LDX 36000 Series

High Power Laser Diode Driver

Product Features

- Output current to 220A QCW and 125A CW
- Compliance voltage up to 35V
- Proven high power laser diode protection features
- Precision current control with 10 mA setpoint resolution
- Hard pulse capability with pulse widths to 2 seconds and duty cycle to 90%
- Peak and CW forward voltage and photodiode measurement
- TTL trigger input and output with adjustable delay
- Temperature measurement with thermistor input
- IEEE488/GPIB interface

The LDX-36000 Series High Power Laser Diode Drivers are a family of high performance current sources designed specifically for controlling and testing high power laser diodes. Over ten models offer maximum current ranges from 10 amps to 220 amps QCW and 125 amps CW with maximum compliance voltages from 12V to 35V. Each instrument offers high setpoint accuracy, low output noise with forward voltage and photodiode measurements in CW, QCW-Pulse and hard pulse operating modes making these instruments ideal for precision, high power laser diode testing.

Multiple laser diode protection features include adjustable voltage and current limits, output shorting relays, slow turn on/off circuits, fast error detection circuits, and transient protection during power up and laser operation. A thermistor based temperature monitor provides additional protection through a programmable temperature limit which can be used to disable the laser output when the limit is exceeded.

Designed for automated laser diode testing in CW or pulse mode, these drivers combine precision control and measurement and an IEEE488/GPIB interface with on-board data storage for high power laser diode characterization. For virtual instrument programming, LabView instrument drivers are available free of charge and can be downloaded from the Newport website.

High Voltage Current Sources for High Power Laser Diode Testing

ILX Lightwave®

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LDX 36000 Series

High Power Laser Diode Driver

HIGH POWER PRECISION LASER DIODE TESTING

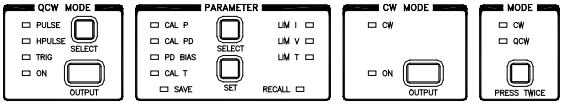
Each LDX-36000 Series Laser Diode Driver was designed as a current source specifically for high power laser diodes. Ideal for R&D or manufacturing testing, precision low noise current control with set point accuracy of 0.1% of reading is delivered to the lasers, with four-wire voltage measurement and a photodiode monitor with adjustable reverse bias for CW and QCW LIV testing, laser qualification testing, or pulse testing.

A CHOICE OF LASER CURRENT CONTROL MODES

Each LDX-36000 can be operated at full scale current and voltage in CW or QCW mode saving time and reducing cost of test by eliminating multiple instruments and test set-ups. Conduct CW L-I-V testing and pulse testing of high power laser diodes all at the same test station, without moving the laser or changing the output cable. With the 36000's there is no need for another QCW instrument, simply change operating modes from the front panel or through the GPIB interface, set up the test parameters and start testing quickly in either mode. In QCW mode, the pulse output can be generated either internally with programmable pulse width, duty cycle and frequency parameters or through an external pulse trigger.

For some applications, long pulse widths are required during testing. All 36000 models offer a "hard" pulse mode where the pulse width can be adjusted from 1 ms to 2 seconds with a duty cycle up to 90%.

Additionally, a unique power display mode allows laser diode power to be set based on programmable slope efficiency and threshold current parameters.



CW and QCW Operating Modes

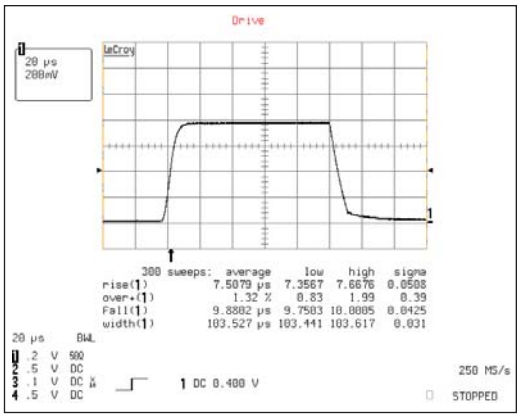
PRECISION PULSE CONTROL FOR HIGH POWER LASER TESTING

The LDX-36000 Series offer several QCW operating modes delivering clean pulses with low overshoot and fast rise and fall times. Digital control of pulse width, duty cycle and frequency provide quick and easy control of pulse parameters for maximum flexibility in varying test applications. The pulsed output can be generated in one of three modes; internal pulse, hard pulse, and triggered pulse. If the LDX-36000 is being used in diode-pumped solid state laser and amplifier testing, programmable input and output trigger delays allow for optimizing Q-switch timing and energy extraction without the need for any external delay generators.

DESIGNED TO PROTECT HIGH POWER LASER DIODES

Eliminate problematic current spiking common with voltage sources. Each LDX-36000 Series Laser Diode Driver was designed as a current source specifically for high power laser diodes. The drivers provide multiple laser diode protection features such as current and voltage limits, slow start turn-on, floating outputs, fast error detection, and immunity to operational and power line transients. Careful attention to design has resulted in minimal overshoot in QCW mode or while rapidly stepping current in CW mode at any output current level. 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).

In case of a device failure with multiple devices connected in series, low overshoot and closed-loop power supply control ensure the remaining devices safety. A temperature monitor provides additional protection with a programmable temperature limit which disables the current source output in a limit condition.



Current Pulse in QCW mode at 80A Output

LDX 36000 Series

High Power Laser Diode Driver

LDX-36000 Series instruments accept an external trigger to synchronize the output pulse.

AUTOMATE HIGH POWER LASER TESTING

Remote instrument operation is available on all of the LDX-36000 Series High Power Drivers through an IEEE488/GPIB interface. All instrument controls and functions are accessible through the interface for easy remote programming and control in automated test systems where repeatable and accurate test sequencing, measurements, and data handling are required. Whether the application is data intensive L-I-V testing, pulsed control for thermal characterization, or R&D evaluations, remote operation of the LDX-36000's saves time and ensures systematic data collection and instrument operation.

PRECISION L-I-V TESTING

Each LDX-36000 Series Laser Diode Driver was developed specifically for precision L-I-V testing of high power laser diodes with 0.1% set point accuracy, low noise and precision forward voltage measurement capability in CW or QCW pulsed modes. Additionally, the instrument can perform power measurements through an independent photo-diode input calibrated with a user-programmable responsivity. An adjustable 0 to -15V reverse bias ensures linear measurements and fast conversion speed. Accurate forward voltage measurements even with high current and long cable lengths are accomplished real time through a four wire measurement system. Reduce total system cost with these high current drivers; there is no need for separate pulsed sources, voltage measuring instruments, or low current measuring instruments for high power L-I-V testing.

EASE OF OPERATION

Designed for ease of use and readability, the front panel features dual 7-segment LED displays with instrument controls grouped by mode and function. The dual display lets you view laser parameters simultaneously with the bright 7-segment LED display highly visible from a distance in darkened labs. Parameters such as output current setpoint, current and voltage limits and calibration constants are easily selected and adjusted with the rotary digital encoder. Each display is easily configured to indicate laser parameters such as current, voltage, power, and temperature with discrete control push buttons located below each display. System errors such as open circuits and current or voltage limits are indicated with discrete LED's with an error code indicated on the appropriate seven-segment LED display.

SAVE AND RECALL INSTRUMENT SETTINGS

For multiple instrument test configurations, the LDX-36000 Series Laser Diode Drivers offer a SAVE and RECALL feature. The SAVE function allows you to store all the front panel settings for any given instrument configuration to a numbered bin. The RECALL function allows you to retrieve any of the saved configurations at any time through simple front panel button presses or remotely through the GPIB interface. This saves time in instrument re-configuration for different manufacturing runs or R&D experiments.

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-36000 Series High Power Laser Diode Drivers, and our complete family of Laser Diode Instrumentation and Test Systems, call us today or visit our website at www.newport.com/ilxlightwave.

LDX 36000 Series

High Power Laser Diode Driver

Specifications

GENERAL

GPIB Interface:	IEEE488
On-Board Memory Storage	1000 points
On-Board Upload Rate	30 ms/point

Current Draw:

	100-120VAC ±10%	200-240VAC ±10%
LDX-36010-12:	4A	2A
LDX-36025-12:	6A	3A
LDX-36050-12:	10A	5A
LDX-36085-12:	15A	7.5A
LDX-36125-12:	20A	10A
LDX-36010-35:	7A	3.5A
LDX-36018-35:	12A	6A
LDX-36040-30:	20A	10A
LDX-36070-30:	N/A	13A
LDX-36125-24:	N/A	16A

Size (HxWxD):[23]	146mm x 483mm x 451mm 5.25" x 19" x 17.75"

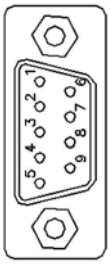
Weight

LDX-36010-12:	10.9 kg (24 lbs.)
LDX-36025-12:	11.9 kg (26 lbs.)
LDX-36050-12:	11.9 kg (26 lbs.)
LDX-36085-12:	13.5 kg (30 lbs.)
LDX-36125-12:	15.2 kg (34 lbs.)
LDX-36010-35:	11.3 kg (25 lbs.)
LDX-36018-35:	11.9 kg (26 lbs.)
LDX-36040-30:	13.5 kg (30 lbs.)
LDX-36070-30:	16.3 kg (36 lbs.)
LDX-36125-24:	18.9 kg (41 lbs.)

Operating Temperature:	0°C to 40°C
Storage Temperature:	-40°C to 70°C
Humidity:	20-85% non-condensing
EMC:	98/336/EEC
Safety:	21CFR 1040.10 EN60950 Low voltage directive
Regulatory Compliance:	
CE:	EN61326-1:2006 EN55011:2007 EN61010
Connectors:	
Current Output (≤50A):	Hybrid D-sub
Current Output (≥50A):	Bus Bar
Measurement:	DB 9; rear panel
Interlocks:	Terminal block; rear panel
Input/Output Trigger:	BNC; front panel
Pulse Out:	BNC; rear panel

LASER DIODE PROTECTION

Output Shorting Relay:	Normally closed
Hardware Fault Response Time:	
Current Limit:	< 2 µs
Open Circuit:	< 50 µs
Transient Protection:	Output On/Off Power Up/Down EFT/Surge
Adjustable Current Limit:	0 to full scale
Adjustable Voltage Limit:	0 to full scale
Output Enable Delay:	2s
Interlock Response Time:[22]	< 6 ms



Measurement Connector Pinout

1–PD Cathode
2–PD Anode
3–Vsense–
4–N/C
5–Thermistor+
6–Vsense+
7–N/C
8–N/C
9–Thermistor–

ORDERING INFORMATION

LDX-36010-12	10A/20A, 12V Laser Diode Current Source
LDX-36025-12	25A/50A, 12V Laser Diode Current Source
LDX-36050-12	50A/100A, 12V Laser Diode Current Source
LDX-36085-12	85A/170A, 12V Laser Diode Current Source
LDX-36125-12	125A/220A, 12V Laser Diode Current Source
LDX-36010-35	10A/20A, 35V Laser Diode Current Source
LDX-36018-35	18A/40A, 35V Laser Diode Current Source
LDX-36040-30	40A/80A, 30V Laser Diode Current Source
LDX-36070-30	70A/160A, 30V Laser Diode Current Source
LDX-36125-24	125A/220A, 24V Laser Diode Current Source
LDM-4409	Temperature Controlled C-Mount Fixture
LDM-4415	Temperature Controlled CS Bar Mount Fixture
LDM-49840	High Power Butterfly Mount
LDM-49840T	High Power Butterfly Mount with Case Control
LDM-49860	High Power 2-Pin Module Mount
LDM-49860T	High Power 2-Pin Module Mount with Case Control
LDM-4986001	49860 Terminal Block for JDS Uniphase Devices

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International Inquiries: 406-556-2481
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Rev08.091013

LDX 36000 Series

High Power Laser Diode Current Source

Specifications [1]

	36010-35	36018-35	36040-30	36070-30	*36125-24*
DRIVE CURRENT OUTPUT					
Output Current Range:					
CW	10A	18A	40A	70A	125A
Pulse	20A	40A	80A	160A	220A
HPulse	10A	18A	40A	70A	125A
Set-Point Resolution:	10 mA	10 mA	10 mA	10 mA	10 mA
Set-Point Accuracy:[2]	±(0.1% +10 mA)	±(0.1% +10 mA)	±(0.1% +20 mA)	±(0.1% +80 mA)	±(0.1% +120 mA)
Settling Time:					
CW[3]	20 µs	20 µs	20 µs	20 µs	20 µs
Pulse[4]	80 µs	80 µs	80 µs	80 µs	80 µs
HPulse[4]	550 µs	550 µs	550 µs	550 µs	550 µs
Maximum CW Power:	350W	630W	1200W	2100W	3000W
Compliance Voltage:[5]	35V	35V	30V	30V	24V
Temperature Coefficient:	±50 ppm/°C	±50 ppm/°C	±50 ppm/°C	±50 ppm/°C	±50 ppm/°C
Stability:[6]	±100 ppm	±100 ppm	±100 ppm	±100 ppm	±100 ppm
Noise and Ripple:[7]	<10 mA rms	<10 mA rms	<10 mA rms	<40 mA rms	<60 mA rms
Transients:					
Operational:[8]	<40 mA	<40 mA	<40 mA	<40 mA	<40 mA
1kV EFT/Surge:[9]	<80 mA	<80 mA	<100 mA	<320 mA	<320 mA
QCW MODE [10, 24]					
Pulse Width:					
Range					
Pulse Mode:	40 µs to 1 ms	40 µs to 1 ms	40 µs to 1 ms	40 µs to 1 ms	40 µs to 1 ms
HPulse Mode:	1 ms to 2s	1 ms to 2s	1 ms to 2s	1 ms to 2s	1 ms to 2s
Resolution:					
Pulse Mode:	2 µs	2 µs	2 µs	2 µs	2 µs
HPulse Mode:	0.01% + 0.5 µs	0.01% + 0.5 µs	0.01% + 0.5 µs	0.01% + 0.5 µs	0.01% + 0.5 µs
Accuracy:					
Pulse Mode:	± 10 µs	± 10 µs	± 10 µs	± 10 µs	± 10 µs
HPulse Mode:	± 20 µs	± 20 µs	± 20 µs	± 20 µs	± 20 µs
Pulse Frequency:					
Range:	0.1 to 1000 Hz	0.1 to 1000 Hz	0.1 to 1000 Hz	0.1 to 1000 Hz	0.1 to 1000 Hz
Resolution:	0.1 Hz	0.1 Hz	0.1 Hz	0.1 Hz	0.1 Hz
Accuracy:[11]	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Duty Cycle:					
Pulse Mode:	0.5 to 20%	0.5 to 20%	0.5 to 20%	0.5 to 20%	0.5 to 10%
HPulse Mode:	20 to 90%	20 to 90%	20 to 90%	20 to 90%	10 to 90%
Resolution:	0.1%	0.1%	0.1%	0.1%	0.1%
Rise/Fall Time:[12]					
Pulse Mode:	<10 µs	<10 µs	<10 µs	<15 µs	<20 µs
HPulse Mode:	200 µs	200 µs	200 µs	200 µs	200 µs
Overshoot:[13]	<2%	<2%	<2%	<2%	<2%
VOLTAGE LIMIT [14]					
Range:	0 – 38 V	0 – 38 V	0 – 33 V	0 – 33 V	0 – 27 V
Resolution:	100 mV	100 mV	100 mV	100 mV	100 mV
Accuracy:[11]	±1% + 200 mV	±1% + 200 mV	±1% + 200 mV	±1% + 200 mV	±1% + 200 mV

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Rev07.050713

Specifications

	36010-12	36025-12	36050-12	36085-12	36125-12
CURRENT LIMIT					
Range					
CW:	0 to 10.5A	0 to 26.2A	0 to 52.5A	0 to 89.2A	0 to 131.2A
QCW:	0 to 22.0A	0 to 53.5A	0 to 106.0A	0 to 179.5A	0 to 232.0A
Resolution:	10 mA	10 mA	10 mA	10 mA	10 mA
Firmware Accuracy Limit:[15]	±0.1% + 10 mA	±0.1% + 10 mA	±0.1% + 20 mA	±0.1% + 80 mA	±0.1% + 120 mA
Hardware Accuracy Limit:[15]	±1% + 10 mA	±1% + 10 mA	±1% + 20 mA	±1% + 80 mA	±1% + 120 mA
MEASUREMENT					
Forward Voltage					
Range:	0.00 to 12.00 V	0.00 to 12.00 V	0.00 to 12.00 V	0.00 to 12.00 V	0.00 to 12.00 V
Resolution:	10 mV	10 mV	10 mV	10 mV	10 mV
Accuracy:[18]	±0.05% of 20mV	±0.05% of 20mV	±0.05% of 20mV	±0.05% of 20mV	±0.05% of 20mV
PD Current					
Range:	3 to 10000 µA	3 to 10000 µA	3 to 10000 µA	3 to 10000 µA	3 to 10000 µA
Resolution:	3 µA	3 µA	3 µA	3 µA	3 µA
Accuracy:[19]	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Reverse Bias					
Range:	0 to -15V	0 to -15V	0 to -15V	0 to -15V	0 to -15V
Resolution:	100 mV	100 mV	100 mV	100 mV	100 mV
Accuracy:	±2.5% FS	±2.5% FS	±2.5% FS	±2.5% FS	±2.5% FS
PD Responsivity					
Range:[20] (mA/W)	0 to 100.00	0 to 100.00	0 to 100.00	0 to 100.00	0 to 100.00
Resolution: (mA/W)	.001	.001	.001	.001	.001
Power Control Range					
Range:	0 to 1000W	0 to 1000W	0 to 1000W	0 to 1000W	0 to 1000W
Resolution:	1W	1W	1W	1W	1W
P1 (Slope Efficiency)					
Range (W/A):	0.00 to 10.00	0.00 to 10.00	0.00 to 10.00	0.00 to 10.00	0.00 to 10.00
Resolution (W/A):	0.01	0.01	0.01	0.01	0.01
P2 (Threshold)					
Range (A):	0.00 to 10.00	0.00 to 25.00	0.00 to 50.00	0.00 to 85.00	0.00 to 125.00
Resolution (A):	0.01	0.01	0.1	0.1	0.1
Temperature					
Sensor Type:	10K Thermistor	10K Thermistor	10K Thermistor	10K Thermistor	10K Thermistor
Range:	0 to +199.9 °C	0 to +199.9 °C	0 to +199.9 °C	0 to +199.9 °C	0 to +199.9 °C
Thermistor Current:	100 µA	100 µA	100 µA	100 µA	100 µA
Accuracy:[21]	±0.2 °C	±0.2 °C	±0.2 °C	±0.2 °C	±0.2 °C

EVENT TRIGGERING (ALL MODELS)

Trigger Output:[16]	TTL Level; active high
Pulse Width:	10 µs
Delay:	Programmable
Accuracy:	2 µs ± 0.05%
Range:	0s to 1s
Resolution:	0.01% + 5 µs
Jitter:	100 ns
Trigger Input:[17]	TTL Level; rising edge triggered, single shot to 1 KHz; high impedance
Delay to Output:	Programmable
Accuracy:	2 µs ± 0.05%
Range:	20 µs to 1s
Resolution:	0.01% + 5 µs
Jitter:	200 ns
Pulse Output Trigger:	TTL Level, high impedance, active high

Notes

1. All values measured after 1-hour warm-up and at 25°C.
2. ± (% of setpoint + mA)
3. Time from 50% of current ramp to setpoint for step sizes 3A or less.
4. From the rising edge of the pulse to the setpoint.
5. At the end of CC-390 output cable in CW mode; 10% de-rating in QCW mode.
6. % of full scale over 1 hour, all instrument modes.
7. RMS electrical noise measured with a resistive load over a 300 KHz bandwidth.
8. Maximum output current transient from normal operations (e.g. power on-off, current on-off), as well as accidental situations (e.g. power line plug removal); normal operations exclude pulse characteristics such as overshoot and undershoot.
9. Maximum output current transient from a 1000V power line transient spike.
10. All QCW mode pulse specifications taken with ILX CC-390 output cable. Use of the instrument with alternative cabling may affect pulse performance.
11. % of reading.
12. Measured from 10% to 90% points at half-scale output at the end of an ILX CC-390 cable into a non-inductive load.
13. % of setpoint, at the end of ILX CC-390 cable into a low inductance load. Overshoot may increase with inductance.
14. Voltage limit is higher than compliance to ensure output is not disabled due to overshoot caused by impedance mismatch.
15. Firmware and calibrated hardware limit accuracy.
16. From start of output pulse to trigger.
17. From start of trigger to output pulse.
18. % of reading + offset.
19. % of FS.
20. The responsivity value is user-defined and is used to calculate optical power.
21. At 25°C, accuracy while using ILX Lightwave TS-510 calibrated 10 kΩ thermistor.
22. Interlock fault time measured from event to device shorting protection enabled.
23. Total external dimensions including handles and support feet. Handles add 1.5" (3.8 cm) and feet add 0.56" (1.4 cm) to overall dimensions.
24. Pulse mode specifications are also external trigger mode specifications.

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

LDX 36000 Series

High Power Laser Diode Current Source

LDX 36000 Series

High Power Laser Diode Current Source

Specifications [1]

	36010-12	36025-12	36050-12	36085-12	36125-12
DRIVE CURRENT OUTPUT					
Output Current Range:					
CW	10A	25A	50A	85A	125A
Pulse	20A	50A	100A	170A	220A
HPulse	10A	25A	50A	85A	125A
Set-Point Resolution:	10 mA	10 mA	10 mA	10 mA	10 mA
Set-Point Accuracy:[2]	±(0.1% +10 mA)	±(0.1% +10 mA)	±(0.1% +20 mA)	±(0.1% +80 mA)	±(0.1% +120 mA)
Settling Time:					
CW[3]	20 µs	20 µs	20 µs	20 µs	20 µs
Pulse[4]	80 µs	80 µs	80 µs	80 µs	80 µs
HPulse[4]	550 µs	550 µs	550 µs	550 µs	550 µs
Maximum CW Power:	120W	300W	600W	1020W	1500W
Compliance Voltage:[5]	12V	12V	12V	12V	12V
Temperature Coefficient:	±50 ppm/°C	±50 ppm/°C	±50 ppm/°C	±50 ppm/°C	±50 ppm/°C
Stability:[6]	±100 ppm	±100 ppm	±100 ppm	±100 ppm	±100 ppm
Noise and Ripple:[7]	<5 mA rms	<10 mA rms	<20 mA rms	<40 mA rms	<60 mA rms
Transients:					
Operational:[8]	<40 mA	<40 mA	<40 mA	<40 mA	<40 mA
1kV EFT/Surge:[9]	<80 mA	<80 mA	<100 mA	<320 mA	<320 mA
QCW MODE [10, 24]					
Pulse Width:					
Range					
Pulse Mode:	40 µs to 1 ms	40 µs to 1 ms	40 µs to 1 ms	40 µs to 1 ms	40 µs to 1 ms
HPulse Mode:	1 ms to 2s	1 ms to 2s	1 ms to 2s	1 ms to 2s	1 ms to 2s
Resolution:					
Pulse Mode:	2 µs	2 µs	2 µs	2 µs	2 µs
HPulse Mode:	0.01% + 0.5 µs	0.01% + 0.5 µs	0.01% + 0.5 µs	0.01% + 0.5 µs	0.01% + 0.5 µs
Accuracy:					
Pulse Mode:	± 10 µs	± 10 µs	± 10 µs	± 10 µs	± 10 µs
HPulse Mode:	± 20 µs	± 20 µs	± 20 µs	± 20 µs	± 20 µs
Pulse Frequency:					
Range:	0.1 to 1000 Hz	0.1 to 1000 Hz	0.1 to 1000 Hz	0.1 to 1000 Hz	0.1 to 1000 Hz
Resolution:	0.1 Hz	0.1 Hz	0.1 Hz	0.1 Hz	0.1 Hz
Accuracy:[11]	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Duty Cycle:					
Pulse Mode:	0.5 to 20%	0.5 to 20%	0.5 to 20%	0.5 to 20%	0.5 to 10%
HPulse Mode:	20 to 90%	20 to 90%	20 to 90%	20 to 90%	10 to 90%
Resolution:	0.1%	0.1%	0.1%	0.1%	0.1%
Rise/Fall Time:[12]					
Pulse Mode:	<10 µs	<10 µs	<20 µs	<25 µs	<20 µs
HPulse Mode:	200 µs	200 µs	200 µs	200 µs	200 µs
Overshoot:[13]	<2%	<2%	<2%	<2%	<2%
VOLTAGE LIMIT [14]					
Range:	0 – 14.0 V	0 – 14.0 V	0 – 14.0 V	0 – 14.0 V	0 – 14.0 V
Resolution:	100 mV	100 mV	100 mV	100 mV	100 mV
Accuracy:[11]	±1% + 200 mV	±1% + 200 mV	±1% + 200 mV	±1% + 200 mV	±1% + 200 mV

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Rev08.91013

LDX 36000 Series

High Power Laser Diode Current Source

Specifications

	36010-35	36018-35	36040-30	36070-30	36125-24
CURRENT LIMIT					
Range					
CW:	0 to 10.5A	0 to 18.9A	0 to 42.0A	0 to 73.5A	0 to 131.25A
QCW:	0 to 22.0A	0 to 43.0A	0 to 85.0A	0 to 169.0A	0 to 232.0A
Resolution:	10 mA	10 mA	10 mA	10 mA	10 mA
Firmware Accuracy Limit:[15]	±0.1% + 10 mA	±0.1% + 10 mA	±0.1% + 20 mA	±0.1% + 80 mA	±0.1% + 120 mA
Hardware Accuracy Limit:[15]	±1% + 10 mA	±1% + 10 mA	±1% + 20 mA	±1% + 80 mA	±1% + 120 mA
MEASUREMENT					
Forward Voltage					
Range:	0.00 to 35.00 V	0.00 to 35.00 V	0.00 to 30.00 V	0.00 to 30.00 V	0.00 to 24.00 V
Resolution:	10 mV	10 mV	10 mV	10 mV	10 mV
Accuracy:[18]	±0.05% of 20mV	±0.05% of 20mV	±0.05% of 20mV	±0.05% of 20mV	±0.05% of 20mV
PD Current					
Range:	3 to 10000 µA	3 to 10000 µA	3 to 10000 µA	3 to 10000 µA	3 to 10000 µA
Resolution:	3 µA	3 µA	3 µA	3 µA	3 µA
Accuracy:[19]	±0.1%	±0.1%	±0.1%	±0.1%	±0.1%
Reverse Bias					
Range:	0 to -15V	0 to -15V	0 to -15V	0 to -15V	0 to -15V
Resolution:	100 mV	100 mV	100 mV	100 mV	100 mV
Accuracy:	±2.5% FS	±2.5% FS	±2.5% FS	±2.5% FS	±2.5% FS
PD Responsivity					
Range:[20] (mA/W)	0.001 to 10.000	0.001 to 10.000	0.001 to 10.000	0.001 to 10.000	0.001 to 10.000
Resolution: (mA/W)	.001	.001	.001	.001	.001
Power Control Range					
Range:	0 to 2500W	0 to 2500W	0 to 2500W	0 to 2500W	0 to 2500W
Resolution:	1W	1W	1W	1W	1W
P1 (Slope Efficiency)					
Range (W/A):	0.00 to 100.0	0.00 to 100.0	0.00 to 100.0	0.00 to 100.0	0.00 to 100.0
Resolution (W/A):	0.01	0.01	0.01	0.01	0.01
P2 (Threshold)					
Range (A):	0.00 to 10.00	0.00 to 20.00	0.00 to 40.00	0.00 to 68.00	0.00 to 125.00
Resolution (A):	0.01	0.01	0.1	0.1	0.1
Temperature					
Sensor Type:	10K Thermistor	10K Thermistor	10K Thermistor	10K Thermistor	10K Thermistor
Range:	0 to +199.9 °C	0 to +199.9 °C	0 to +199.9 °C	0 to +199.9 °C	0 to +199.9 °C
Thermistor Current:	100 µA	100 µA	100 µA	100 µA	100 µA
Accuracy:[21]	±0.2 °C	±0.2 °C	±0.2 °C	±0.2 °C	±0.2 °C

EVENT TRIGGERING (ALL MODELS)

Trigger Output:[16]	TTL Level; active high
Pulse Width:	10 µs
Delay:	Programmable
Accuracy:	2 µs ± 0.05%
Range:	0s to 1s
Resolution:	0.01% + 5 µs
Jitter:	100 ns
Trigger Input:[17]	TTL Level; rising edge triggered, single shot to 1 KHz; high impedance
Delay to Output:	Programmable
Accuracy:	2 µs ± 0.05%
Range:	20 µs to 1s
Resolution:	0.01% + 5 µs
Jitter:	200 ns
Pulse Output Trigger:	TTL Level, high impedance, active high

Notes

1. All values measured after 1-hour warm-up and at 25°C.
2. ± (% of setpoint + mA)
3. Time from 50% of current ramp to setpoint for step sizes 3A or less.
4. From the rising edge of the pulse to the setpoint.
5. At the end of CC-390 output cable in CW mode; 10% de-rating in QCW mode.
6. % of full scale over 1 hour, all instrument modes.
7. RMS electrical noise measured with a resistive load over a 300 KHz bandwidth.
8. Maximum output current transient from normal operations (e.g. power on-off, current on-off), as well as accidental situations (e.g. power line plug removal); normal operations exclude pulse characteristics such as overshoot and undershoot.
9. Maximum output current transient from a 1000V power line transient spike.
10. All QCW mode pulse specifications taken with ILX CC-390 output cable. Use of the instrument with alternative cabling may affect pulse performance.
11. % of reading.
12. Measured from 10% to 90% points at half-scale output at the end of an ILX CC-390 cable into a non-inductive load.
13. % of setpoint, at the end of ILX CC-390 cable into a low inductance load. Overshoot may increase with inductance.
14. Voltage limit is higher than compliance to ensure output is not disabled due to overshoot caused by impedance mismatch.
15. Firmware and calibrated hardware limit accuracy.
16. From start of output pulse to trigger.
17. From start of trigger to output pulse.
18. % of reading + offset.
19. % of FS.
20. The responsivity value is user-defined and is used to calculate optical power.
21. At 25°C, accuracy while using ILX Lightwave TS-510 calibrated 10 kΩ thermistor.
22. Interlock fault time measured from event to device shorting protection enabled.
23. Total external dimensions including handles and support feet. Handles add 1.5" (3.8 cm) and feet add 0.56" (1.4 cm) to overall dimensions.
24. Pulse mode specifications are also external trigger mode specifications.

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