

# 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  $\mu$ s lead of triggering pulse is available as a PRETRIG feature that is designed to provide precise, very low jitter trigger pulses for a streak camera.

## Built-in harmonic generators

Motorised switching of wavelength. Non-linear crystals mounted in temperature stabilized heaters are used for second, third and fourth high spectral purity harmonic generation.

## Available models <sup>1)</sup>

Model	Features
PL2210A	Up to 0.9 mJ, 29 ps pulses at an up to 1 kHz repetition rate
PL2210B	Up to 2.5 mJ, 29 ps pulses at an up to 1 kHz repetition rate

<sup>1)</sup> Custom-built models with higher pulse energy are available on request.

## 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
- ▶ Optional temperature stabilized second, third and fourth **harmonic generators**

### APPLICATIONS

- ▶ Time resolved fluorescence (including streak camera measurements), pump-probe spectroscopy
- ▶ OPG/OPA/OPO pumping
- ▶ Remote Laser Sensing
- ▶ Other spectroscopic and nonlinear optics applications

### Simple and convenient laser control

For customer convenience, the laser can be operated from a master device or a personal computer using various interfaces. Depending on the system configuration, control is available via the USB interface (REST API over RNDIS or VCP with ASCII commands), the RS-232 interface (ASCII commands), the LAN interface (REST API), or from the remote control pad with a backlit display that remains easy to read even while wearing laser safety glasses.

SPECIFICATIONS <sup>1)</sup>

Model	PL2210A	PL2210B
Output energy		
at 1064 nm	0.9 mJ	2.5 mJ
at 532 nm <sup>2)</sup>	0.45 mJ	1.3 mJ
at 355 nm <sup>3)</sup>	0.35 mJ	0.8 mJ
at 266 nm <sup>4)</sup>	0.1 mJ	0.25 mJ
Pulse energy stability (StdDev) <sup>5)</sup>		
at 1064 nm	0.5 %	
at 532 nm	0.8 %	
at 355 nm	1 %	
at 266 nm	2 %	
Pulse duration (FWHM) <sup>6)</sup>	29 ± 5 ps	
Pulse repetition rate	1 kHz	
Triggering mode	internal/external	
Typical TRIG1 OUT pulse delay <sup>7)</sup>	-500 ... 50 ns	
TRIG1 OUT pulse jitter	< 0.1 ns rms	
Spatial mode <sup>8)</sup>	Close to Gaussian	
Beam divergence <sup>9)</sup>	<1 mrad	
Beam diameter <sup>10)</sup>	1.7 mm	~3 mm
Beam pointing stability (RMS) <sup>11)</sup>	< 30 µrad	
Pre-pulse contrast	> 200 : 1	
Polarization	linear, >100 : 1	

## PHYSICAL CHARACTERISTICS

Laser unit size (W × L × H)	508 × 1030 × 244 ±3 mm	
Power supply size (W × L × H)	365 × 392 × 290 ±3 mm	450 × 375 × 130 ±3 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 <sup>12)</sup>	<1 kW

- <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 and for basic system without options.
- <sup>2)</sup> For PL2210 series laser with -SH, -SH/TH, -SH/FH or -SH/TH/FH option. Outputs are not simultaneous.
- <sup>3)</sup> For PL2210 series laser with -TH, -SH/TH or -SH/TH/FH option. Outputs are not simultaneous.
- <sup>4)</sup> For PL2210 series laser with -SH/FH or -SH/TH/FH option. Outputs are not simultaneous.
- <sup>5)</sup> Averaged from pulses, emitted during 30 sec time interval.

- <sup>6)</sup> Optional 80 or 20 ps ± 10% duration. Pulse energy specifications may differ from indicated here.
- <sup>7)</sup> TRIG1 OUT lead or delay can be adjusted with 0.25 ns steps in specified range.
- <sup>8)</sup> Near field Gaussian fit is >90%.
- <sup>9)</sup> Average of X- and Y-plane full angle divergence values 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> point.
- <sup>11)</sup> Beam pointing stability is evaluated from fluctuations of beam centroid position in the far field.
- <sup>12)</sup> At 1 kHz pulse repetition rate.



## OPTIONS

- ▶ **PRETRIG** provides low jitter pulse for streak camera triggering with lead/delay in -400...600  $\mu$ 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 20 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 harmonic will be reduced by approx. 20% with installation of the -PC option.

## BEAM PROFILE

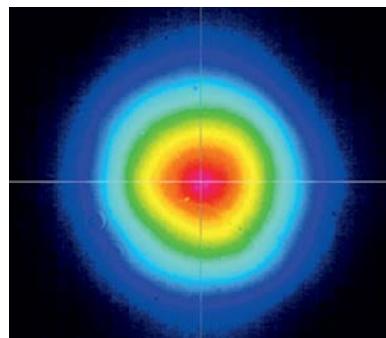


Fig 1. Typical PL2210 series laser near field beam profile at 1064 nm except PL2211A

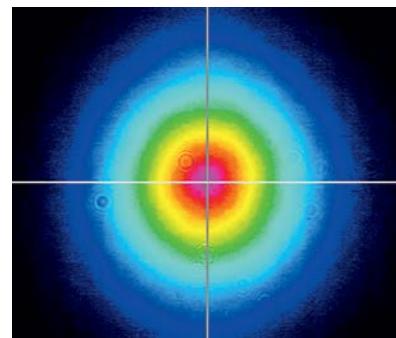


Fig 2. Typical PL2211A laser near field beam profile at 1064 nm

## OUTLINE DRAWINGS

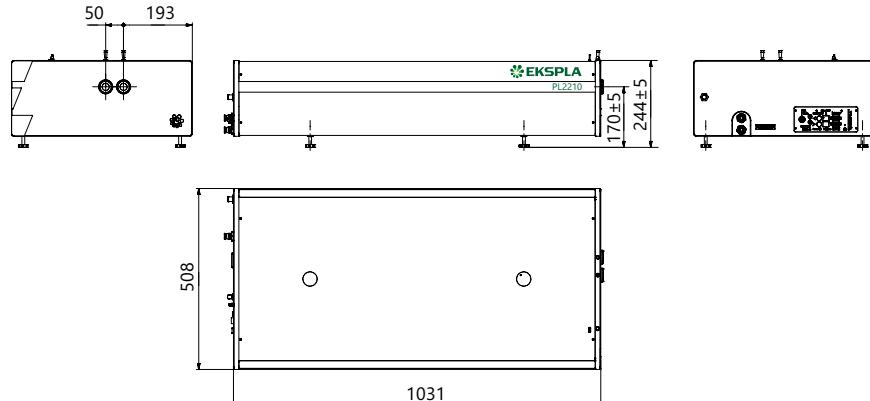


Fig 3. Dimensions of PL2210 series laser head

## ORDERING INFORMATION

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

## PL2210A-SH/TH/FH-P20

## Model

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

## Other options:

- P80 → 80 ps pulse duration option
- P20 → 20 ps pulse duration option
- PC → pulse picker option
- PLL → pulse repetition rate locking option