

PL2210 SERIES



PL2210 series diode-pumped, air-cooled, mode-locked Nd:YAG lasers provide picosecond pulses at a kilohertz pulse repetition rate.

Short pulse duration, excellent pulse-to-pulse stability, superior beam quality makes PL2210 series diode pumped picosecond lasers well suited for many applications, including material processing, time-resolved spectroscopy, optical parametric generator pumping, and other tasks.

Flexible design

PL2210 series lasers offer a number of optional items that extend the capabilities of the laser.

A pulse picker option allows control of the pulse repetition rate of the laser and operation in single-shot mode.

The repetition rate and timing of pulses can be locked to an external RF source (with –PLL option) or other ultrafast laser system (with –FS option). The laser provides a triggering pulse for synchronization of the customer’s equipment. A low jitter SYNC OUT pulse has a lead up to 500 ns that can be adjusted in ~0.25 ns steps from a PC. Up to 400 μs lead of triggering pulse is available as a PRETRIG option that is designed to provide precise, very low jitter trigger pulses for a streak camera.

Custom-built models with higher pulse energy are available on request.

Built-in harmonic generators

Automated angle-tuned non-linear crystals mounted in temperature

Diode Pumped Picosecond kHz Pulsed Nd:YAG Lasers

FEATURES

- ▶ High pulse energy at **kHz rates**
- ▶ Diode pumped **solid state** design
- ▶ **Air cooled** – external water supply is not required
- ▶ Turn-key operation
- ▶ Low maintenance costs
- ▶ Optional streak camera triggering pulse with <10 ps rms jitter
- ▶ Remote control pad
- ▶ PC control via USB with supplied LabVIEW™ drivers
- ▶ Optional temperature stabilized second, third and fourth **harmonic generators**

APPLICATIONS

- ▶ Time resolved fluorescence, pump-probe spectroscopy
- ▶ OPG/OPA/OPO pumping
- ▶ Remote Laser Sensing
- ▶ Other spectroscopic and nonlinear optics applications

stabilized heaters are used for second, third and fourth high spectral purity harmonic generation.

Simple and convenient laser control

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. Alternatively, the laser can be controlled from a computer with supplied software for a Windows™ operating system. LabVIEW™ drivers are supplied as well.

Available models

Model	Features
PL2210A-2k	Up to 400 μJ, 28 ps pulses at an up to 2 kHz repetition rate
PL2210A-1k	Up to 900 μJ, 28 ps pulses at an up to 1 kHz repetition rate
PL2210B	Up to 2.5 mJ energy at a 1 kHz repetition rate at 80 ps pulses
PL2210B-TR	Model, in addition to a 1 kHz pulse train, has an output of 88 MHz pulse train with 5 W average power that can be used for pumping synchronously pumped OPOs
PL2211	Up to 2.5 mJ energy at a 1 kHz repetition rate at 28 ps pulses
PL2211A	Up to 5 mJ energy at a 1 kHz repetition rate at 28 ps pulses

SPECIFICATIONS ¹⁾

Model	PL2210A-2k	PL2210A-1k	PL2210B	PL2210B-TR	PL2211	PL2211A
Output energy						
at 1064 nm	0.4 mJ	0.9 mJ	2.5 mJ	2.5 mJ at 1 kHz 5 W at 88 MHz	2.5 mJ	5 mJ
at 532 nm ²⁾	0.2 mJ	0.45 mJ	1.3 mJ	–	1.3 mJ	2.5 mJ
at 355 nm ³⁾	0.14 mJ	0.35 mJ	0.8 mJ	–	0.8 mJ	1.6 mJ
at 266 nm ⁴⁾	0.05 mJ	0.16 mJ	0.5 mJ	–	0.5 mJ	1 mJ
Pulse energy stability (StdDev) ⁵⁾						
at 1064 nm				0.5 %		
at 532 nm				0.8 %		
at 355 nm				1 %		
at 266 nm				2 %		
Pulse duration (FWHM) ⁶⁾	28 ps ± 10 %		80 ps ± 10 %		28 ps ± 10 %	
Pulse repetition rate	2 kHz	1 kHz		1 kHz / 1 MHz	1 kHz	
Triggering mode	internal/external					
Typical TRIG1 OUT pulse delay ^{7) 8)}	-500 ... 50 ns					
TRIG1 OUT pulse jitter	<0.1 ns rms					
Spatial mode ⁹⁾	Close to Gaussian				"Top-hat" in near field and close to Gaussian in far field	
Beam divergence ¹⁰⁾	<1 mrad					
Beam diameter ¹¹⁾	~3 mm					
Beam pointing stability ¹²⁾	<30 µrad					
Pre-pulse contrast	>200:1					
Polarization	linear, >100:1					

PHYSICAL CHARACTERISTICS			
Laser head size (W × L × H) ¹³⁾	456 × 1031 × 249 mm		456 × 1233 × 249 mm
Power supply size (W × L × H)	365 × 392 × 290 mm	475 × 460 × 290 mm	365 × 285 × 360 mm

OPERATING REQUIREMENTS		
Water service	not required, air-cooled	
Relative humidity	20–80 % (non condensing)	
Ambient temperature	22±2 °C	
Power requirements	100–240 V AC, single phase 50/60 Hz	
Power consumption ¹⁴⁾	<1 kW	< 1.5 kW

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.
²⁾ For PL2210 series laser with -SH, -SH/TH, -SH/FH or -SH/TH/FH option. Outputs are not simultaneous.
³⁾ For PL2210 series laser with -TH, -SH/TH or -SH/TH/FH option. Outputs are not simultaneous.
⁴⁾ For PL2210 series laser with -SH/FH or -SH/TH/FH option. Outputs are not simultaneous.
⁵⁾ Averaged from pulses, emitted during 30 sec time interval.
⁶⁾ Optional 80 or 22 ps ± 10% duration. Pulse energy specifications may differ from indicated here.

⁷⁾ With respect to optical pulse. <10 ps rms jitter is provided with PRETRIG option.
⁸⁾ TRIG1 OUT lead or delay can be adjusted with 0.25 ns steps in specified range.
⁹⁾ Near field Gaussian fit is >90%.
¹⁰⁾ Average of X- and Y-plane full angle divergence values measured at the 1/e² level at 1064 nm.
¹¹⁾ Beam diameter is measured at 1064 nm at the 1/e² point.
¹²⁾ Beam pointing stability is evaluated from fluctuations of beam centroid position in the far field.
¹³⁾ 456×1233×249 mm (W×L×H) laser head size might be required for some optional configurations.
¹⁴⁾ At 1 kHz pulse repetition rate.



OPTIONS

- ▶ **Option PRETRIG** provides low jitter pulse for streak camera triggering with lead/delay in -400...600 μ s range and <10 ps rms jitter.
- ▶ **Option P80** provides 80 ps \pm 10 % output pulse duration. Inquire for pulse energy specifications.
- ▶ **Option P20** provides 22 ps \pm 10 % output pulse duration. Inquire for pulse energy specifications.
- ▶ **Option PC** allows reduction of the pulse repetition rate of the PL2210 series laser by integer numbers. Single shot mode is also possible. In addition, the -PC option reduces the low-intensity quasi-CW background that is present at laser output at 1064 nm wavelength. Please note that the output of fundamental wavelength and harmonics will be reduced by approx. 20% with installation of the -PC option.

BEAM PROFILE

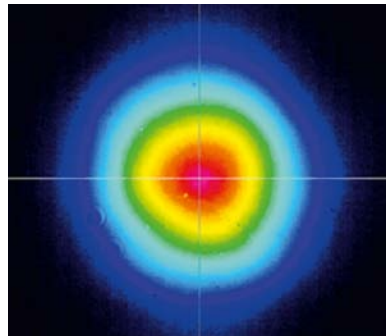


Fig 1. Typical PL2210 series laser near field beam profile at 1064 nm except PL2211, PL2211A

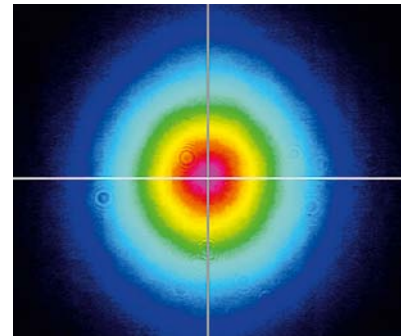


Fig 2. Typical PL2211, PL2211A laser near field beam profile at 1064 nm

OUTLINE DRAWINGS

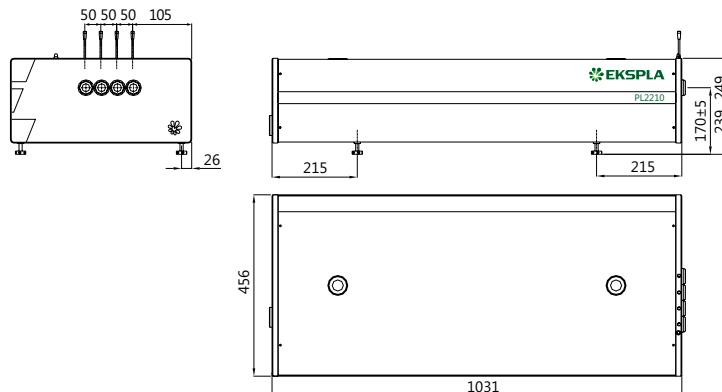


Fig 3. Dimensions of PL2210 series laser head

ORDERING INFORMATION

PL2210A-1K-SH/TH/FH-PRETRIG

<p>Model</p> <p>Pulse energy level, A for 0.9 mJ output</p> <p>Pulse repetition rate in Hz, 1K=1000 Hz</p>	<p>Harmonic generator options:</p> <p>SH → second harmonic</p> <p>TH → third harmonic</p> <p>FH → fourth harmonic</p>	<p>Other options:</p> <p>PRETRIG → pre-trigger option</p> <p>P80 → 80 ps pulse duration option</p> <p>P20 → 20 ps pulse duration option</p> <p>PC → pulse picker option</p> <p>PLL → pulse repetition rate locking option</p> <p>TR → auxiliary quasi-CW train output option</p>
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