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LDX 3620B

Ultra Low Noise Laser Diode Current Source

Product Features

- Battery operated dual range 200mA/500 mA current source
- <100 nA rms noise in battery mode
- Better than 10ppm stability over one hour
- Constant current and constant power operating modes
- Laser diode protection and error detection circuits protect lasers in all operating modes
- Two modulation inputs with up to 1MHz bandwidth for precise laser tuning
- Battery charge mode with front panel charge level indication

The LDX-3620B is a battery powered, ultra low noise current source, optimized for narrow linewidth or stable wavelength laser diode applications. The all new instrument provides a precision current output with <100 nA rms noise and <10ppm stability. The current source can be operated in one of two output ranges in constant current or constant power operating modes. Additionally, two AC or DC coupled modulation inputs, fine and coarse, can control the current source for precise laser diode wavelength or linewidth tuning with a bandwidth up to a 1 MHz.

All of ILX Lightwave's proven laser diode protection features are designed into each model, which include adjustable current limits, a floating output, shoring relays, slow turn-on circuits, and transient protection during power up and laser operation. Error indicators help resolve set up problems quickly such as open circuit and power limits.

Additional features include long battery life between charges, a battery charge mode and front panel charge indicator making the LDX-3620B a reliable test instrument for low noise, precision laser wavelength control applications. The LDX-3620B is compatible with a large selection of ILX Lightwave laser diode TO-can, butterfly, and DIL laser mounting fixtures with interconnect cables for fast, easy system set up.



Battery Powered Ultra Low Noise Laser Diode Current Source

ILX Lightwave
Laser Diode Instrumentation & Test Systems

LDX 3620B

Ultra Low Noise Laser Diode Current Source

ULTRA LOW NOISE AND HIGH STABILITY

A lead acid battery and careful design and attention to detail in component selection, instrument and circuit board design allow the LDX-3620B to achieve an order of magnitude lower noise levels than AC powered current sources.

With proper cabling and laser diode mounting, current noise levels of <100 nA can be achieved; critical performance for spectroscopic, coherent communications, and other applications requiring narrow linewidths.

The same attention to detail also allows the LDX-3620B to achieve current source stability on the order of 10ppm over any one hour period in any instrument mode of operation.

LASER DIODE PROTECTION

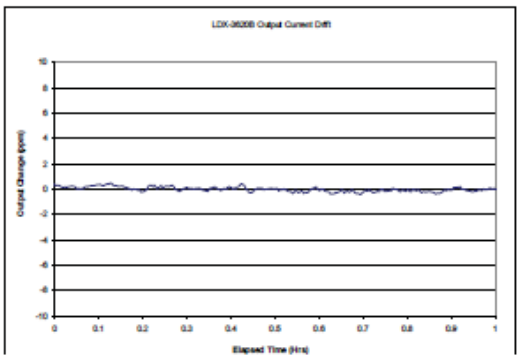
Laser diodes are extremely sensitive to electro-static discharge, excessive current levels, current spikes or transients from power surges or other laboratory equipment. The LDX-3620B protects laser diodes from these potentially damaging events through instrument features such as adjustable current limit and circuit design. Slow start circuits minimize power up transients and a shorting relay across the output maintains the laser leads at the same potential until the output is enabled.

Instrument current source response is tested to IEC surge and electrically fast transients (EFT) standards. The current source output is floating relative to chassis ground to prevent any potentially damaging common ground coupling between instruments or machinery and the laser diode.

A CHOICE OF LASER CONTROL MODES

The LDX-3620B can be operated at full-scale current in constant current low bandwidth, constant current high bandwidth or constant optical power mode. The constant current low bandwidth mode provides stable DC current to the laser diode while offering lowest current noise. In constant current high bandwidth mode, an external control voltage is summed into the output current stage allowing DC or modulated voltage control of the output up to a 1 MHz bandwidth. For laser protection, the modulation port is implemented as a differential input allowing the control voltage and the instrument's laser output to use different grounds.

The constant power mode maintains constant optical operation of the laser diode by measuring the photocurrent from the diode's rear-facet photodiode, or from an external photodiode in a feedback control loop to the current source. Coarse and fine gain adjustments on the front panel are provided to scale the display to the full scale laser operating point and permit the feedback circuit to operate over a wide range of photodiode current.



The LDX-3620B delivers ≤10ppm output current drift over a one hour operating time.

EXTERNAL CURRENT CONTROL

The current output of the LDX-3620B can be controlled by an external voltage source; either a DC signal or an alternating waveform for applications requiring DC biasing and/or linewidth broadening, wavelength control or amplitude modulation. One or two external voltage wave forms can be used to modulate the output current through the front panel modulation input ports. Both inputs can be AC or DC coupled to the current source drive circuits. The transconductance of each input differs by a factor of 10 for modulated and error signal summing to the drive circuits. In all modes of operation, the voltage inputs are summed with the front panel current controls for current control to the laser.

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Ultra Low Noise Laser Diode Current Source



The LDX-3620B is compatible with a large selection of laser diode mounts.
Shown is the LDX-3620B with an LDM-4412 TO-Can laser diode mount.

LONG LIFE BATTERIES

The LDX-3620B can be operated up to 16 hours on a full charge making it ideal for overnight testing.

Monitoring the battery charge level any time during instrument operation is easy with a front panel battery charge indicator. Pushing the switch on the left of the display indicates a charge level up to 100% in 25% intervals.

The internal batteries provide the benefits of lower noise without the drawbacks of battery powered instruments. Lead acid batteries with good charge retention and charge recoverability were chosen. A DC input to the instrument with a battery charge mode is provided for charging the batteries even during instrument operation.

Low battery circuits were designed into the instrument to safely shut down the instrument if the battery charge gets below required instrument operating levels.

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 LDX-3620B, call us today or visit us at www.ilxlightwave.com.

LDX 3620B

Ultra Low Noise Laser Diode Current Source

Specifications

DRIVE CURRENT OUTPUT[1]

Output Current Range:	0 to 200 mA	0 to 500 mA
Compliance Voltage:	< 5V	< 5V
Temperature Coefficient:	< 20 ppm / °C	< 20 ppm / °C
Short Term Stability:[2]		
5 minutes:	< 4 ppm	< 4 ppm
30 mintues:	< 10 ppm	< 10 ppm
1 hour:	< 10 ppm	< 10 ppm
Long Term Stability (12 hours): [2]	< 50 ppm	< 50 ppm
Noise and Ripple (rms):[3]		
Charge Mode Operation		
Low Bandwidth Mode (100 Hz):	< 1.0 µA	< 1.0 µA
Low Bandwidth Mode (100 KHz):	< 2.0 µA	< 2.0 µA
High Bandwidth Mode (100 KHz):	< 3.0 µA	< 3.0 µA
High Bandwidth Mode (1 MHz):	< 5.0 µA	< 7.0 µA
Battery Operation		
Low Bandwidth Mode (100 Hz):	< 70 nA	< 120 nA
Low Bandwidth Mode (100 KHz):	< 250 nA	< 400 nA
High Bandwidth Mode (100 KHz):	< 600 nA	< 900 nA
High Bandwidth Mode (1 MHz):	< 750 nA	< 2.0 µA
Transients: [4]		
Operational (output on/off):	< 10 µA	< 10 µA
Operational (power on/off):	< 1mA	< 1 mA

DRIVE CURRENT LIMIT SETTINGS

Range:	10 to 500 mA
Accuracy (% of FS):	±5 mA

PHOTODIODE FEEDBACK

Type:	Differential	Differential
PD Current Input Range:	20 to 2000.0 µA	20 to 2000.0 µA

EXTERNAL ANALOG MODULATION

Input 1:	10V	10V
Transfer Function:	2 mA/V	5 mA/V
Bandwidth (3dB; DC coupled)[6]		
High Bandwidth Mode:	DC to 1 MHz	DC to 1 MHz
Low Bandwidth Mode:	10 kHz	10 kHz
Bandwidth (3dB; AC coupled)[6]		
High Bandwidth Mode:	100 Hz to 1 MHz	100 Hz to 1 MHz
Low Bandwidth Mode:	100 Hz to 10 kHz	100 Hz to 10 kHz
Input Impedance:	1 KΩ	1 KΩ
Input 2:	10V	10V
Transfer Function:	20 mA/V	50 mA/V
Bandwidth (3dB; DC coupled)[6]		
High Bandwidth Mode:	DC to 1 MHz	DC to 1 MHz
Low Bandwidth Mode:	10 kHz	10 kHz
Bandwidth (3dB; AC coupled)[6]		
High Bandwidth Mode:	100 Hz to 1 MHz	100 Hz to 1 MHz
Low Bandwidth Mode:	100 Hz to 10 kHz	100 Hz to 10 kHz
Input Impedance:	1 KΩ	1 KΩ

MEASUREMENT

Output Current Range:	0 to 199.99 mA	0 to 500.0 mA
Output Current Resolution:	0.01 mA	0.1 mA
Output Current Accuracy:	0.1% FS	0.2% FS
Photodiode Current Range:	0 to 1999.9 µA	0 to 1999.9 µA
Photodiode Current Resolution:	0.1 µA	0.1 µA
Photodiode Current Accuracy:	±4 µA	±4 µA

INPUT/OUTPUT CONNECTORS

Photodiode:	9-pin d-sub rear panel; BNC, rear panel
Modulation (Input 1):	BNC, front panel
Modulation (Input 2):	BNC, front panel
Laser Current Source:	9-pin d-sub rear panel
DC Power Supply:	Standard Type R1B: DIN 5-pin

GENERAL

DC Input Power Requirements:	100VAC - 120VAC ±10%, 47 to 63 Hz 220VAC - 230VAC ±10%, 47 to 63 Hz
Maximum Current Draw	
100VAC to 120VAC:	1.6A
220VAC to 240VAC:	1.6A
Batteries	
Battery Operation Time:[7]	16 hours
Battery Charge Time:	15 hours
+12V Supply	
Type:	Lead acid
Capacity:	12 amp-hour
Charge Operating Temperature:	0 - 40°C
Discharge Operating Temperature:	-20°C - 50°C
Weight:	3.94 kg (8.68 lbs)
-12V Supply	
Type:	Lead acid
Capacity:	2.2 amp-hour
Weight:	0.94 kg (2.07 lbs)
Size (HxWxD):	5" x 13.4" x 16.3" 127mm x 340mm x 414mm
Weight:	25.4 lbs.; 11.11 kg
Operating Temperature:	0°C to 40°C
Storage Temperature:	-40°C to 60°C
Humidity:	Up to 80%, non-condensing
Regulatory Compliance:	CE Certified; EMC Directive 2004/108/EC per standard EN61326-1:2006; Low Voltage Directive 2006/96/EC per standard EN61010-1:2001

NOTES

1. Unless otherwise noted, all specifications measured at 23°C ±3°C after one-hour warm-up period.
2. Over the specified period, half-scale output into a temperature controlled resistive load.
3. Measured electrically, with a 24Ω load evaluating AC coupled rms value over the specified bandwidth.
4. 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).
5. Internal specification only, not to be published.
6. Sine wave with 5V peak to peak modulation at half scale output
7. Battery operating time is the same for both 200 mA and 500 mA ranges, instrument circuitry draws 500 mA in either current range.
8. Measurement accuracy specification becomes non-linear after 180mA in 200mA range and at 1800uA for photodiode current measurement. Total non-linearity error not to exceed ±0.2% of current measurement full scale or ±4uA of photodiode measurement current.

ORDERING INFORMATION

LDX-3620B	Ultra Low Noise Current Source
CC-305S	Current Source/LD Mount Interconnect Cable
CC-306S	Current Source Unterminated Interconnect Cable
LDM-4412	Temperature Controlled TO-can Laser Diode Mount with Collimating Lens
LDM-4405	Low Cost TO-Can Laser Diode Mount
LDM-4407	Temperature Controlled TO-can Laser Diode Mount
LDM-4982	DIL Laser Diode Mount
LDM-4984	Butterfly Laser Diode Mount

Other laser diode mounts are available; contact sales@ilxlightwave.com for more information.

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

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