller modules consisting of both 1.5A of laser current and 9W of TEC control, dual laser current control modules with two isolated outputs with 1.5 or 3A and dual TEC control modules with 9W or 24W.

Support Future System Expansion

Designed to provide the most efficient and safest control available for multiple laser diodes, each module’s control functions are managed locally and communicated to the master processor. On-board intelligence simplifies future addition of modules since all operational and calibration data is stored in the module. Simply plug in the new module and power up the system. The mainframe never needs to leave the rack.

16 Channels of High Power Laser Diode Current and Temperature Control

LDC 3926

16-Channel High Power Laser Diode Controller

State-of-the-Art Laser Diode Current Source

The LDC-3926 current source topology uses an innovative, proprietary control loop and incorporates the latest techniques for signal filtering and circuit board shielding. Adjustable voltage limit and faster shutoff help prevent dangerous reconnect transients that can occur from intermittent connections between controller and laser diode. Investment in this instrument provides assurance for safe, worry-free testing and control of higher power laser diodes.

Higher Power Laser Diodes

Operational modes including constant current in low or high bandwidth or constant optical power are selectable from the front panel or via the remote interface. Measurement of the laser diode forward voltage is provided with 4-wire accuracy for production environments where longer cable runs are common. A single, rear panel modulation port provides direct modulation of each channel's laser current and supports external modulation bandwidths of up to 1MHz (lower current modules). Individual channel modulation ports are available on request.

High-Stability TEC Control

Achieve up to ±0.007°C temperature stability with the low noise temperature controller modules. The temperature control circuits optimize temperature settling times with a smart integrator control loop with expanded gain setting ranges. All TEC control modules for the LDC-3926 include voltage measurement capabilities and internal thermistor current selection via front panel or remotely for control over a wide temperature range.

Flexible Control Over a Wide Range of Applications

By combining true modularity and high channel density, the LDC-3926 easily adapts to a wide variety of applications. This system can be used for controlling multiple pump lasers in amplifier test or low channel count burn-in applications. When coupled with ILX's LDM-4616 16-channel laser diode mount, the LDC-3926 can provide a cost effective DWDM optical source test set. For picometer tuning of wavelengths, select the LDC-3916371 module with 0.01°C temperature setpoint resolution.

Protect Your Investment with the Leaders in Laser Diode Protection

The LDC-3926 provides all of ILX Lightwave's proven laser protection features like independent current limits, slow-start turn-on circuits, and isolated power supplies. The adjustable laser voltage limit brings even greater levels of protection. If a temperature limit is reached, the TEC Temperature control modules can be programmed to turn off any or all lasers in a mainframe.

Designed for production test, the LDC-3926 will satisfy higher power multiple laser diode operation with reliable and secure control.

LDC 3926

16-Channel High Power Laser Diode Controller

Specifications[1]

Fine Temperature Resolution Controller Module

CURRENT SOURCE[1]	3916371 500mA/9W
LASER CURRENT OUTPUT	
Output Current Range:	0–500mA
Setpoint	
Resolution:	10µA
Accuracy:	±0.1% of FS
Compliance Voltage:	6V (adjustable voltage limit)
Temperature Coefficient:	<50ppm/°C
Short-Term Stability (one-hour):[2]	<20ppm
Long-Term Stability (24-hour):[3]	<50ppm
Noise and Ripple[4]	
High Bandwidth:	<30µA rms
Low Bandwidth:	<24µA rms
Transients	
Operational:[5]	<3mA
1kV EFT:[6]	<4mA
Surge:	<8mA
LASER DRIVE LIMIT SETTINGS	
Current Limit	
Range:	0–500mA
Resolution:	0.2mA
Accuracy:	±0.7mA
Voltage Limit	
Range:	0–7.5V
Resolution:	0.1V
Accuracy:	±0.2V
PHOTODIODE FEEDBACK	
Type:	Differential 10Ω Input. Selectable Zero Bias or 5V Reverse Bias
Photodiode Current Range:	0–5000µA
Output Stability:[7]	0.01%
Setpoint Accuracy:	±0.1% of FS
EXTERNAL ANALOG MODULATION	
Input:[8]	0–10V, 50Ω
Transfer Function:	50mA/V
High Bandwidth Mode	
Small Signal Bandwidth:[9]	DC to 1.2MHz
Large Signal Bandwidth:[10]	DC to 1.0MHz
Low Bandwidth Mode	DC to 30kHz
LASER CURRENT MEASUREMENT (DISPLAY)	
Output Current	
Range:	0–500.00mA
Resolution:	0.01mA
Accuracy (at 25°C):	±0.05% of FS
Photodiode Current	
Range:[11]	0–5000µA
Resolution:	0.1µA
Accuracy (at 25°C):	±2µA
Photodiode Responsivity	
Range:[11]	0.00–1000.00µA/mW
Resolution:	0.01µA/mW
Range:	0.00–5000.0mW
Optical Power Resolution:	100µW
Forward Voltage	
Range:	0.00–7.5V
Resolution:[12]	10mV
Accuracy:[13]	±7mV

TEMPERATURE CONTROL[1]	3916371 500mA/9W
TEMPERATURE CONTROL OUTPUT	
Temperature Control Range:[2]	-5°C to 50°C
Thermistor Setpoint	
Resolution:	0.01°C
Accuracy:[3]	±0.2°C
Short-Term Stability (one-hour):[4]	<±0.007°C
Long-Term Stability (24-hours):[5]	<±0.01°C
Output Type:	Bipolar current source
Compliance Voltage:	>7V DC
Maximum Output Current:	1.5A
Maximum Output Power:	9W
Current Noise and Ripple:[6]	<1mA rms
Current Limit	
Range:	0–1.5A
Accuracy:	±0.05A
Control Algorithm:	Smart Integrator, Hybrid PI, Gain adjustable from 1–127
TEMPERATURE SENSOR	
Types:	Thermistor (2-wire NTC)
Thermistor Sensing Current:[7]	100µA
Usable Thermistor Range:	5100–13,000Ω, typical
User Calibration:	Steinhart-Hart, 3 constants
TEC MEASUREMENT (DISPLAY)	
Temperature	
Range:[8]	–99.9°C to 199.9°C
Accuracy:[3]	±0.5°C
Thermistor Resistance	
100µA Setting	
Range:	5100–13,000Ω
Accuracy:[10]	±5Ω
TEC Current	
Range:	–1.50 to 1.50A
Accuracy:	±0.04A
Voltage	
Range:	–9.999 to 9.999V
Resolution:[11]	100mV
Accuracy:[12]	±70mV

NOTES

The 3916371 Current Source and Temperature Control notes are on the following pages.

LDC 3926

16-Channel High Power Laser Diode Controller

Specifications

TEC Modules

TEMPERATURE CONTROL[1]	3916550 Dual 9W	3916558 Single 24W (3A)	3926559 Single 48W (6A)
TEMPERATURE CONTROL OUTPUT			
Temperature Control Range:[2]	–99.9°C to 150°C	–99.9°C to 150°C	–99.9°C to 150°C
Thermistor Setpoint:	Resolution Accuracy[3]	Resolution Accuracy[3]	Resolution Accuracy[3]
–20°C to 20°C:	0.1°C ±0.2°C	0.1°C ±0.2°C	0.1°C ±0.2°C
20°C–50°C:	0.2°C ±0.2°C	0.2°C ±0.2°C	0.2°C ±0.2°C
Short-Term Stability (one-hour):[4]	<±0.007°C	<±0.007°C	<±0.007°C
Long-Term Stability (24-hours):[5]	<±0.01°C	<±0.01°C	<±0.01°C
Output Type:	Bipolar current source	Bipolar current source	Bipolar current source
Compliance Voltage:	>6 V DC	>8V DC	>8V DC
Maximum Output			
Current:	1.5A	3.0A	6.0A
Power:	9W	24W	48W
Current Noise and Ripple:[6]	<1mA rms	<2mA rms	<2mA rms
Current Limit			
Range:	0.1–1.6A	0.1–3.10A	0.1–6.10A
Accuracy:	±0.05A	±0.05A	±0.06 A
Control Algorithm:	Smart Integrator, Hybrid PI, Gain adjustable from 1–127	Smart Integrator, Hybrid PI, Gain adjustable from 1–127	Smart Integrator, Hybrid PI, Gain adjustable from 1–127
TEMPERATURE SENSOR			
Types:	Thermistor (2-wire NTC)	Thermistor (2-wire NTC)	Thermistor (2-wire NTC)
Thermistor Sensing Current:[7]	10µA/100µA	10µA/100µA	10µA/100µA
Usable Thermistor Range:	25–450,000Ω, typical	25–450,000Ω, typical	25–450,000Ω, typical
User Calibration:	Steinhart-Hart, 3 constants	Steinhart-Hart, 3 constants	Steinhart-Hart, 3 constants
TEC MEASUREMENT (DISPLAY)			
Temperature			
Range:[8]	–99.9°C to 199.9°C	–99.9°C to 199.9°C	–99.9°C to 199.9°C
Accuracy:[3]	±0.5°C	±0.5°C	±0.5°C
Thermistor Resistance			
10µA Setting			
Range:	0.01–450.00kΩ	0.01–450.00kΩ	0.01—450.00kΩ
Accuracy:[9]	±0.05kΩ	±0.05kΩ	±0.05kΩ
100µA Setting			
Range:	0.001–45.000kΩ	0.001–45.000kΩ	0.001—45.000kΩ
Accuracy:[10]	±0.005kΩ	±0.005kΩ	±0.005kΩ
TEC Current			
Range:	–1.50 to 1.50A	–3.00 to 3.00A	–6.00 to 6.00A
Accuracy:	±0.04A	±0.04A	±0.04A
Voltage			
Range:	–9.999 to 9.999V	–10.75 to 10.75V	–10.75 to 10.75V
Resolution:[11]	100mV	100mV	100mV
Accuracy:[12]	±70mV	±70mV	±70mV

TEMPERATURE CONTROL 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 used.
3 Accuracy figures are quoted for a typical 10kΩ thermistor and 100µA current setting for –5°C to 50°C, and typical 10kΩ thermistor and 10µA current setting for –20°C to –5°C. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
4 Over any one-hour period, controlling a load resistor mounted in a LDM-4412 mount at 25°C with 10kΩ thermistor. Load current is set at ½ scale.
5 Over any 24-hour period, controlling a load resistor mounted in a LDM-4412 mount at 25°C, with 10kΩ thermistor. Load current is set at ½ scale.
6 Measured at 1A (3916550), 2A (3916558,3916559) with a bandwidth to 10 MHz (3916550) to 25 MHz (3916558, 3916559).
7 Thermistor current range software selectable by front panel or GPIB.
8 Software limits of display range.
9 Using a 10kΩ thermistor, controlling an LDM-4412 mount over -30°C to 65°C (~200-2kΩ) or a 100kΩ thermistor controlling an LDM-4412 mount over 10°C-85°C (~200-10kΩ).
10 Using a 10kΩ thermistor, controlling an LDM-4412 mount over -5°C to 90°C (~45-1kΩ).
11 1mV through GPIB interface.
12 Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load used. Accuracy of ±20 mV through GPIB interface.

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

LDC 3926

16-Channel High Power Laser Diode Controller

Specifications

High Power Current Source Modules

CURRENT SOURCE[1]	3916338 Single 3A	3926339 Single 6A
LASER CURRENT OUTPUT		
Output Current Range:	0–3000mA	0–6000mA
Setpoint		
Resolution:	80µA	130µA
Accuracy:	±0.15% of FS	±0.1% of FS
Compliance Voltage:	4.5V (adjustable voltage limit)	7.0V (adjustable voltage limit)
Temperature Coefficient:	<100ppm/°C	<75ppm/°C
Short-Term Stability (one-hour):[2]	<50ppm	<50ppm
Long-Term Stability (24-hour):[3]	<75ppm	<75ppm
Noise and Ripple[4]		
High Bandwidth:	<22µA rms	<48µA rms
Low Bandwidth:	<16µA rms	<32µA rms
Transients		
Operational:[5]	<5mA	<5mA
1kV EFT:[6]	<10mA	<7mA
Surge:	<8mA	<12mA
LASER DRIVE LIMIT SETTINGS		
Current Limit		
Range:	0–3000mA	0–6025mA
Resolution:	1.025mA	2.05mA
Accuracy:	±9mA	±18mA
Voltage Limit		
Range:	0–7.5V	0–7.5V
Resolution:	10mV	10mV
Accuracy:	±200mV	±200mV
PHOTODIODE FEEDBACK		
Type:	Differential 10Ω Input Selectable Zero Bias or 5V reverse Bias	Differential 10Ω Input Selectable Zero Bias or 5V reverse Bias
Photodiode Current Range:	0–5000µA	0–5000µA
Output Stability:[7]	±0.01%	±0.01%
Setpoint Accuracy:	±0.1% of FS	±0.1% of FS
EXTERNAL ANALOG MODULATION		
Input:[8]	0–8.0V, 50Ω	0–8.0V, 50Ω
Transfer Function:	375mA/V ±10%	750mA/V ±10%
High Bandwidth Mode		
Large Signal Bandwidth:[9]	DC to 0.6MHz	DC to 100kHz
Low Bandwidth Mode:	DC to 30kHz	DC to 27kHz
LASER CURRENT MEASUREMENT (DISPLAY)		
Output Current		
Range:	0–3000.0mA	0–6000.0mA
Resolution:	0.01mA	0.01mA
Accuracy (at 25°C):	±0.07% of FS	±0.07% of FS
Photodiode Current		
Range:	0–5000µA	0–5000µA
Resolution:	0.1µA	0.1µA
Accuracy (at 25°C):	±2µA	±2µA
Photodiode Responsivity		
Range:[10]	0.00–1000.00µA/mW	0.00–1000.00µA/mW
Resolution:	0.01µA/mW	0.01µA/mW
Optical Power		
Range:	0.0–5000.0mW	0.0–5000.0mW
Resolution:	100µW	100µW
Forward Voltage		
Range:	0.00–7.5V	0.00–7.5V
Resolution:[11]	10mV	10mV
Accuracy:[12, 13]	±7mV	±7mV

CURRENT SOURCE NOTES

1. All values relate to a one-hour warm-up period.
2. Over any one-hour period, half-scale output.
3. Over any 24-hour period, half-scale output.
4. Measured optically, evaluating noise intensity of a laser diode into a photo detector with 160kHz bandwidth.
5. Maximum output current transient resulting from normal operational situations (e.g., power on-off, current on-off), as well as accidental situations (e.g., power line plug removal).
6. Maximum output current transient resulting from a 1000V power-line transient spike. Tested to ILX Lightwave Technical Standard #LDC-00196. Request ILX Application Note #3 "Protecting Your Laser Diode."
7. Maximum monitor photodiode current drift over any 30-minute period. Assumes zero drift in responsivity of photodiode.
8. Modulation input is 50Ω terminated inside the mainframe.
9. 50% modulation at mid-scale output, 1Ω load (3916338) 0.5Ω load (3926339).
10. Responsivity value is user-defined and is used to calculate the optical power.
11. 1mV through GPIB
12. Four-wire voltage measurement while driving calibration load. Specification valid for values above 10mV.
13. Accuracy is ±2mV through GPIB.

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

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

www.ilxlightwave.com

For information call
1-800-459-9459

International Inquiries: 406-556-2481
email: sales@ilxlightwave.com

REV02.070505

LDC 3926

16-Channel High Power Laser Diode Controller

Controller Modules (Laser and TE Control)

CURRENT SOURCE[1]	3916372 500mA/9W	3916374 1A/9W	3916376 1.5A/9W
LASER CURRENT OUTPUT			
Output Current Range:	0–500mA	0–1000mA	0–1500mA
Setpoint			
Resolution:	10µA	20µA	40µA
Accuracy:	±0.1% of FS	±0.1% of FS	±0.1% of FS
Compliance Voltage:	6V (adjustable voltage limit)	6V (adjustable voltage limit)	4.75V (adjustable voltage limit)
Temperature Coefficient:	<50ppm/°C	<50ppm/°C	<50ppm/°C
Short-Term Stability (one-hour):[2]	<20ppm	<20ppm	<20ppm
Long-Term Stability (24-hours):[3]	<50ppm	<50ppm	<50ppm
Noise and Ripple[4]			
High Bandwidth:	<30µA rms	<24µA rms	<24µA rms
Low Bandwidth:	<24µA rms	<22µA rms	<20µA rms
Transients			
Operational:[5]	<3mA	<3mA	<3mA
1 kV EFT:[6]	<4mA	<5mA	<5mA
Surge:	<8mA	<10mA	<10mA
LASER DRIVE LIMIT SETTINGS			
Current Limit			
Range:	0–500mA	0–1000mA	0–1500mA
Resolution:	0.2mA	0.4mA	0.6mA
Accuracy:	±0.7mA	±1.4mA	±4.5mA
Voltage Limit			
Range:	0–7.5V	0–7.5V	0–7.5V
Resolution:	0.1V	0.1V	0.1V
Accuracy:	±0.2V	±0.2V	±0.2V
PHOTODIODE FEEDBACK			
Type:	Differential 10Ω Input Selectable Zero Bias or 5V Reverse Bias on all modules		
Photodiode Current Range:	0–5000µA	0–5000µA	0–5000µA
Output Stability:[7]	±0.01%	±0.01%	±0.01%
Setpoint Accuracy:	±0.1% of FS	±0.1% of FS	±0.1% of FS
EXTERNAL ANALOG MODULATION			
Input:[8]	0–10V, 50Ω	0–10V, 50Ω	0–7.5V, 50Ω
Transfer Function:	50mA/ V	100mA/ V	200mA/ V
High Bandwidth Mode			
Small Signal Bandwidth:[9]	DC to 1.2MHz	DC to 1.0MHz	DC to 0.9MHz
Large Signal Bandwidth:[10]	DC to 1.0MHz	DC to 1.0MHz	DC to 0.9MHz
Low Bandwidth Mode:	DC to 30kHz	DC to 30kHz	DC to 30kHz
LASER CURRENT MEASUREMENT (DISPLAY)			
Output Current			
Range:	0–500.00mA	0–1000.0mA	0–1500.0mA
Resolution:	0.01mA	0.01mA	0.03mA
Accuracy (at 25°C):	±0.05% of FS	±0.05% of FS	±0.07% of FS
Photodiode Current			
Range:	0–5000µA	0–5000µA	0–5000µA
Resolution:	0.1µA	0.1µA	0.1µA
Accuracy (at 25°C):	±2µA	±2µA	±2µA
Photodiode Responsivity			
Range:[11]	0.0–1000.00µA/mW	0.0–1000.00µA/mW	0.0–1000.00µA/mW
Resolution:	0.01µA/mW	0.01µA/mW	0.01µA/mW
Optical Power			
Range:	0.0–5000.00mW	0.0–5000.00mW	0.0–5000.00mW
Resolution:	100µW	100µW	100µW
Forward Voltage			
Range:	0.00–7.5V	0.00–7.5V	0.00–5V
Resolution:[12]	10mV	10mV	10mV
Accuracy:[13]	±7mV	±7mV	±7mV

CONTROLLER MODULE CURRENT SOURCE NOTES

1 All values relate to a one-hour warm-up period.
2 Over any one-hour period, half-scale output.
3 Over any 24-hour period, half-scale output.
4 Measured optically, evaluating noise intensity of a laser diode into a photodetector with 160kHz bandwidth.
5 Maximum output current transient resulting from normal operational situations (e.g., power on-off, current on-off), as well as accidental situations (e.g., power line plug removal).
6 Maximum output current transient resulting from a 1000V power-line transient spike. Tested to ILX Lightwave Technical Standard #LDC-00196. Request ILX Application Note #3, "Protecting your Laser Diode."
7 Maximum monitor photodiode current drift over any 30-minute period. Assumes zero drift in responsivity of photodiode.
8 Modulation input is 50Ω terminated inside the mainframe.
9 250mA setpoint, 50mA modulation current, 1Ω load.
10 50% modulation at mid-scale output, 1Ω load.
11 Responsivity value is user-defined and is used to calculate the optical power.
12 1mV through GPIB interface.
13 Four-wire voltage measurement while driving calibration load. Specification valid for values above 10mV. Accuracy is ±2mV through GPIB interface.

LDC 3926

16-Channel High Power Laser Diode Controller

Controller Modules (Laser and TE Control) continued

TEMPERATURE CONTROL[1]	3916372 500mA/9W		3916374 1A/9W		3916376 1.5A/9W	
OUTPUT						
Temperature Control Range:[2]	–99°C to 150°C		–99°C to 150°C		–99°C to 150°C	
Thermistor Setpoint:	Resolution	Accuracy[3]	Resolution	Accuracy[3]	Resolution	Accuracy[3]
–20°C to 20°C:	0.1°C	±0.2°C	0.1°C	±0.2°C	0.1°C	±0.2°C
20°C–50°C:	0.2°C	±0.2°C	0.2°C	±0.2°C	0.2°C	±0.2°C
Short-Term Stability (one-hour):[4]	<±0.007°C		<±0.007°C		<±0.007°C	
Long-Term Stability (24-hours):[5]	<±0.01°C		<±0.01°C		<±0.01°C	
Output Type:	Bipolar current source		Bipolar current source		Bipolar current source	
Compliance Voltage:	>7V DC		>7V DC		>7V DC	
Short Circuit Output Current:	1.5A		1.5A		1.5A	
Maximum Output Power:	9 W		9W		9W	
Current Noise and Ripple:[6]	<1mA rms		<1mA rms		<1mA rms	
Current Limit						
Range:	0–1.5A		0–1.5A		0–1.5A	
Accuracy:	±0.05A		±0.05A		±0.05A	
Control Algorithm:	Smart Integrator, Hybrid PI Gain adjustable from 1–127		Smart Integrator, Hybrid PI Gain adjustable from 1–127		Smart Integrator, Hybrid PI Gain adjustable from 1–127	
TEMPERATURE SENSOR						
Types:	Thermistor (2-wire NTC)		Thermistor (2-wire NTC)		Thermistor (2-wire NTC)	
Thermistor Sensing Current:[7]	10/100µA		10/100µA		10/100µA	
Usable Thermistor Range:	25–450,000Ω, typical		25–450,000Ω, typical		25–450,000Ω, typical	
User Calibration:	Steinhart-Hart, 3 constants		Steinhart-Hart, 3 constants		Steinhart-Hart, 3 constants	
TEC MEASUREMENT (DISPLAY)						
Temperature:						
Range:[8]	–99.9°C to 199.9°C		–99.9°C to 199.9°C		–99.9°C to 199.9°C	
Accuracy:	±0.5°C		±0.5°C		±0.5°C	
Thermistor Resistance						
10µA Setting						
Range:	0.01–450.00kΩ		0.01–450.00kΩ		0.01–450.00kΩ	
Accuracy:[9]	±0.05kΩ		±0.05kΩ		±0.05kΩ	
100µASetting						
Range:	0.001–45.000kΩ		0.001–45.000kΩ		0.001–45.000kΩ	
Accuracy:[10]	±0.005kΩ		±0.005kΩ		±0.005kΩ	
TEC Current						
Range:	–1.50 to 1.50A		–1.50 to 1.50A		–1.50 to 1.50A	
Accuracy:	±0.04A		±0.04A		±0.04A	
Current Resolution:	±0.01A		±0.01A		±0.01A	
Voltage						
Range:	–9.999 to 9.999V		–9.999 to 9.999V		–9.999 to 9.999V	
Resolution:[11]	100mV		100mV		100mV	
Accuracy:[12]	±70mV		±70mV		±70mV	

CONTROLLER MODULE TEMPERATURE CONTROL 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 quoted for a typical 10kΩ thermistor and 100µA current setting for –5°C to 50°C, and typical 10kΩ thermistor and 10µA current setting for –20°C to –5°C. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
4 Over any one-hour period, half-scale output, controlling an LDM-4412 mount at 25°C with 10kΩ thermistor on 100µA setting.
5 Over any 24-hour period, half-scale output, controlling an LDM-4412 Mount at 25°C, with 10kΩ thermistor, on 100µA setting.
6 Measured at 1A output over a bandwidth of 10Hz to 10MHz. 3916558 Module noise measured at 2A output over a bandwidth of DC to 25MHz
7 Thermistor current range software selectable by front panel or GPIB. (10µA range not available for 3916371.)
8 Software limits of display range.
9 Using a 10kΩ thermistor, controlling an LDM-4412 mount over –30°C to 65°C (~200–2kΩ) or a 100kΩ thermistor controlling an LDM-4412 mount over 10°C–85°C (~200–10kΩ).
10 Using a 10kΩ thermistor, controlling an LDM-4412 mount over –5°C to 90°C (~45–1kΩ).
11 Resolution 1mV through GPIB interface.
12 Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load used. Accuracy of ±20mV through GPIB interface.

When coupled with the LDM-4616 Modular Laser Diode Mount, the LDC-3926 Multi-channel controller provides a configurable, cost-effective solution for multi-channel, DWDM signal sources. This mount can also support many popular 980nm and 1480nm pump laser diodes for EDFA test applications.

LDC 3926

16-Channel High Power Laser Diode Controller

Dual Current Source Modules*

CURRENT SOURCE[1]	3916332 Dual 500mA	3916334 Dual 1A
LASER CURRENT OUTPUT		
Output Current Range:	0–500mA	0–1000mA
Setpoint		
Resolution:	10µA	20µA
Accuracy:	±0.1% of FS	±0.1% of FS
Compliance Voltage:	6V (adjustable voltage limit)	6V (adjustable voltage limit)
Temperature Coefficient:	<50ppm/°C	<50ppm/°C
Short-Term Stability (one-hour):[2]	<20ppm	<20ppm
Long-Term Stability (24-hours):[3]	<50ppm	<50ppm
Noise and Ripple[4]		
High Bandwidth:	<30µA rms	<24µA rms
Low Bandwidth:	<24µA rms	<22µA rms
Transients		
Operational:[5]	<3mA	<3mA
1kV EFT:[6]	<4mA	<5mA
Surge:	<8mA	<10mA
LASER DRIVE LIMIT SETTINGS		
Current Limit		
Range:	0–500mA	0–1000mA
Resolution:	0.2mA	0.4mA
Accuracy:	±0.7mA	±1.4mA
Voltage Limit		
Range:	0–7.5V	0–7.5V
Resolution:	0.1V	0.1V
Accuracy:	±0.2V	±0.2V
PHOTODIODE FEEDBACK		
Type:	Differential 10Ω Input Selectable Zero Bias or 5V Reverse Bias	Differential 10Ω Input Selectable Zero Bias or 5V Reverse Bias
Photodiode Current Range:	0–5000µA	0–5000µA
Output Stability:[7]	0.01%	0.01%
Setpoint Accuracy:	±0.1% of FS	±0.1% of FS
EXTERNAL ANALOG MODULATION		
Input:[8]	0–10V, 50Ω	0–10V, 50Ω
Transfer Function:	50mA/V	100mA/V
High Bandwidth Mode		
Small Signal Bandwidth:[9]	DC to 1.2MHz	DC to 1.0MHz
Large Signal Bandwidth:[10]	DC to 1.0MHz	DC to 1.0MHz
Low Bandwidth Mode:	DC to 30kHz	DC to 30kHz
LASER CURRENT MEASUREMENT (DISPLAY)		
Output Current		
Range:	0–500.0mA	0–1000.0mA
Resolution:	0.01mA	0.01mA
Accuracy (at 25°C):	±0.05% of FS	±0.05% of FS
Photodiode Current		
Range:	0–5000µA	0–5000µA
Resolution:	0.1µA	0.1µA
Accuracy (at 25°C):	±2µA	±2 µA
Photodiode Responsivity		
Range:[11]	0.00–1000.00µA/mW	0.00–1000.00µA/mW
Resolution:	0.01µA/mW	0.01µA/mW
Optical Power		
Range:	0.0– 5000.00mW	0.0– 5000.00mW
Resolution:	100µW	100µW
Forward Voltage		
Range:	0.00– 7.5V	0.0– 7.5V
Resolution:[12]	10mV	10mV
Accuracy:[13]	±7mV	±7mV

DUAL CURRENT SOURCE NOTES

*Two isolated laser sources in each module.

1 All values relate to a one-hour warm-up period.
2 Over any one-hour period, half-scale output.
3 Over any 24-hour period, half-scale output.
4 Measured optically, evaluating noise intensity of a laser diode into a photodetector with 160kHz bandwidth.
5 Maximum output current transient resulting from normal operational situations (e.g. power on-off, current on-off), as well as accidental situations (e.g. power line plug removal).
6 Maximum output current transient resulting from a 1000V power-line transient spike. Tested to ILX Lightwave Technical Standard #LDC-00196. Request ILX Application Note #3, "Protecting Your Laser Diode."
7 Maximum monitor photodiode current drift over any 30-minute period. Assumes zero drift in responsivity of photodiode.
8 Modulation input is 50Ω terminated inside the mainframe.
9 250mA setpoint, 50mA modulation current, 1Ω load.
10 50% modulation at mid-scale output, 1Ω load.
11 Responsivity value is user-defined and is used to calculate the optical power.
12 1mV through GPIB interface.

LDC 3926

16-Channel High Power Laser Diode Controller

Specifications

GENERAL

Chassis Ground:	4mm Banana Jack
GPIB Connector:	24-pin IEEE-488
RS-232 Connector:	9–pin D–sub
Power Requirements:[1]	100 VAC ±10%, 15A 120 VAC ±10%, 12A 200-240 VAC ±10%, 6A
Size (HxWxD):	133mm x 482mm x 653mm 5.25" x 18.98" x 25.7"
Weight (typical)	
Mainframe Only:	20kg (44lbs)
With Modules:	27kg (59lbs)
Operating Temperature:	0°C to 40°C
Storage Temperature:	–40°C to 70°C
Humidity:[2]	20–85%, non condensing
Laser Safety Features:	Keyswitch, Interlock, Output Delay: (Meets 21 CFR 1040.10)
Display:	Vacuum fluorescent, 64 x 128 pixels 83mm x 41mm

NOTES

1 All channels driving 6A.

2 Based on the vacuum fluorescent display specification.

This product has passed all CE requirements and bears the CE mark.

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

LDC-3926	16-Channel High Power Laser Diode Controller Mainframe
LDC-3926339	6A Current Source Module
LDC-3926559	48W, 6A TEC Temperature Control Module
LDC-3916371	Fine Temperature Resolution 500mA/9W Controller Module
LDC-3916372	500mA/9W Controller Module
LDC-3916374	1A/9W Controller Module
LDC-3916376	1.5A/9W Controller Module
LDC-3916332	500mA/500mA Dual Current Source Module
LDC-3916334	1A Dual Current Source Module
LDC-3916338	3A Current Source Module
LDC-3916550	9W Dual TEC Temperature Control Module
LDC-3916558	3A (24W) TEC Temperature Control Module

Accessories

LNF-320	Low Noise Filter
LDM-4616	16-Channel Butterfly Mount
UCA-350	Unipolar Heater Control Adapter
RM-137	Rack Mount Kit, 20.5" hole spacing
RM-138	Rack Mount Kit, 25" hole spacing
TS-510	Calibrated 10kΩ Thermistor (-20°C to +50°C)
TS-520	Uncalibrated 10kΩ Thermistor (-20°C to +50°C)
TS-521	Uncalibrated 5kΩ Thermistor (-45°C to +30°C)
TS-523	Uncalibrated 20kΩ Thermistor (-10°C to +70°C)
TS-525	Uncalibrated 100kΩ Thermistor (-10°C to +110°C)
LabVIEW® Instrument Driver	

LabVIEW® is a registered trademark of National Instruments.

3926339 and 3926559 Module Cables

CC-306H	6A Current Source/Unterminated Interconnect Cable
CC-501H	Low-R TEC/Unterminated Interconnect Cable

3916 Series Module Cables

CC-305S	Current Source/Laser Diode Mount Interconnect Cable
CC-306S	Current Source/Unterminated Interconnect Cable
CC-355S	Current Source/Laser Diode Mount Interconnect Cable (5 meters)
CC-550S	TE Controller/Laser Diode Mount Interconnect Cable (5 meters)
CC-316M	Laser Current Cables (bundle of 8)
CC-501S	TEC/Unterminated Interconnect Cable
CC-505S	TEC/Laser Diode Mount Interconnect Cable
CC-516M	TEC Cables (bundle of 8)

This product has passed all CE requirements and bears the CE mark.

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: 406-556-2481
email: sales@ilxlightwave.com

REV02.070505