

PL2210

SERIES

Diode Pumped Picosecond Nd:YAG Lasers



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

- Model **PL2210** delivers **400 μ J**, **25 ps** pulses at an up to **2 kHz** repetition rate
- Model **PL2210A** delivers **900 μ J**, **25 ps** pulses at an up to **1 kHz** repetition rate
- Model **PL2210B** provides pulses with up to **2.5 mJ** energy at a **1 kHz** at pulse duration of **80 ps**
- Model **PL2210B-TR**, 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

Short pulse duration, excellent pulse-to-pulse stability, superior beam quality makes PL2200 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 μ s 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 LBO and/or BBO crystals mounted in temperature stabilized heaters are used for second, third and fourth harmonic generation. The harmonics separation system is designed to ensure a high spectral purity of radiation directed to the output ports.

SIMPLE AND CONVENIENT LASER CONTROL

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 while 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.

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 (RS232 is optional) with supplied LabVIEW™ drivers
- Optional temperature stabilized second, third and fourth harmonic generators

APPLICATIONS

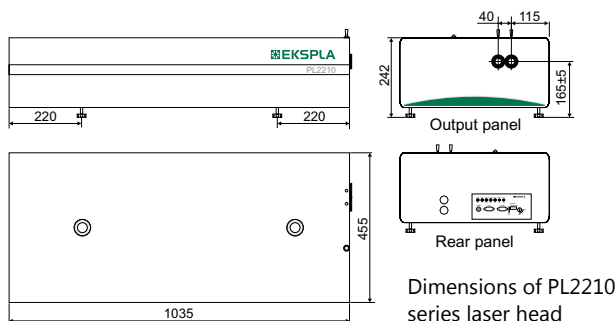
- Time resolved fluorescence, pump-probe spectroscopy
- OPG/OPA/OPO pumping
- Micromachining
- Other spectroscopic and nonlinear optics applications

SPECIFICATIONS ¹⁾

MODEL	PL2210	PL2210A	PL2210B	PL2210B-TR
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
at 532 nm ²⁾	0.2 mJ	0.45 mJ	1.3 mJ	–
at 355 nm ³⁾	0.11 mJ	0.3 mJ	0.8 mJ	–
at 266 nm ⁴⁾	0.05 mJ	0.15 mJ	0.5 mJ	–
Pulse energy stability (StDev) ⁵⁾				
at 1064 nm			0.5 %	
at 532 nm			0.8 %	
at 355 nm			1 %	
at 266 nm			4 %	
Pulse duration (FWHM) ⁶⁾	25±2 ps	25±2 ps	80±8 ps	100±10 ps
Pulse duration stability ⁷⁾	±1 ps	±1 ps	±3 ps	±3 ps
Pulse repetition rate ⁸⁾	1 or 2 kHz		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			
Typical 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× ×250 mm
Power supply size (W×L×H)	365×392×290 mm	472×460× ×290 mm	550×600× ×530 mm	
OPERATING REQUIREMENTS				
Water service	not required, air-cooled			
Relative humidity (non condensing)	10-80 %			
Operating ambient temperature	22±2 °C			
Mains requirements	100-240 V AC, single phase, 47-63 Hz			
Power consumption ¹⁶⁾	<0.5 kW	<1 kW	<1 kW	<2 kW

- ¹⁾ 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 PL22210x-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 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/e² point at 1064 nm.
- ¹³⁾ Beam diameter is measured at 1064 nm at the 1/e² 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.



Dimensions of PL2210 series laser head

OPTIONS

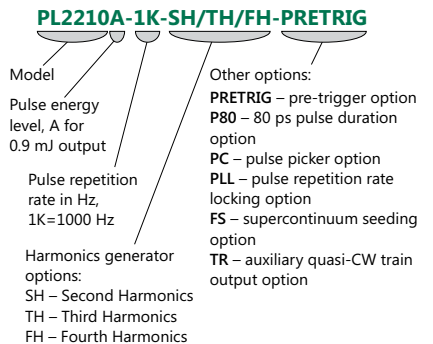
- **Option PRETRIG** provides low jitter pulse for streak camera triggering with lead/delay in -150...150 μs range and <10 ps rms jitter.
- **Option P80** provides 80±8 ps output pulse duration. Main specifications:

MODEL	PL2210	PL2210A
Pulse energy *	0.7 mJ	1.2 mJ
Pulse duration (FWHM)	<80 ps	

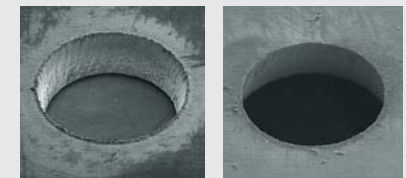
*At 1064 nm

- **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.

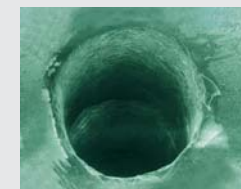
ORDERING INFORMATION



MICROMACHINING SAMPLES



Hole made in 200 μm thickness stainless steel:
Inlet, diameter 570 μm Outlet, diameter 475 μm



200 μm through-out hole made in diamond



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