NL200 SERIES

Compact Q-switched DPSS Lasers

FEATURES

- *Up to **4 mJ** pulse energy at **1064 nm***
- *Up to **2500 Hz** variable repetition rate*
- ***532 nm, 355 nm, 266 nm, 213 nm** wavelengths as standard options*
- ***<10 ns** pulse duration at 1064 nm*
- *Electro-optical Q-switching*
- *Turn-key operation*
- *Rugged sealed cavity*
- *Compact size*
- *Simple and robust*
- *Air cooled*
- *External TTL triggering*
- *Remote control via keypad and/or any controller running on any OS using REST API commands*

BENEFITS

- *Continuous tuning of repetition rate while maintaining constant pulse energy, superior beam pointing and energy stability make the laser the first choice for micromachining, marking, thin film removing applications*
- *Close to Gaussian smooth beam profile with low value M^2 < 1.3 and good focusability is beneficial for such applications, as LCD and OLED display repair*
- *Compactness and lightness make a laser easy transportable, saves on valuable laboratory space*
- *Fast wavelength selection is superior for applications where alternating wavelengths are required, like material ablation, LIBS*
- *Air cooling, cheap and reliable end-pumping technology, amplifiers free DPSS design guarantee easy operation and alignment of laser, simple installation and low life-time ownership cost*
- *Variety of control interfaces USB, RS232, LAN, WLAN ensure easy control and integration of laser with laboratory or OEM equipment*

APPLICATIONS

- *Material processing*
- *LCD and OLED display panel repair*
- *Marking*
- *Micromachining*
- *Engraving*
- *Laser deposition*
- *Laser cleaning*
- *Ablation*
- *Spectroscopy*
- *OPO pumping*
- *Remote sensing*

NL200 series DPSS air-cooled nanosecond lasers offer high pulse energy at kHz repetition rates. End-pumped design makes this laser compact and easy to integrate into various laser equipment both industrial and R&D. Featuring short nanosecond pulse duration, variable repetition rate and external TTL triggering, nanosecond diode pumped NL200 series Q-switched lasers are excellent and cost-effective sources for specific applications, when higher pulse energy is required, like material processing, LCD and OLED display panel repair, ablation, marking, engraving, laser cleaning, laser deposition and many more.

This laser can be equipped with harmonic generation modules for 532 nm, 355 nm, 266 nm and 213 nm wavelengths. Excellent energy stability and a wide range of wavelength options make this laser a perfect tool for spectroscopy, photoacoustic imaging and remote sensing applications. The mechanically stable and hermetically sealed design ensures reliable operation and long lifetime of the laser components.

Because of its robust design and diode-pumped technology this laser can work 24/7 with minimal down time and low ownership cost.

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SPECIFICATIONS [1]

Model [2]	NL201 [3]	NL202 [4]	NL204 [4]
Pulse energy			
at 1064 nm	0.9 mJ	2.0 mJ	4.0 mJ
at 532 nm	0.3 mJ	0.9 mJ	2.0 mJ
at 355 nm	0.2 mJ	0.6 mJ	1.3 mJ
at 266 nm	0.08 mJ	0.2 mJ	0.6 mJ
at 213 nm	0.04 mJ	0.1 mJ	0.2 mJ
Pulse to pulse energy stability (StdDev) [5]			
at 1064 nm	<0.5 %		
at 532 nm	<2.5 %		
at 355 nm	<3.5 %		
at 266 nm	<4.0 %		
at 213 nm	<5.0 %		
Typical pulse duration [6]	7 – 10 ns		
Power drift [7]	± 2 %		
Pulse repetition rate	1–2500 Hz	1–1000 Hz	
Beam spatial profile	Close to Gaussian in near and far fields		
Ellipticity	0.9–1.1 at 1064 nm		
M^2	<1.3		
Beam divergence [8]	<3 mrad		
Polarization	linear		
Typical beam diameter [9]	0.7 mm		
Beam pointing stability (StdDev) [10]	≤10 µrad		
Optical jitter (StdDev) [11]	<0.5 ns		
PHYSICAL CHARACTERISTICS			
Laser head (W × L × H) [12]	164 × 320 × 93 mm		
Power supply unit (W × L × H)	470 × 390 × 140 mm		
Umbilical length	3 m		
OPERATING REQUIREMENTS			
Cooling	air cooled		
Ambient temperature	18–30 °C		
Realtive humidity	20–80 % (non-condensing)		
Power requirements	100–240 V AC, single phase, 50/60 Hz		
Power consumption	<600 W		
Cleanliness of the room	not worse than ISO Class 9		

1) Due to continuous improvement, all specifications are subject to change. Parameters marked typical are illustrative; they are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise all specifications are measured at 1064 nm and for basic system without options.

2) Please indicate clearly if 1064 nm output is required in case harmonics options are ordered (except H200STHC module). In such a case, the energy of 1064 nm is optimized for harmonics generation and may differ from specified in the table.

3) Unless stated otherwise all specifications are measured at 2500 Hz pulse repetition rate.

4) Unless stated otherwise all specifications are measured at 1000 Hz pulse repetition rate.

5) Averaged from pulses emitted during 30 sec time interval.

6) FWHM at 1064 nm.

7) Measured over 8 hours period after 20 min warm-up when ambient temperature variation is less than ± 2 °C and humidity <± 5%.

8) Full angle measured at the $1/e^2$ level at 1064 nm.

9) Beam diameter is measured at 1064 nm at the $1/e^2$ level.

10) Beam pointing stability is evaluated as movement of the beam centroid in the focal plane of a focusing element.

11) With respect to QSW IN or SYNC OUT pulse.

12) Without optional harmonic module.

PERFORMANCE

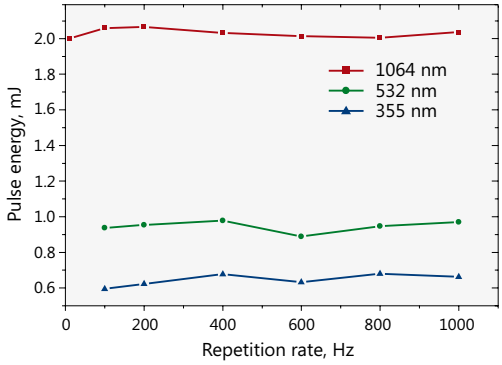


Fig 1. Typical performance data of model NL202 laser

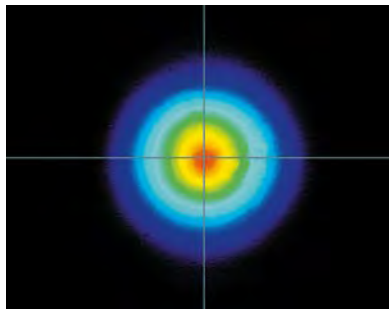


Fig 2. Typical beam intensity profile in the far field

OUTLINE DRAWINGS

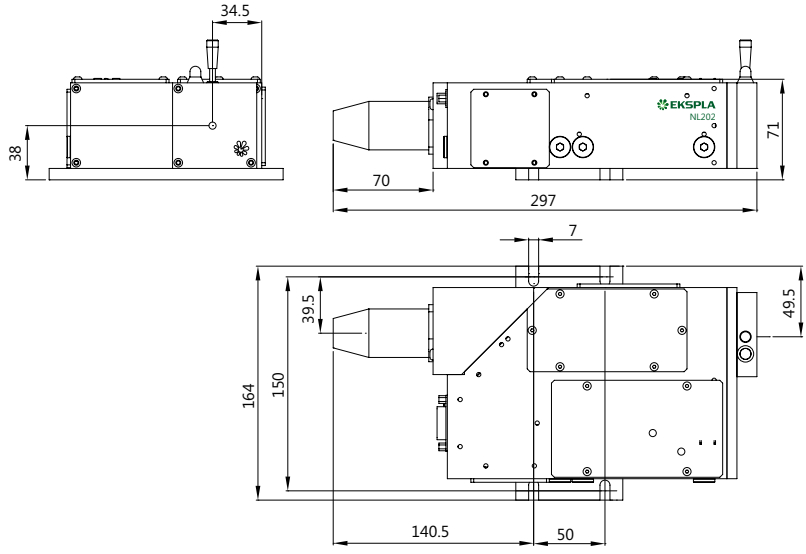


Fig 3. NL202 laser head drawing

ORDERING INFORMATION

Note: Laser must be connected to the mains electricity all the time. If there will be no mains electricity for longer that 1 hour then laser (system) needs warm up for a few hours before switching on.

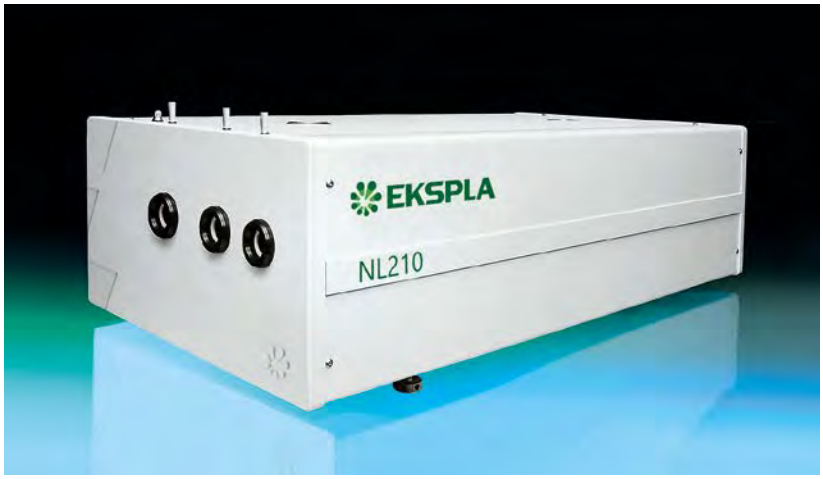
NL201-H200SHC

Model

Harmonic generator options:
H200SHC → second harmonic
H200THC → third harmonic
H200FHC → fourth harmonic
H200FiHC → fifth harmonic

NL210 SERIES

High Energy kHz Pulsed Cavity Dumped DPSS Nd:YAG Lasers



FEATURES

- ***10 mJ** at 1064 nm*
- ***1 kHz** pulse repetition rate*
- ***All-solid-state** design*
- *Internal/external triggering*
- *Short warm-up time*
- *Air cooled*
- *Optional temperature stabilized second, third and fourth harmonic generators*
- *Remote control via keypad or PC with supplied LabVIEW™ drivers*

BENEFITS

- *High 10 mJ pulse energy and nanosecond pulse-width ensures strong nonlinear response*
- *Smooth beam profile with optimal M^2 value suitable for OPO pumping*
- *1 kHz repetition rate enables fast material processing and data collection*
- *Air cooling, cost-effective and reliable end-pumping technology and amplifier-free DPSS design guarantee easy operation and alignment, simple installation and low maintenance costs*
- *Variety of control interfaces: USB, RS232, LAN and WLAN ensures easy control and integration with laboratory or OEM equipment*

APPLICATIONS

- *OPO pumping*
- *Laser spectroscopy*
- *Remote sensing*
- *Material ablation*
- *Micromachining*

NL210 series diode pumped Q-switched lasers produce up to 10 mJ at 1000 Hz pulse repetition rate. The laser is designed to produce high intensity, high brightness pulses and is targeted for applications like OPO pumping, nonlinear spectroscopy, material ablation, micromachining, and other tasks.

Employing electro-optical type of the cavity dumping, the master oscillator can produce pulses with a short pulse duration of 3 – 4 ns, the uniform beam profile and low divergence. The M^2 factor of 3 – 4 and uniform beam profile is useful for OPO pumping.

Angle-tuned LBO and/or BBO crystals mounted in temperature stabilized heaters are used for optional second, third or fourth harmonic generation. The harmonic separation system is designed to ensure a high spectral purity of radiation directed to separate output ports.

For customer convenience the laser can be controlled from a remote control pad or PC. The remote pad allows easy control of all parameters and features a backlit display that is easy to read even wearing laser safety eyewear. Alternatively, the laser can be controlled from a personal computer with supplied software for a Windows™ operating system, LabVIEW™ drivers are supplied as well.

SPECIFICATIONS [1]

Model	NL210
MAIN SPECIFICATIONS	
Pulse energy:	
at 1064 nm	10 mJ
at 532 nm [2]	5 mJ
at 355 nm [3]	3 mJ
at 266 nm [4]	1 mJ
Pulse to pulse energy stability [5]	
at 1064 nm	< 1.0 % rms
at 532 nm [2]	< 2.0 % rms
at 355 nm [3]	< 2.5 % rms
at 266 nm [4]	< 4.0 % rms
Pulse duration [6]	3 – 4 ns
Pulse repetition rate	1000 Hz
Beam profile	multimode
Elipticity	0.9 – 1.1 at 1064 nm
M^2	< 4
Beam divergence [7]	< 2 mrad
Beam pointing stability, StDev	< 50 µrad
Polarization	linear, > 95 %
Typical beam diameter [8]	2 mm
Pulse jitter wrt to SYNC OUT, StDev [9]	< 0.5 ns
Pulse jitter wrt to ext. trigger, StDev [10]	< 0.5 ns
PHYSICAL CHARACTERISTICS	
Laser head (W × L × H)	456 × 1031 × 260 mm
Power supply unit (W × L × H)	520 × 400 × 290 mm
Umbilical length	3 m
OPERATING REQUIREMENTS	
Cooling [11]	Built-in chiller
Ambient temperature	18–27 °C
Relative humidity	20–80 % (non-condensing)
Power requirements	100–240 V AC, single phase, 50/60 Hz
Power consumption	< 1 kW
Cleanliness of the room	not worse than ISO Class 9

1) Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm and for basic system without options.

2) For NL210 with -SH option. Outputs are not simultaneous. The laser performance is specified for SH wavelength; specifications for other wavelengths may differ from that indicated above.

3) For NL210 with -SH/TH option. Outputs are not simultaneous. The laser performance is specified for TH wavelength; specifications for other wavelengths may differ from that indicated above.

4) For NL210 with -SH/FH option. Outputs are not simultaneous. The laser performance is specified for FH wavelength; specifications for other wavelengths may differ from that indicated above.

5) Averaged from pulses, emitted during 30 sec time interval.

6) FWHM.

7) Full angle measured at the $1/e^2$ point at 1064 nm.

8) Beam diameter is measured at 1064 nm at the $1/e^2$ point.

9) Optical pulse jitter with respect to SYNC OUT in internal triggering mode.

10) Optical pulse jitter with respect to QSW IN in external triggering mode.

11) Air cooled.

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PERFORMANCE

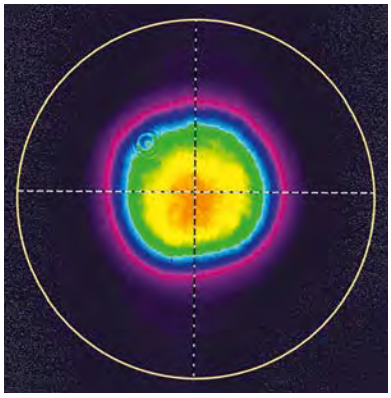

Fig 1. Typical near field beam profile of NL210 series laser

OUTLINE DRAWINGS

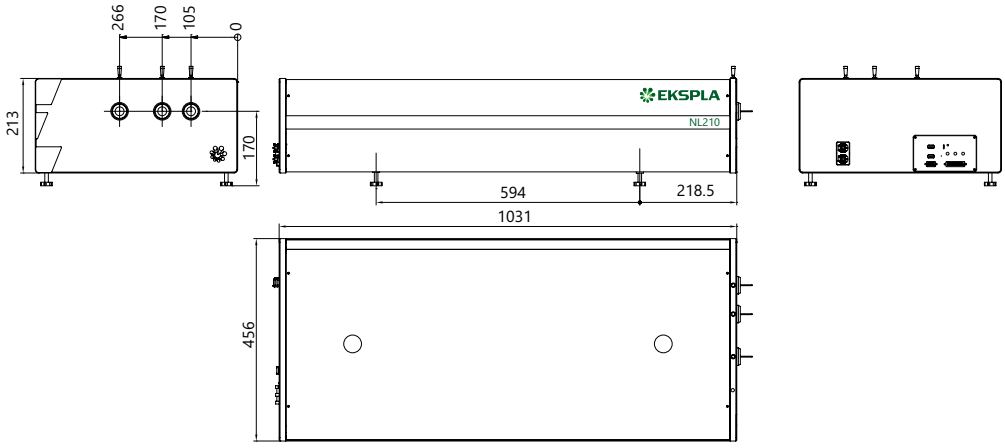

Fig 2. NL210 series laser head dimensions

ORDERING INFORMATION

Note: Laser must be connected to the mains electricity all the time. If there will be no mains electricity for longer that 1 hour then laser (system) needs warm up for a few hours before switching on.

NL210-SH

Model

Harmonic generator options:
SH → second harmonic
SH/TH → third harmonic
SH/FH → fourth harmonic