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LDX 3500B Series

Precision Laser Diode Driver

Product Features

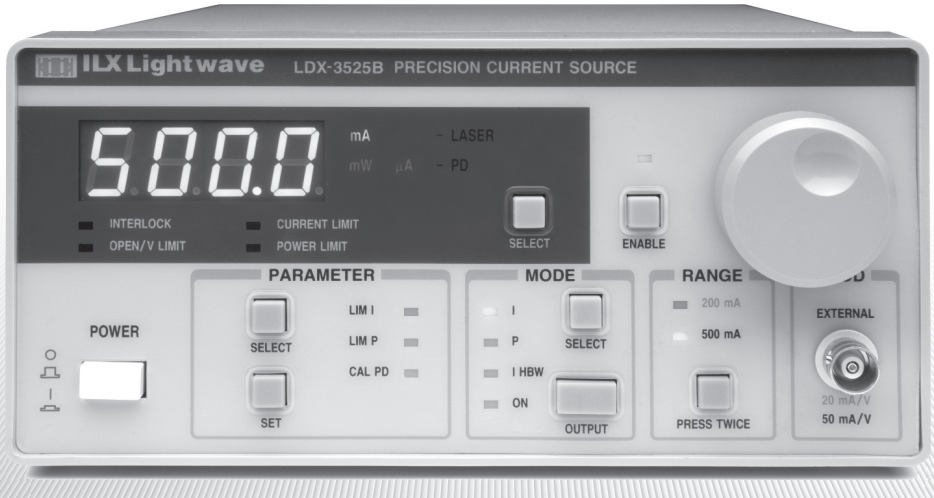
- Three models with source current output up to 6A
- High stability, low noise current output with multi-layered laser diode protection
- Constant current and constant power operating modes
- Analog modulation
- USB 2.0 serial interface

The LDX-3500B Series Laser Diode Drivers are a family of low noise high stability current sources specifically for precision control of low to high power laser diodes. Three models with a full scale output current range from 200 mA to 6A operate in constant current or constant optical power modes to cover a wide range of laser diode testing and control applications. In addition to precision current control, the LDX-3500B Series drivers also feature photodiode current measurement for constant power control, analog modulation for power and wavelength tuning, and an analog output for remote monitoring.

All of ILX Lightwave's proven laser diode protection strategies are designed into each model, which include adjustable current limits, shorting relays, slow turn-on circuits, and transient protection during power up and laser operation.

The front panel was designed for quick and easy operation. Parameters and instrument modes are grouped without confusing multi-function keys or menus. Informative error indicators such as open circuit and current and power limit let you resolve set up and operating problems quickly.

The USB interface and control software allows for fast, repeatable instrument control during R&D and manufacturing testing and other automated control applications.



Precision Laser Diode Driver

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LDX 3500B Series

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PRECISION LASER DIODE TESTING

Each LDX-3500B Series Laser Diode Driver was designed as a current source specifically for low to high power laser diodes. Stable, precision low noise current control with a set point accuracy of 0.1% is delivered to the laser during R&D or manufacturing testing including L-I testing, qualification testing, or automated testing and control applications.

A CHOICE OF LASER CONTROL MODES

The LDX-3500B Series Laser Diode Drivers control the current to the laser diode in one of three modes:

1. Constant Current low bandwidth
2. Constant Current high bandwidth
3. Constant Optical Power

The Constant Current, low bandwidth mode offers improved noise performance and is optimized for DC operation.

In Constant Current high bandwidth mode, the output stage supports higher modulation frequencies, up to 500 kHz, for dithering the laser current for power and wavelength tuning. For laser protection, the modulation input is implemented as a differential input, allowing the modulation control voltage and laser outputs to use different grounds.

The Constant Power mode provides constant optical power operation of your laser diode by using the photocurrent from the laser's rear facet photodiode or from an external photodiode measuring front facet light in a feedback control loop to the current source for precise and stable optical power control.

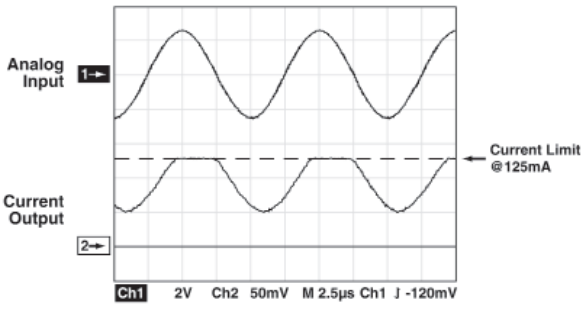
DESIGNED TO PROTECT YOUR LASER DIODE

The LDX-3500B Series Laser Diode Driver provides multiple laser diode protection features such as independent hardware current limits, slow-start turn-on circuits, and isolated supplies. The output of the drivers are bound by fully independent current limits.

A "clamping" circuit topology prevents the limits from being exceeded under any condition including current modulation. An output shorting switch provides a safe method of switching the output on and off during operation while protecting the laser during load/unload or connect/disconnect operations.

Also, if the instrument senses an open circuit, the output will immediately shut off followed by the illumination of the appropriate fault indicator.

During AC power-up, the laser is protected from current transients by power line filters, double shielded transformers and hardware and firmware turn-on sequencing. When the output is enabled, slow start circuits gradually open shorting FETs allowing current to slowly be diverted to the laser. Transients from normal instrument operation such as output on/off have been thoroughly tested and minimized as well as transients from inadvertent instrument operation (such as mode switching).



Each of the 3500B Series Current Sources feature a current limit "clamping" topology which prevents the limit from being exceeded under any condition including current modulation.

AUTOMATE LASER DIODE CONTROL AND TESTING

Remote instrument operation is available on all LDX-3500B Series Laser Diode Drivers through a USB 2.0 serial interface. All instrument controls and functions are accessible through the serial interface for easy remote programming and control in automated test and control systems where repeatable and accurate test sequencing, measurements, and data handling are required.

LabVIEW™ software drivers are available with each instrument, facilitating instrument set up and control. Through these drivers, instrument controls are organized similar to the front panel for easy, intuitive remote control and monitoring.

LDX 3500B Series

Precision Laser Diode Driver



The USB interface allows for quick, effortless remote control for fast, repeatable instrument control during L-I testing and R&D or manufacturing control applications.

Whether the application is data intensive L-I testing or control in R&D manufacting testing, remote operation of the LDX-3500B saves time and ensures systematic data collection and instrument operation.

SIMPLIFY ROUTINE MAINTENANCE

The LDX-3500B architecture simplifies routine maintenance; calibration of the laser current source can be performed via the front panel or remotely through the USB 2.0 interface, without opening the instrument up or manual adjustments. A calibration mode is entered through unique push button combinations or control commands, and all calibration data is easily entered via the front panel with the adjust knob or commands. Calibration data is automatically stored in on-board non-volatile memory.

EASE OF OPERATION

The LDX-3500B Series Laser Diode Drivers are microprocessor controlled instruments. The front panel of the LDX-3500B Series was designed for quick and easy instrument operation and information display. A bright five digit, green LED display is easy to read from a distance, even with laser safety glasses. Parameters and instrument modes are grouped without confusing multi-function keys. Informative error indicators such as open circuit, current and power limit let the user resolve set-up and operational problems quickly.

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 up by industry leading after sales support. For more information about the LDX-3500B Series Current Sources and our complete family of laser diode instrumentation and test systems, call us today or visit www.newport.com/ilxlightwave.

LDX 3500B Series

Precision Laser Diode Driver

Specifications[1]

	LDX-3525B	LDX-3545B	LDX-3565B
CURRENT OUTPUT			
Output Current Range:	200mA / 500mA	1000mA / 3000mA	2000mA / 6000mA
Setpoint Resolution:	12 bit (100 µA / 150 µA)	12 bit (250 µA / 750 µA)	12 bit (500 µA / 1.5mA)
Setpoint Accuracy (% of FS):[2]	±0.1% (±.2mA / ±.5mA)	±0.1% (±1mA / ±3mA)	±0.15% (±2mA / ±6mA)
Compliance Voltage:	7.0 V	6.0 V[3]	5.0 V[4]
Temperature Coefficient:	<50 ppm/°C	<50 ppm/°C	<50 ppm / <100 ppm/°C
Short-Term Stability (1 hr):[5]	<20 ppm	<20 ppm	<20 ppm
Long-Term Stability (24 hr):[6]	<50 ppm	<50 ppm	<50 ppm
Noise and Ripple (rms)[7]			
High Bandwidth Mode:	<4 µA rms /<4 µA rms	<25 µA rms /<25 µA rms	<50 µA rms /<100 µA rms
CW Mode:	<2 µA rms /<2 µA rms	<15 µA rms /<15 µA rms	<15 µA rms /<30 µA rms
Transients			
Operational: [8]	<1mA / <1mA	<2mA / <5mA	<30mA / <40mA
Power-line Induced: [9]	<10mA / <10mA	<20mA / <20mA	<20mA / <40mA
DRIVE CURRENT LIMIT SETTINGS			
Range:	0– 202.0mA / 0–505.0mA	0–1010mA / 0–3030mA	0–2020mA / 0–6060mA
Resolution:	1mA / 2mA	4mA / 12mA	8mA / 24mA
Accuracy (% of FS):	±1%[14]	±1%	±1%
PHOTODIODE FEEDBACK[13]			
Type:	Differential	Differential	Differential
Reverse Bias:	0–5 V, adjustable	0–5 V, adjustable	0–5 V, adjustable
Photodiode Current Range:	0–5000 µA	5–9999 µA	0.01–25mA
Output Stability: [10]	±0.01%	±0.02%	±0.02%
Setpoint Accuracy (% of FS):[2]	±0.1% (±5 µA)	±0.1% (±5 µA)	±0.1% (±5 µA)
Power Modulation BW:	1 kHz	1 kHz	1 kHz
ANALOG MODULATION			
Input:	0–10 V, 1 kΩ	0–10 V, 1 kΩ	0–10 V, 1 kΩ
Transfer Function (±15%):	20mA/V / 50mA/V	100mA/V / 300mA/V	200mA/V / 600 mA/V
Bandwidth (3dB)[11]			
High Bandwidth Mode:	DC–500 kHz / DC–150 kHz	DC–150 kHz / DC–50 kHz	DC–100/ DC–50 kHz
CW Mode:	DC–100 Hz / DC–100 Hz	DC–100 Hz / DC–100 Hz	DC–80 Hz / DC–80 Hz
ANALOG OUTPUT			
Output Voltage:	0–10 V	0–10 V	0–10 V
Transfer Function (±15% of FS):	20mA/V / 50 mA/V	100mA/V / 300 mA/V	200mA/V / 600 mA/V
MEASUREMENT (DISPLAY)			
Display Type:	4 digit green LED	4 digit green LED	4 digit green LED
Output Current Range:	0–200.0mA / 0–500.0mA	0–999.9mA / 0–3000mA	0–2000mA / 0–6000mA
Output Current Resolution:	0.1mA /0.1mA	0.1mA / 1.0mA	1.0mA / 1.0mA
Output Current Accuracy:	±0.1% of FS	±0.1% of FS	±0.15% of FS
Photodiode Current Range:	0–5.000mA	0–9.999mA	0–25.00mA
Photodiode Current Resolution:	0.001mA	0.002mA	0.01mA
Photodiode Current Accuracy:	±0.1% of FS	±0.1% of FS	±0.1% of FS
Photodiode Resposivity Range:[12]	0.001–1.000 mA/mW	0.001–1.000 mA/mW	0.001–1.000 mA/mW
Photodiode Responsivity Resolution:	0.001 mA/mW	0.001 mA/mW	0.001 mA/mW
Optical Power Range:	0–500.0 mW	0–3000 mW	0–6000 mW
Optical Power Resolution:	0.1 mW	1 mW	1 mW

CONNECTORS

Current Source Output:	9-pin, D-sub female
PD Input:	BNC rear panel; 9-pin D-sub laser connector
Modulation Input:	BNC front panel
Analog Output:	BNC rear panel
Chassis Ground:	4 mm Banana Jack
Interlock:	9-pin D-sub laser connector

LASER DIODE PROTECTION

Output Shorting Relay:	Normally closed
Output Enable Delay:	2s (per 21CFR 1040.10)
Current Limit:	Adjustable, redundant hardware limit
AC Power Failure / Brown-out Protection	
Hardware Fault Response Time	
Current Limit:	Continuous operation
Voltage Limit	5µS
Open Circuit:	50µS
Error Monitoring / Reporting:	Current limit, voltage limit, open circuit, optical power limit, interlock

GENERAL

Power Requirements, VAC (50–60Hz):	95–125, 210–250
Remote Interface:	USB 2.0
Size (HxWxD):	88 mm x 185 mm x 304 mm 3.5"x 7.3"x12.5"
Weight (LDX-3525B and LDX-3545B):	3.5 kg (7.65 lbs)
Weight (LDX-3565B):	4.6 kg (10.15 lbs)
Operating Temperature:	10°C to 40°C
Storage Temperature:	–40°C to 70°C
Humidity:	<85% relative, noncondensing
Laser Safety:	Keyswitch, Interlock, Output Delay (meets 21 CFR 1040.10),all models
Regulatory Compliance:	CE certified EN 61326-1:2006 Basic Requirements; Immunity EN 55011:2007 Radiated and Conducted Emissions EN 61010-1 Safety Requirements EN 60950 Low Voltage Directive

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

NOTES

1 All values measured after a one hour warm-up period.
2 Measured at 25°C ambient.
3 Maximum compliance voltage of 5V @ 95VAC input
4 Maximum compliance voltage of 3.5V @ 95VAC input
5 Over any 1-hour period, half-scale output @ 25°C ambient
6 Over any 24-hour period, half-scale output @ 25°C ambient
7 Measured electrically, with a resistive load evaluating AC coupled rms value over a 100 kHz bandwidth.
8 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). Tested to ILX Technical Standard #LDC-00196.
9 Maximum output current transient resulting from a 1000V power line transient spike. Tested to ILX Technical standard #LDC-00196. Request ILX Application Note #3.
10 Maximum monitor photodiode current drift over any 30-minute period. Assumes zero drift in photodiode responsivity.
11 Assumes 50% modulation depth at half-scale output into a 1Ω load.
12 The responsivity value is user-defined and is used to calculate the optical power.
13 Laser diodes which have voltages above 1.2V when the current is <0.4% of range may trigger the instrument to shut down the output in constant power mode. In order to determine if your laser will function in constant power mode, please contact ILX Lightwave.
14 ± 2% for limit settings ≤20 mA.

ORDERING INFORMATION

LDX-3525B-120V	Precision Laser Diode Driver (200/500 mA), 120V
LDX-3525B-220V	Precision Laser Diode Driver (200/500 mA), 220V
LDX-3545B-110V	Precision Laser Diode Driver (1/3 A), 120V
LDX-3545B-220V	Precision Laser Diode Driver (1/3 A), 220V
LDX-3565B-120V	Precision Laser Diode Driver (2/6 A), 120V
LDX-3565B-220V	Precision Laser Diode Driver (2/6 A), 220V
CC-305S	Current Source/Laser Diode Mount Interconnect Cable
CC-306S	Current Source/Unterminated Interconnect Cable
LNF-320	Low Noise Filter
RM-134	Single Rack Mounting Kit
RM-135	Dual Rack Mounting Kit

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