

Product Features

4A high stability, low noise driver with up to 15V compliance

Designed specifically for quantum cascade lasers

Laser current modulation to 250kHz

Precision 4-wire forward voltage measurement

Laser diode protection including adjustable compliance voltage, independent current limits, and intermittent contact protection

Over temperature input shuts off current source output

GPIB/IEEE-488 interface and trigger output

The LDX-3232 High Compliance Laser Diode Current Source is the industry's only laser diode driver specifically developed for controlling high compliance voltage devices such as quantum cascade laser diodes. Careful attention to design allows these drivers to deliver up to 4A of low noise current at up to 15V with a stability of better than 20ppm. This performance is critical for development of room temperature quantum cascade lasers and spectroscopic applications using quantum cascade lasers. This new current source joins ILX Lightwave's LDX-3200 Series Laser Diode Drivers, which are known throughout the industry for their reliability, precision, and ease-of-use.

In addition to precision current control, the LDX-3232 is loaded with standard features such as dual current ranges, constant power control, fine/coarse setpoint control, laser current and voltage measurement, photodiode current display modes, forward voltage adjustment and measurement, and an external modulation input.

Furthermore, all of ILX Lightwave's proven laser diode protection strategies have been designed into each model including slow start, adjustable current limits and compliance voltage, intermittent contact protection, and shorting relays. In addition, the LDX-3232 accepts a TTL input that can be configured to turn off the output to the laser diode in an over-temperature condition.

LDX 3232

High Compliance Laser Diode Driver



For CW Quantum Cascade Laser Diodes and other High Power Laser Modules

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

LDX 3232

High Compliance Laser Diode Driver

Remote operation in an R&D or production environment is afforded through the GPIB/IEEE488 interface and a TTL output trigger. For virtual instrument programming, LabView® instrument drivers are available free-of-charge on request or can be downloaded from the ILX website

HIGH COMPLIANCE PRECISION LASER DIODE DRIVER

The LDX-3232 Driver offers a precision 16-bit current source delivering 0.05% setpoint accuracy in two user-selectable ranges of 2A and 4A for laser diodes and modules requiring high compliance voltage up to 15V. Careful attention to design delivers as low as 20ppm stability and 20 μ A of noise, ensuring user confidence with consistency and precision in laser wavelength and power stability for sensitive spectroscopic measurement applications.

The laser driver's current source can be operated in one of three modes:

1. Constant current, CW
2. Constant current, high bandwidth
3. Constant light power

The CW mode offers improved laser protection and noise performance and is optimized for DC operation. In high bandwidth mode, the output stage supports laser current modulation at frequencies up to 250kHz for wavelength tuning and control in sensitive spectroscopic measurement applications. The modulation port is implemented as a differential input, allowing the modulation control voltage and laser output to use different grounds.

The constant light power mode provides constant optical power at the laser diode by using the photocurrent from the laser diode's rear facet monitor or an external photodiode as an input through the 9-pin connector on the rear panel in a feedback control loop to the laser driver output stage. If the photo-diode responsivity is known, the driver can act as a power meter by entering the responsivity through the front panel controls or through GPIB.

SAFEGUARD YOUR LASER INVESTMENT

ILX Lightwave has implemented rigorous laser diode protection standards as described in our Technical Standard LDC-00196. These standards have lead to advanced protection features, which are designed into the LDX-3232 to ensure protection for your laser diode under all operating conditions.

Laser diode protection features include independent current limits under CW and modulated operating conditions and exclusive braid-shielded cables specifically designed to suppress radiated noise and transients commonly found in laboratory or production environments. During AC power up, careful turn-on sequencing and redundant output shorting circuits protect the laser from current transients. When the output is enabled, a slow start circuit gradually opens the output circuits. Current is withheld from the output until the control circuits are fully active and all circuit transients have died out. Fast monitoring, turn off circuits, and adjustable compliance voltage protect against intermittent contact at the diode.

A new laser diode protection feature was designed into the LDX-3232 to protect expensive higher power laser diodes and modules in an over-temperature condition. A TTL interlock input at the rear panel of the instrument is monitored and under a "low" condition, the output of the current source will be disabled.

EASE OF OPERATION

Designed for quick and easy operation, the LDX-3232 laser diode driver displays information without confusing multi-layer menus. All of the instrument's parameters (except for PD bias) and operation modes are logically grouped by function with easy-to-use pushbuttons and indicating LEDs. A digital potentiometer with a large adjustment knob simplifies current source setpoints and limit adjustments, and a "Fine Adjustment" mode enables higher precision control of the current source output and, ultimately, the laser diode. Laser

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current modulation is easy with a BNC input from the front panel.

Remote operation is available with the built-in IEEE/GPIB interface for easy remote programming and control in automated test systems where repeatable and accurate test sequencing, measurements, and data handling are required. All instrument controls and functions are accessible through the GPIB/IEEE-488 interface. For virtual instrument programming, LabView® drivers are available on request or through the ILX website.

The LDX-3232 architecture simplifies routine maintenance with the ability to perform closed case calibration through the front panel or the GPIB interface.

SAVE AND RECALL

For repeat applications with unique operating parameters, the LDX-3232 offers a SAVE and RECALL feature. The SAVE feature stores all the front panel settings for any given instrument condition; up to 10 instrument settings can be saved. Any saved instrument setting can easily be reset by using the RECALL feature where the condition is retrieved with a single button press.

PUT OUR EXPERTISE TO WORK

ILX Lightwave is a recognized world leader in laser diode test instrumentation. Our products are known for their reliability, quality, and value, and they're backed by strong after-sales support. For more information about the LDX-3232 High Compliance Laser Diode Driver and our complete family of Laser Diode Instrumentation, Power Meters, and Fiber Optic Sources, call us today or visit our website at www.ilxlightwave.com.

Specifications

DRIVE CURRENT OUTPUT¹

Output Current Range:	0 to 2000mA	0 to 4000mA
Setpoint Resolution: ²	40µA	80µA
Setpoint Accuracy:	±0.15% of SP ±2 mA	±0.15% of SP ±2 mA
Compliance Voltage:	0–15V, adjustable	0–15V, adjustable
Temperature Coefficient:	<100ppm/°C	<100 ppm/°C
Short Term Stability (1 hr.): ³	<20ppm	<20 ppm
Long Term Stability (24 hr.): ⁴	<40ppm	<40 ppm
Noise and Ripple (rms) ⁵		
High Bandwidth Mode:	<20µA	<40µA
Low Bandwidth Mode:	<20µA	<20µA
Transients:		
Operational: ⁶	<4mA	<4mA
1kV EFT/Surge: ⁷	<8mA	<8mA

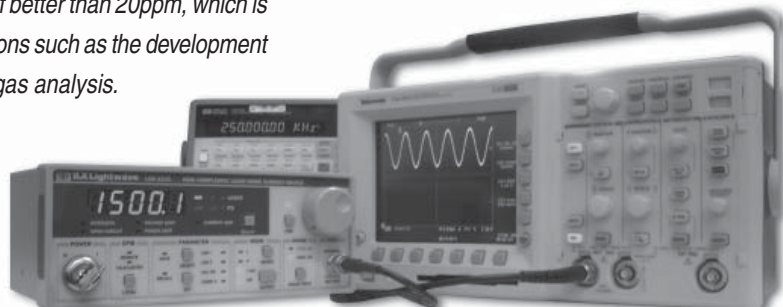
COMPLIANCE VOLTAGE ADJUST

Range:	0–15V	0–15V
Resolution:	60mV	60mV
Accuracy:	±2.5%	±2.5%

VOLTAGE MEASUREMENT

Range:	0–15V	0–15V
Resolution:	1mV	1mV
Accuracy:	±2mV	±2mV

The LDX-3232 Laser Diode Driver delivers up to 4A at 15V of low noise current with a stability of better than 20ppm, which is critical for spectroscopic applications such as the development of new laser optical sensors for gas analysis.



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Specifications

DRIVE CURRENT LIMIT SETTINGS

Range:	1 to 2020mA	1 to 4040mA
Resolution:	10mA	20mA
Accuracy:	±20mA	±40mA

PHOTODIODE FEEDBACK

Type:	Differential	Differential
PD Reverse Bias:	0-5V, Adjustable	0-5V, Adjustable
PD Current Range:	5 to 10000µA	5 to 10000µA
Output Stability: ³	±0.02%	±0.02%
Accuracy, setpoint (% of FS):	±0.05%	±0.05%

EXTERNAL ANALOG MODULATION

Input:	0-10V, 1 kΩ	0-10V, 1 kΩ
Transfer Function:	200mA/V	400mA/V
Bandwidth (3dB) ⁹		
High Bandwidth Mode:	DC to 250kHz	DC to 250kHz
Low Bandwidth Mode:	DC to 10kHz	DC to 10kHz

INTERLOCK INPUT

Type: ¹⁰	TTL; edge triggered, active low	TTL; edge triggered, active low
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TRIGGER OUTPUT

Type:	TTL	TTL
Pulse Width:	13µs	13µs
Delay:	12ms	12ms

MEASUREMENT (DISPLAY)

Output Current		
Range:	0 to 2000.0mA	0 to 4000.0mA
Resolution: ¹¹	0.1mA	0.1mA
PD Current		
Range:	0 to 10000µA	0 to 10000µA
Resolution:	1µA	1µA
Accuracy:	±4µA	±4µA
PD Responsivity		
Range: ¹²	0.00 to 1000.00µA/mW	0.00 to 1000.00µA/mW
Resolution:	0.01µA/mW	0.01µA/mW
Optical Power		
Range:	0.00 to 5000.0mW	0.00 to 5000.00mW
Resolution:	0.1mW	0.1mW
Forward Voltage		
Range:	0.000 to 15.000V	0.000 to 15.000V
Resolution:	1mV	1mV
Accuracy: ¹³	±2mV	±2mV

NOTES

- All values relate to a one-hour warm-up period at room temperature, 25°C.
- Based on resolution of digital-to-analog converters used in circuit.
- Over any one-hour period, half-scale output.
- Over any 24-hour period, half-scale output.
- Measured electrically with a 1Ω load at half scale output; evaluating spectral noise density over a 150kHz bandwidth from 125kHz to 275kHz.
- 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).
- 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 photodiode responsivity.
- 50% modulation at mid-scale output. Higher bandwidth is possible with smaller magnitude modulation signal.
- TTL low input will disable the current source output.
- Similar resolution available over GPIB.
- The responsivity value is user-defined and is used to calculate the optical power.
- Four-wire voltage measurement at the load. Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load and cable used.

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

ORDERING INFORMATION

LDX-3232	High Compliance Laser Diode Driver
CC-306S	Unterminated Current Source Interconnect Cable
LNF-320	Low Noise Filter
RM-139	Single Rack Mounting Kit
RM-140	Dual Rack Mounting Kit
LabView®	Instrument Driver



The Source for Unipolar Quantum Cascade Lasers
for Mid and Far Infrared

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