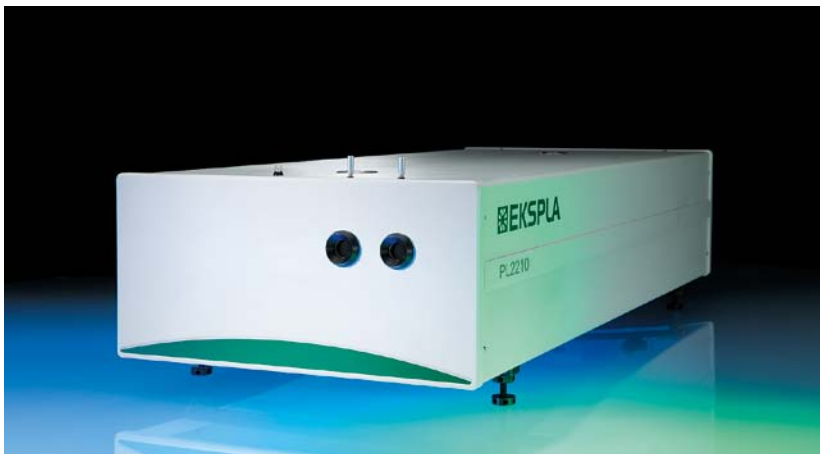
PL2210 SERIES

Diode Pumped Mode-locked 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*

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 150 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

Angle-tuned non-linear crystals mounted in temperature 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
PL2210	Up to 400 µJ, 25 ps pulses at an up to 2 kHz repetition rate
PL2210A	Up to 900 µJ, 25 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
PL2210C	Up to 5 mJ energy at a 1 kHz repetition rate at 80 ps pulses

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SPECIFICATIONS [1]

Model	PL2210	PL2210A	PL2210B	PL2210B-TR	PL2210C
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 / 5 mJ
at 532 nm [2]	0.2 mJ	0.45 mJ	1.3 mJ	–	1.3 / 2.5 mJ
at 355 nm [3]	0.11 mJ	0.3 mJ	0.8 mJ	–	0.8 / 1.3 mJ
at 266 nm [4]	0.05 mJ	0.15 mJ	0.5 mJ	–	0.5 / 0.8 mJ
Pulse energy stability (StdDev) [5]					
at 1064 nm	0.5 %				
at 532 nm	0.8 %				
at 355 nm	1 %				
at 266 nm	2.5 %				
Pulse duration (FWHM) [6]	25±2 ps	25±2 ps	80±8 ps	100±10 ps	25±2 ps / 80±8 ps
Pulse duration stability [7]	±1 ps	±1 ps	±3 ps	±3 ps	±1 / ±3 ps
Pulse repetition rate [8]	1 or 2 kHz	1 kHz		1 kHz / 1 MHz	1 kHz
Triggering mode	internal/external				
Typical SYNC OUT pulse delay [9] [10]	-500 ... 50 ns				
SYNC OUT pulse jitter	<0.1 ns rms				
Spatial mode [11]	TEM_{00}				
Beam divergence [12]	<1.6 mrad				
Beam diameter [13]	~3 mm				
Beam pointing stability [14]	<30 µrad				
Pre-pulse contrast	>200:1				
Polarization	linear, >100:1				
PHYSICAL CHARACTERISTICS					
Laser head size (W × L × H) [15]	455 × 1035 × 242 mm			455 × 1235 × 242 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	10–80 % (non condensing)				
Ambient temperature	22±2 °C				
Power requirements	100–240 V AC, single phase 50/60 Hz				
Power consumption [16]	<0.5 kW	<1 kW		<2 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 PL2210x-SH and PL2210x-SH/FH options. Outputs are not simultaneous. Please inquire for pulse energies for other harmonic generator options.

3) For PL2210x-TH option. Outputs are not simultaneous. Please inquire for pulse energies for other harmonic generator options.

4) For PL2210x-SH/FH option. Outputs are not simultaneous. Please inquire for pulse energies for other harmonic generator options.

5) Averaged from 300 pulses at 1 kHz pulse repetition rate.

6) Optional 80±8 ps duration.

7) Measured over 1 hour period when ambient temperature variation is less than ±2 °C.

8) Should be specified when ordering. Inquire for custom pulse repetition rates.

9) In respect to optical pulse. <10 ps rms jitter is provided with PRETRIG option.

10) SYNC OUT lead or delay can be adjusted with 0.25 ns steps in specified range.

11) Gaussian fit >90%.

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

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

14) Rms value measured from 300 shots.

15) 455×1235×250 mm (W×L×H) laser head size might be required for some optional configurations.

16) At 1 kHz pulse repetition rate.

OPTIONS

- **Option PRETRIG** provides low jitter pulse for streak camera triggering with lead/delay in -150...150 µs range and <10 ps rms jitter.
- **Option P80** provides 80±8 ps output pulse duration. Main specifications:

Model	PL2210	PL2210A
Pulse energy [1)]	0.7 mJ	1.2 mJ
Pulse duration (FWHM)	<80 ps	

[1)] At 1064 nm

- **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

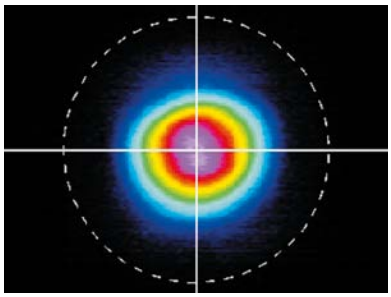

Fig 1. Typical near field beam profile of PL2210 series laser

OUTLINE DRAWINGS

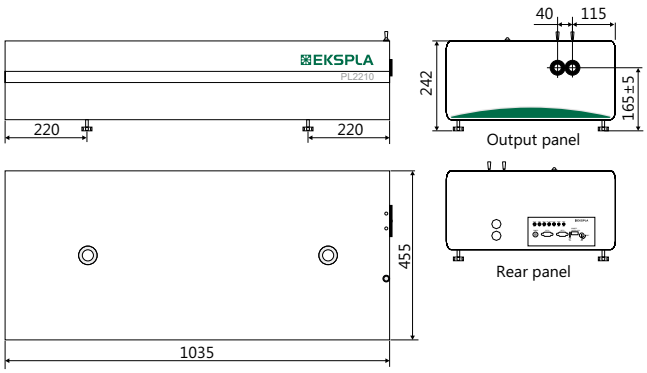

Fig 2. Dimensions of PL2210 series laser head (for models PL2210, PL2210A and PL2210B)

ORDERING INFORMATION

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

Model

Pulse energy level, A for 0.9 mJ output

Pulse repetition rate in Hz, 1K=1000 Hz

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

Other pptions:
PRETRIG → pre-trigger option
P80 → 80 ps pulse duration option
PC → pulse picker option
PLL → pulse repetition rate locking option
FS → supercontinuum seeding option
TR → auxiliary quasi-CW train output option

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