

# NL220 SERIES



NL220 series diode pumped Q-switched lasers produce up to 30 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, Ti:sapphire or dye laser pumping, nonlinear spectroscopy, material ablation, micromachining, and other tasks.

Employing electro-optical type of Q-switch allows the master oscillator to produce pulses with a short pulse duration of 6 ns, nearly TEM<sub>00</sub> beam profile and nearly diffraction-limited divergence. The M<sup>2</sup> factor of the beam is typically less than 2.5.

Laser cooling uses a closed loop chiller, thus eliminating the need for external cooling water, and reducing running costs.

For PIV applications a double-pulse version of this laser is available.

Angle-tuned LBO and/or BBO crystals mounted in temperature stabilized heaters are used for optional second, third or fourth harmonic generation. The harmonics 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 user-friendly remote control pad or USB interface.

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.

## High Pulse Energy at kHz Repetition Rate

### FEATURES

- ▶ **30 mJ at 1064 nm**
- ▶ **1 kHz pulse repetition rate**
- ▶ *Close to TEM<sub>00</sub> beam profile*
- ▶ *Simple and robust all-solid-state design*
- ▶ *Internal/external triggering*
- ▶ *Short warm-up time*
- ▶ *Water-to-air cooling (external water service is not required)*
- ▶ *Optional temperature stabilized second, third and fourth harmonic generators*
- ▶ *PC control via USB (RS232 is optional) with supplied LabVIEW™ drivers*
- ▶ *Remote control via keypad*

### APPLICATIONS

- ▶ *OPO, Ti:Sapphire and dye laser pumping*
- ▶ *PIV*
- ▶ *Laser spectroscopy*
- ▶ *Material ablation*
- ▶ *Micromachining*

SPECIFICATIONS <sup>1)</sup>

Model	NL220	NL220-30-1K
Pulse energy:		
at 1064 nm	10 mJ	30 mJ
at 532 nm <sup>2)</sup>	5 mJ	12 mJ
at 355 nm <sup>3)</sup>	3 mJ	7 mJ
at 266 nm <sup>4)</sup>	1 mJ	2 mJ
Pulse to pulse energy stability <sup>5)</sup>		
at 1064 nm	<1.0 % rms	<1.5 % rms
at 532 nm <sup>2)</sup>	<2.0 % rms	<2.5 % rms
at 355 nm <sup>3)</sup>	<2.5 % rms	<3.5 % rms
at 266 nm <sup>4)</sup>	<4.0 % rms	<6.0 % rms
Pulse duration <sup>6)</sup>	6–8 ns	~28 ns
Pulse repetition rate <sup>7)</sup>	1000 Hz	
Beam profile	close to TEM <sub>00</sub> , >90 % Gaussian fit	bell-shaped beam profile
Ellipticity	0.9–1.1 at 1064 nm	
M <sup>2</sup>	<2.5 <sup>8)</sup>	
Beam divergence <sup>9)</sup>	2 mrad at 1064 nm	
Beam pointing stability	<20 µrad rms	<25 µrad rms
Polarization	linear, vertical at 1064 nm, >95 %	
Typical beam diameter <sup>10)</sup>	2.5 mm	3 mm
Pulse jitter wrt to SYNC OUT <sup>11)</sup>	<0.5 ns rms	
Pulse jitter wrt to ext. trigger <sup>12)</sup>	<0.5 ns rms	

PHYSICAL CHARACTERISTICS

Laser head (W × L × H)	455 × 826 × 260 mm	318 × 1035 × 260mm
Power supply unit (W × L × H)	365 × 392 × 289 mm	552 × 600 × 841 mm
Umbilical length	2.5 m	
Chiller <sup>13)</sup>	please inquire, depends on location	

OPERATING REQUIREMENTS

Cooling	air cooled	air or water cooled
Ambient temperature	18–27 °C	
Relative humidity	20–80 % (non-condensing)	
Power requirements	100–240 V AC, single phase, 50/60 Hz	220–240 V AC, single phase, 50/60 Hz
Power consumption	<1 kVA	<2 kVA

- <sup>1)</sup> 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.
- <sup>2)</sup> For NL220-SH option. Outputs are not simultaneous. The laser performance is specified for SH wavelength; specifications for other wavelengths may differ from that indicated above.
- <sup>3)</sup> For NL220-TH option. Outputs are not simultaneous. The laser performance is specified for TH wavelength; specifications for other wavelengths may differ from that indicated above.
- <sup>4)</sup> For NL220-FH option. Outputs are not simultaneous. The laser performance is specified for FH wavelength; specifications for other wavelengths may differ from that indicated above.
- <sup>5)</sup> Averaged from 300 pulses.

- <sup>6)</sup> FWHM at 1064 nm, measured with at 5 G/s oscilloscope and photodiode with 1 ns rise time.
- <sup>7)</sup> Optional 100 Hz or 200 Hz pulse repetition rate. Pulse energy specifications are 50 % higher for 100 Hz version and 30 % higher for 200 Hz version.
- <sup>8)</sup> M<sup>2</sup> < 1.5 available on request.
- <sup>9)</sup> Full angle measured at the 1/e<sup>2</sup> level at 1064 nm.
- <sup>10)</sup> Beam diameter is measured at 1064 nm at the 1/e<sup>2</sup> level.
- <sup>11)</sup> Optical pulse jitter with respect to SYNC OUT. In internal triggering mode. Typical lead time is 220 ns with respect to optical pulse.
- <sup>12)</sup> Optical pulse jitter with respect to QSW IN. In external triggering mode when triggered with two separate pulses for pump diodes and Q-switch.
- <sup>13)</sup> Available options: water-air or water-water.



BEAM PROFILE

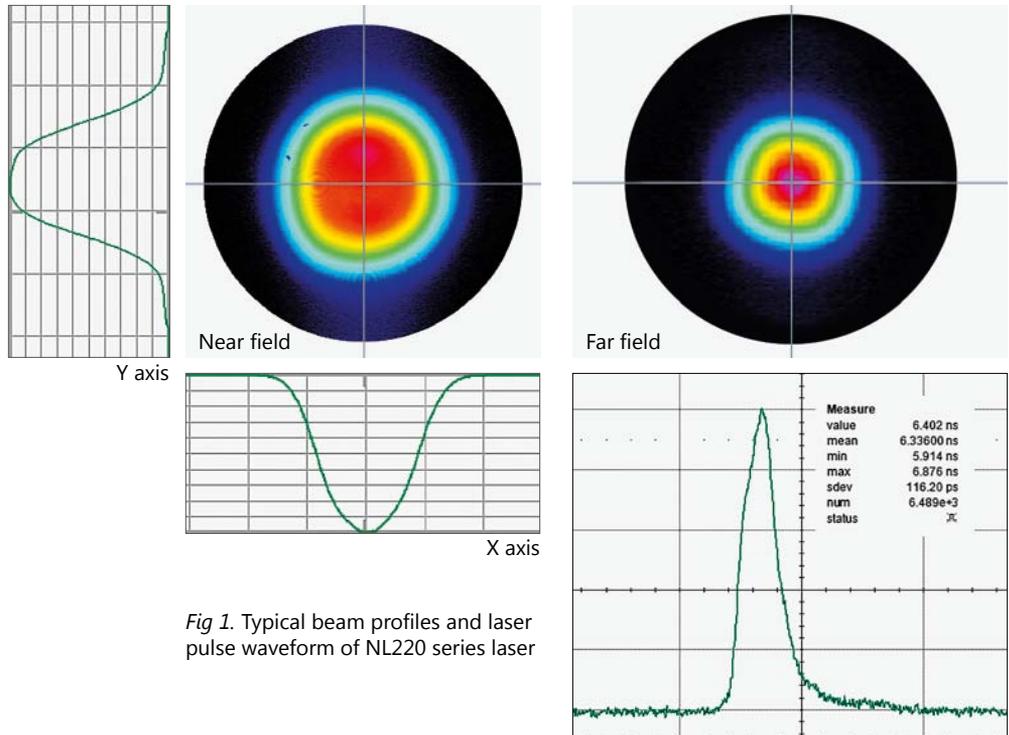


Fig 1. Typical beam profiles and laser pulse waveform of NL220 series laser

OUTLINE DRAWINGS

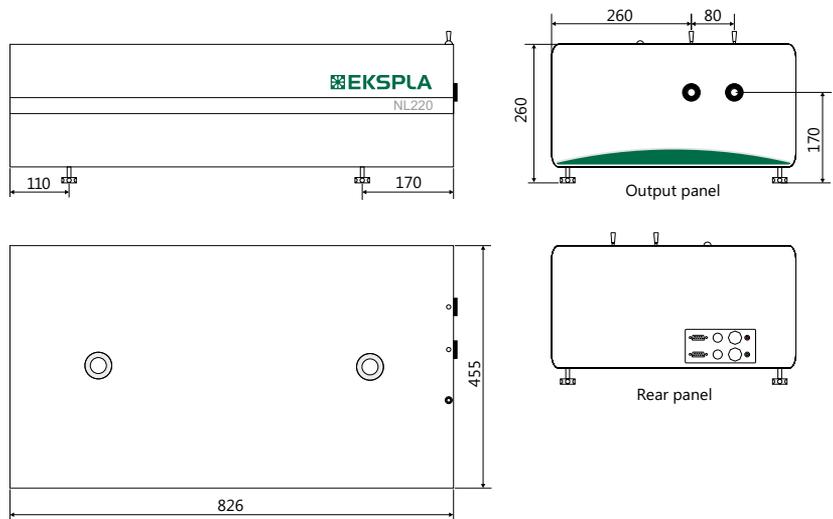


Fig 2. NL220 series laser head dimensions

ORDERING INFORMATION

**NL220D-1K-SH**

Model

Pulse options:  
 S → single head option  
 D → double head option

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

Pulse repetition rate in kHz

Picosecond Lasers  
 Picosecond Tunable Systems  
 Nanosecond Lasers  
 Nanosecond Tunable Lasers  
 High Energy Lasers  
 Ultrafast Fiber Lasers  
 Other Ekspla Products