

# 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 feature that is designed to provide precise, very low jitter trigger pulses for a streak camera.

### Built-in harmonic generators

Motorised switching of wavelength for PL2210A. 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-1k	Up to 900 μJ, 29 ps pulses at an up to 1 kHz repetition rate
PL2211A	Up to 5 mJ energy at a 1 kHz repetition rate at 28 ps pulses

<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 (for PL2210A-1k only)
- ▶ 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 master device or personal computer through USB (VCP, ASCII commands), RS232 (ASCII commands), LAN (REST API) or RS232 (ASCII commands), LAN (REST API) depending on the system configuration or from remote control pad with backlit display that is easy to read even while wearing laser safety glasses.

**SPECIFICATIONS <sup>1)</sup>**

Model	PL2210A	PL2211A
<b>Output energy</b>		
at 1064 nm	0.9 mJ	5 mJ
at 532 nm <sup>2)</sup>	0.45 mJ	2.5 mJ
at 355 nm <sup>3)</sup>	0.35 mJ	1.6 mJ
at 266 nm <sup>4)</sup>	0.16 mJ	1 mJ
<b>Pulse energy stability (StdDev) <sup>5)</sup></b>		
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>8)</sup>	-500 ... 50 ns	
TRIG1 OUT pulse jitter	< 0.1 ns rms	
Spatial mode <sup>9)</sup>	Close to Gaussian	
Beam divergence <sup>10)</sup>	<1 mrad	
Beam diameter <sup>11)</sup>	1.7 ± 0.3 mm	~3 mm
Beam pointing stability (RMS) <sup>12)</sup>	< 30 µrad	
Pre-pulse contrast	> 200 : 1	
Polarization	linear, >100 : 1	

**PHYSICAL CHARACTERISTICS**

Laser head size (W × L × H) <sup>13)</sup>	456 × 1031 × 249 mm	
Power supply size (W × L × H)	365 × 392 × 290 mm	550 × 600 × 550 ±3 mm (19" standard, MR-9)

**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>14)</sup>	<1 kW	<1.5 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 22 ps ± 10% duration. Pulse energy specifications may differ from indicated here.

<sup>7)</sup> With respect to optical pulse. <10 ps rms jitter is provided optionally with PRETRIG feature.

<sup>8)</sup> TRIG1 OUT lead or delay can be adjusted with 0.25 ns steps in specified range.

<sup>9)</sup> Near field Gaussian fit is >90%.

<sup>10)</sup> Average of X- and Y-plane full angle divergence values measured at the 1/e<sup>2</sup> level at 1064 nm.

<sup>11)</sup> Beam diameter is measured at 1064 nm at the 1/e<sup>2</sup> point.

<sup>12)</sup> Beam pointing stability is evaluated from fluctuations of beam centroid position in the far field.

<sup>13)</sup> 456×1233×249 mm (W×L×H) laser head size might be required for some optional configurations.

<sup>14)</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 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 harmonic will be reduced by approx. 20% with installation of the -PC option.

**BEAM PROFILE**

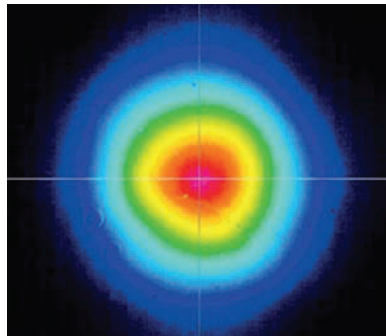


Fig 1. Typical PL2210 series laser near field beam profile at 1064 nm except PL2211A

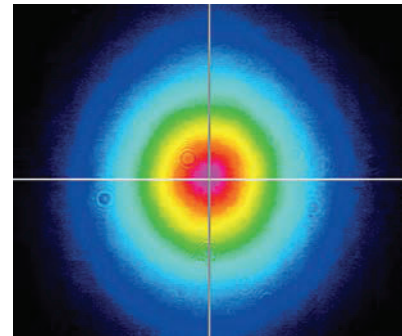


Fig 2. Typical PL2211A laser near field beam profile at 1064 nm

**OUTLINE DRAWINGS**

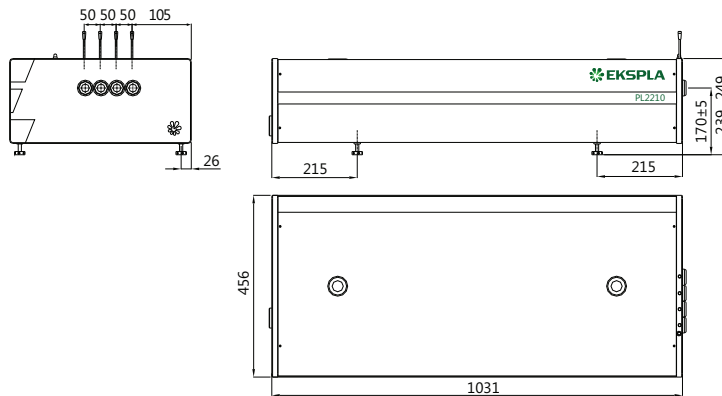


Fig 3. Dimensions of PL2210 series laser head

**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	Other options:
Harmonic generator options:	P80 → 80 ps pulse duration option
SH → second harmonic	P20 → 20 ps pulse duration option
TH → third harmonic	PC → pulse picker option
FH → fourth harmonic	PLL → pulse repetition rate locking option

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# PL2230 SERIES



## Innovative design

The heart of the system is a diode pumped solid state (DPSS) master oscillator placed in a sealed monolithic block, producing high repetition rate pulse trains (87 MHz) with a low single pulse energy of several nJ. Diode pumped amplifiers are used for amplification of the pulse to 30 mJ or up to 40 mJ output. The high-gain regenerative amplifier has an amplification factor in the proximity of  $10^6$ . After the regenerative amplifier, the pulse is directed to a multipass power amplifier that is optimized for efficient stored energy extraction from the Nd:YAG rod, while maintaining a near Gaussian beam profile and low wavefront distortion. The output pulse energy can be adjusted in approximately 1% steps, while pulse-to-pulse energy stability remains at less than 0.5% rms at 1064 nm.

Angle-tuned KD\*P and KDP crystals mounted in thermostabilised ovens are used for second, third, and fourth harmonic generation. Harmonic separators ensure the high spectral purity of each harmonic guided to different output ports.

Built-in energy monitors continuously monitor output pulse energy. Data from the energy monitor can be seen on the remote keypad or on a PC monitor. The laser provides triggering pulses for the synchronisation of your equipment. The lead of the triggering pulse can be up to 500 ns and is user adjustable in  $\sim 0.25$  ns steps from a personal computer. Up to 1000  $\mu$ s lead of triggering pulse is available as a pretrigger feature. Precise pulse energy control, excellent short-term and long-term stability, and a 50 Hz repetition rate makes PL2230 series lasers an excellent choice for many demanding scientific applications.

## Simple and convenient laser control

For customer convenience the laser can be operated from master device or personal computer through USB (VCP, ASCII commands), RS232 (ASCII commands), LAN (REST API) or RS232 (ASCII commands), LAN (REST API) depending on the system configuration or from remote control pad with backlit display that is easy to read even while wearing laser safety glasses.

## Diode Pumped High Energy Picosecond Nd:YAG Lasers

### FEATURES

- ▶ Diode pumped power amplifier producing up to **40 mJ** per pulse at 1064 nm
- ▶ Beam profile improvement using advanced beam shaping system
- ▶ Hermetically sealed DPSS master oscillator
- ▶ Diode pumped regenerative amplifier
- ▶ Air-cooled
- ▶ **<30 ps** pulse duration
- ▶ Excellent pulse duration stability
- ▶ Up to **100 Hz** repetition rate
- ▶ Streak camera triggering pulse with **<10 ps** jitter
- ▶ Excellent beam pointing stability
- ▶ Thermo stabilized second, third or fourth harmonic generator options
- ▶ PC control
- ▶ Remote control via keypad

### APPLICATIONS

- ▶ Time resolved fluorescence (including streak camera measurements)
- ▶ SFG/SHG spectroscopy
- ▶ Nonlinear spectroscopy
- ▶ Laser-induced breakdown spectroscopy
- ▶ OPG pumping
- ▶ Remote laser sensing
- ▶ Satellite ranging
- ▶ Other spectroscopic and nonlinear optics applications

**SPECIFICATIONS <sup>1)</sup>**

Model	PL2230-100	PL2231-100	PL2231-50	PL2231A-50
<b>Pulse energy <sup>2)</sup></b>				
at 1064 nm	3 mJ	12 mJ	30 mJ	40 mJ
at 532 nm <sup>3)</sup>	1.3 mJ	5 mJ	13 mJ	18 mJ
at 355 nm <sup>4)</sup>	0.9 mJ	3.5 mJ	9 mJ	13 mJ
at 266 nm <sup>5)</sup>	0.3 mJ	1.2 mJ	3 mJ	5 mJ
at 213 nm <sup>6)</sup>	inquire			
<b>Pulse energy stability (StdDev) <sup>7)</sup></b>				
at 1064 nm	< 0.2 %		< 0.5 %	
at 532 nm	< 0.4 %		< 0.8 %	
at 355 nm	< 0.5 %		< 1.1 %	
at 266 nm	< 0.5 %		< 1.2 %	
at 213 nm	< 1.5 %		< 1.5 %	
<b>Pulse duration (FWHM) <sup>8)</sup></b>				
		29 ± 5 ps		
<b>Pulse duration stability <sup>9)</sup></b>				
		± 1 %		
<b>Power drift <sup>10)</sup></b>				
		± 2 %		
<b>Pulse repetition rate</b>				
At 1064, 532, 355 nm	0 – 100 Hz	100 Hz	50 Hz	50 Hz
At 266, 213 nm	0 – 100 Hz		10 Hz	
<b>Polarization</b>				
	vertical, >99 % at 1064 nm			
<b>Pre-pulse contrast</b>				
	> 200 : 1 (peak-to-peak with respect to residual pulses)			
<b>Beam profile <sup>11)</sup></b>				
	close to Gaussian in near and far fields			
<b>Beam divergence <sup>12)</sup></b>				
	< 1.5 mrad		< 0.7 mrad	
<b>Beam propagation ratio M<sup>2</sup></b>				
	< 1.3		< 2.5	
<b>Beam pointing stability (RMS) <sup>13)</sup></b>				
	≤ 10 μrad		≤ 20 μrad	
<b>Typical beam diameter <sup>14)</sup></b>				
	~ 2 mm		~ 6 mm	~ 7 mm
<b>Optical pulse jitter</b>				
Internal triggering regime <sup>15)</sup>	<50 ps (StdDev) with respect to TRIG1 OUT pulse			
External triggering regime <sup>16)</sup>	~3 ns (StdDev) with respect to SYNC IN pulse			
<b>TRIG1 OUT pulse delay <sup>17)</sup></b>				
	-500 ... 50 ns			
<b>Typical warm-up time</b>				
	5 min		15 min	
<b>PHYSICAL CHARACTERISTICS</b>				
<b>Laser head size (W × L × H)</b>				
	456×1031×249 ± 3 mm			
<b>Electrical cabinet size (W × L × H)</b>				
	12 V DC power adapter, 85×170×41 ± 3 mm	471×391×147 ± 3 mm		
<b>Umbilical length</b>				
	2.5 m			
<b>OPERATING REQUIREMENTS</b>				
<b>Cooling <sup>18)</sup></b>				
	stand-alone chiller			
<b>Room temperature</b>				
	22±2 °C			
<b>Relative humidity</b>				
	20 – 80 % (non-condensing)			
<b>Power requirements</b>				
	110–240 V AC, 50/60 Hz	Single phase, 110–240 V AC, 5 A, 50/60 Hz		
<b>Power consumption</b>				
	< 0.15 kVA	< 1.0 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 and for basic system without options.

<sup>2)</sup> Outputs are not simultaneous.

<sup>3)</sup> For PL2230 series laser with -SH, -SH/TH, -SH/FH or -SH/TH/FH option or -SH/TH/FH/FiH module.

<sup>4)</sup> For PL2230 series laser with -TH, -SH/TH or -SH/TH/FH option or -SH/TH/FH/FiH module.

<sup>5)</sup> For PL2230 series laser with -SH/FH or -SH/TH/FH option or -SH/TH/FH/FiH module.

<sup>6)</sup> For PL2230 series laser with -SH/TH/FH/FiH module.

<sup>7)</sup> Averaged from pulses, emitted during 30 sec time interval.

<sup>8)</sup> FWHM. Inquire for optional pulse durations in 20 – 90 ps range. Pulse energy specifications may differ from indicated here.

<sup>9)</sup> Measured over 1 hour period when ambient temperature variation is less than ±1 °C.

<sup>10)</sup> Measured over 8 hours period after 20 min warm-up when ambient temperature variation is less than ± 2 °C.

<sup>11)</sup> Near field Gaussian fit is >80%.

<sup>12)</sup> Average of X- and Y-plane full angle divergence values measured at the 1/e<sup>2</sup> level at 1064 nm.

<sup>13)</sup> Beam pointing stability is evaluated from fluctuations of beam centroid position in the far field.

<sup>14)</sup> Beam diameter is measured at 1064 nm at the 1/e<sup>2</sup> level.

<sup>15)</sup> With respect to TRIG1 OUT pulse. <10 ps jitter is provided optionally with PRETRIG feature.

<sup>16)</sup> With respect to SYNC IN pulse.

<sup>17)</sup> TRIG1 OUT lead or delay can be adjusted with 0.25 ns steps in specified range.

<sup>18)</sup> Air cooled. Adequate room air conditioning should be provided.



Femtosecond Lasers

Picosecond Lasers

Picosecond Tunable Wavelength Lasers

Nanosecond Lasers

Nanosecond Tunable Wavelength Lasers

Other Ekspla Products

Custom products, tailored for specific applications <sup>1)</sup>

Model	PL2231C-20 (inquire)	PL2231A-10 (inquire)
Pulse energy <sup>2)</sup>		
at 1064 nm	140 mJ	80 mJ
at 532 nm <sup>3)</sup>	60 mJ	50 mJ
at 355 nm <sup>4)</sup>	35 mJ	inquire
at 266 nm <sup>5)</sup>	15 mJ	inquire
Pulse duration (FWHM) <sup>6)</sup>	80 ps ± 10 %	29 ± 5 ps
Pulse repetition rate	20 Hz	10 Hz

<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. Specifications for model PL2231C and PL2231A-10 are preliminary and should be confirmed against quotation and purchase order.

<sup>2)</sup> Outputs are not simultaneous.

If laser is optimised for pumping parametrical generator, maximum output energy may be different than specified for stand alone application.

<sup>3)</sup> For PL2230 series laser with -SH, -SH/TH, -SH/FH or -SH/TH/FH option or -SH/TH/FH/FiH module.

<sup>4)</sup> For PL2230 series laser with -TH, -SH/TH or -SH/TH/FH option or -SH/TH/FH/FiH module.

<sup>5)</sup> For PL2230 series laser with -SH/FH or -SH/TH/FH option or -SH/TH/FH/FiH module.

<sup>6)</sup> FWHM. Inquire for optional pulse durations in 20 – 90 ps range. Pulse energy specifications may differ from indicated here.

**OPTIONS**

- **Option P20** provides 20 ps ±10% output pulse duration. Pulse energies are ~ 30 % lower in comparison to the 28 ps pulse duration version. See table below for pulse energy specifications:

Model	PL2231-50	PL2231A-50
1064 nm	23 mJ	28 mJ
532 nm	9 mJ	13 mJ
355 nm	6 mJ	9 mJ
266 nm	2 mJ	4 mJ

- **Option P80** provides 80 ps ± 10% output pulse duration. Pulse energy specifications are same as those of 28 ps lasers.
- **Option PLL** allows locking the master oscillator pulse train repetition rate to an external RF generator, enabling precise external triggering with low jitter. Inquire for more information.

**BEAM PROFILE**

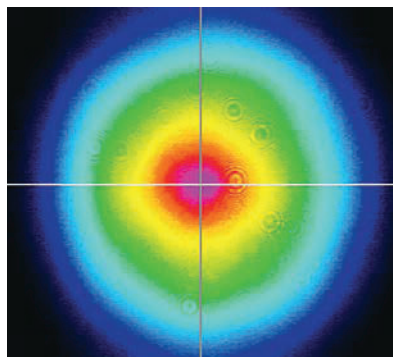


Fig 1. Typical near field output beam profile of PL2230 model laser

OUTLINE DRAWINGS

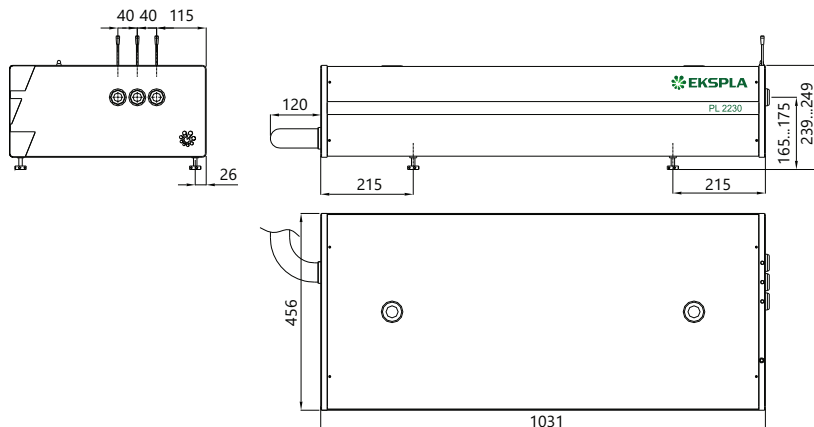
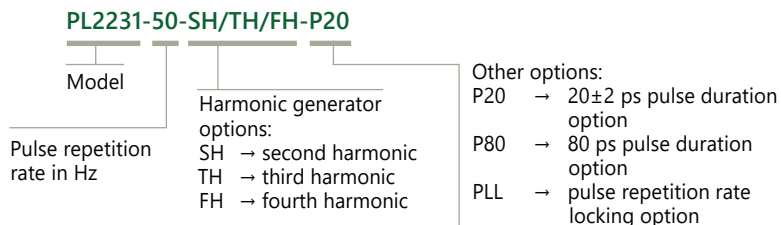


Fig 2. Dimensions of PL2230 series laser head

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.



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# PL2250 SERIES



PL2250 series lasers cost-effective design improves laser reliability and reduces running and maintenance costs.

## Innovative design

The heart of the system is a diode pumped solid state (DPSS) master oscillator placed in a hermetically sealed monolithic block. The flashlamp pumped regenerative amplifier is replaced by an innovative diode pumped regenerative amplifier. Diode pumping results in negligible thermal lensing, which allows operation of the regenerative amplifier at variable repetition rates, as well as improved long-term stability and maintenance-free operation.

The optimized multiple-pass power amplifier is flashlamp pumped and is optimized for efficient amplification of pulse while maintaining a near Gaussian beam profile and low wavefront distortion. The output pulse energy can be adjusted in approximately 1% steps, at the same time as pulse-to-pulse energy stability remains less than 0.8% rms at 1064 nm.

Angle-tuned KD\*P and KDP crystals mounted in thermostabilised ovens are used for second, third and fourth harmonic generation. Harmonic

separators ensure the high spectral purity of each harmonic directed to different output ports.

Built-in energy monitors continuously monitor output pulse energy. Data from the energy monitor can be seen on the remote keypad or PC monitor. The laser provides several triggering pulses for synchronization of the customer's equipment. The lead or delay of the triggering pulse can be adjusted in 0.25 ns steps from the control pad or PC. Up to 1000  $\mu$ s lead of triggering pulse is available as a pretrigger feature.

Precise pulse energy control, excellent short-term and long-term stability, and up to 20 Hz repetition rate makes PL2250 series lasers an excellent choice for many demanding scientific applications.

## Simple and convenient laser control

For customer convenience the laser can be operated from master device or personal computer through USB (VCP, ASCII commands), RS232 (ASCII commands), LAN (REST API) or RS232 (ASCII commands), LAN (REST API) depending on the system configuration or from remote control pad with backlit display that is easy to read even while wearing laser safety glasses.

## Flash-Lamp Pumped Picosecond Nd:YAG Lasers

### FEATURES

- ▶ Hermetically sealed DPSS master oscillator
- ▶ Diode pumped regenerative amplifier
- ▶ Flashlamp pumped power amplifier producing up to **100 mJ** per pulse at 1064 nm
- ▶ **30 ps** pulse duration (20 ps optional)
- ▶ Excellent pulse duration stability
- ▶ Up to **20 Hz** repetition rate
- ▶ Streak camera triggering pulse with <10 ps jitter
- ▶ Excellent beam pointing stability
- ▶ Thermo-stabilized second, third, fourth and fifth harmonic generator options
- ▶ PC control
- ▶ Remote control via keypad

### APPLICATIONS

- ▶ Time resolved fluorescence (including streak camera measurements)
- ▶ SFG/SHG spectroscopy
- ▶ Nonlinear spectroscopy
- ▶ Laser-induced breakdown spectroscopy
- ▶ OPG pumping
- ▶ Remote laser sensing
- ▶ Satellite ranging
- ▶ Other spectroscopic and nonlinear optics experiments



SPECIFICATIONS <sup>1)</sup>

Model	PL2251A	PL2251B	PL2251C
<b>Pulse energy</b>			
at 1064 nm	50 mJ <sup>2)</sup>	80 mJ <sup>2)</sup>	100 mJ
at 532 nm <sup>3)</sup>	25 mJ	40 mJ	50 mJ
at 355 nm <sup>4)</sup>	15 mJ	24 mJ	30 mJ
at 266 nm <sup>5)</sup>	7 mJ	10 mJ	12 mJ
at 213 nm <sup>6)</sup>		inquire	
<b>Pulse energy stability, (StdDev.) <sup>7)</sup></b>			
at 1064 nm		< 0.8 %	
at 532 nm		<1.0 %	
at 355 nm		< 1.1 %	
at 266 nm		< 1.2 %	
<b>Pulse duration (FWHM) <sup>8)</sup></b>			
		29 ± 5 ps	
<b>Pulse duration stability <sup>9)</sup></b>			
		± 1.0 ps	
<b>Repetition rate</b>			
	20 or 10 Hz		10 Hz
<b>Polarization</b>			
	linear, vertical, >99 %		
<b>Pre-pulse contrast</b>			
	>200:1 (peak-to-peak with respect to residual pulses)		
<b>Optical pulse jitter</b>			
	internal / external		
<b>Internal triggering regime <sup>10)</sup></b>			
	<50 ps (StdDev) with respect to TRIG1 OUT pulse		
<b>External triggering regime <sup>11)</sup></b>			
	~3 ns (StdDev) with respect to SYNC IN pulse		
<b>SYNC OUT pulse delay <sup>12)</sup></b>			
	-500 ... 50 ns		
<b>Beam divergence <sup>13)</sup></b>			
	< 0.5 mrad		
<b>Beam pointing stability (RMS) <sup>14)</sup></b>			
	≤ 20 μrad		
<b>Beam diameter <sup>15)</sup></b>			
	~ 8 mm	~10 mm	~12 mm
<b>Typical warm-up time</b>			
	30 min		

PHYSICAL CHARACTERISTICS

Laser head size (W × L × H)	456×1233×249 mm ±3 mm (for PL2251A, B with harmonic and C models) 456×1031×249 mm ±3 mm (for PL2251A, B models without harmonic)
Electric cabinet size (W × L × H)	550×600×550 ±3 mm (19" standard, MR-9)
Umbilical length	2.5 m

OPERATING REQUIREMENTS

Water consumption (max 20 °C)	water cooled, water consumption (max. 20 °C), <8 l/min, 2 bar		
Room temperature	22 ± 2 °C		
Relative humidity	20–80 % (non-condensing)		
Power requirements <sup>16)</sup>	single phase, 200–240 V AC, 16 A, 50/60 Hz		
Power <sup>17)</sup>	< 1.5 kVA	< 2.5 kVA	< 2.5 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 and for basic system without options.

<sup>2)</sup> PL2251B-20 has 70 mJ at 1064 nm output energy. Inquire for these energies at other wavelengths.

<sup>3)</sup> For -SH option. Outputs are not simultaneous. Please inquire for pulse energies at other wavelengths.

<sup>4)</sup> For -TH option. Outputs are not simultaneous. Please inquire for pulse energies at other wavelengths.

<sup>5)</sup> For -FH option. Outputs are not simultaneous. Please inquire for pulse energies at other wavelengths.

<sup>6)</sup> For PL2250 series laser with custom -FiH option.

<sup>7)</sup> Averaged from pulses, emitted during 30 sec time interval.

<sup>8)</sup> FWHM. Inquire for optional pulse durations in 20 – 90 ps range. Pulse energy specifications may differ from indicated here.

<sup>9)</sup> Measured over 1 hour period when ambient temperature variation is less than ±1 °C.

<sup>10)</sup> With respect to TRIG1 OUT pulse. <10 ps jitter is provided optionally with PRETRIG feature.

<sup>11)</sup> With respect to SYNC IN pulse.

<sup>12)</sup> TRIG1 OUT lead or delay can be adjusted with 0.25 ns steps in specified range.

<sup>13)</sup> Average of X- and Y-plane full angle divergence values measured at the 1/e<sup>2</sup> level at 1064 nm.

<sup>14)</sup> Beam pointing stability is evaluated from fluctuations of beam centroid position in the far field.

<sup>15)</sup> Beam diameter is measured at 1064 nm at the 1/e<sup>2</sup> point.



<sup>16)</sup> Three phase 208 or 380 VAC mains are required for 50 Hz versions.

<sup>17)</sup> For 10 Hz version.

If laser is optimised for pumping parametrical generator, maximum output energy may be different than specified for stand alone application.

**OPTIONS**

► **Option P20** provides 20 ps ± 10% output pulse duration. Pulse energies are 30% lower in comparison to the 30 ps pulse duration version. Linewidth <math>< 2 \text{ cm}^{-1}</math> at 1064 nm. See table below for pulse energy specifications:

Model	PL2251A-10	PL2251B-10	PL2251C -10
1064 nm	35 mJ	60 mJ	80 mJ
532 nm	17 mJ	30 mJ	40 mJ
355 nm	12 mJ	18 mJ	24 mJ
266 nm	5 mJ	8 mJ	10 mJ

► **Option P80** provides 80 ps ±10% output pulse duration. Pulse energy specifications as below:

Model	PL2251A	PL2251B	PL2251C
Pulse energy at 1064 nm	70 mJ	100 mJ	160 mJ

**BEAM PROFILE**

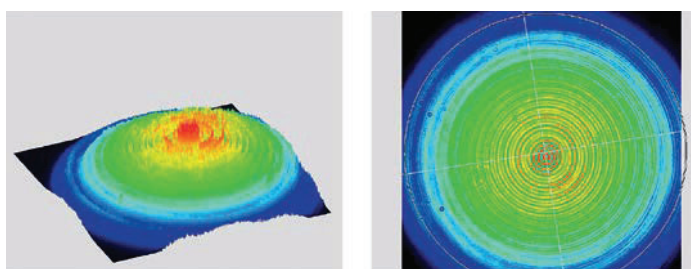


Fig 1. Typical near field output beam profile of PL2250 series laser

**OUTLINE DRAWINGS**

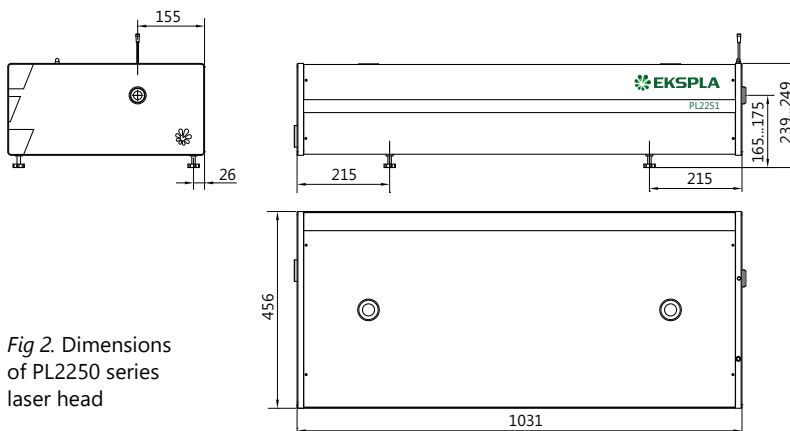
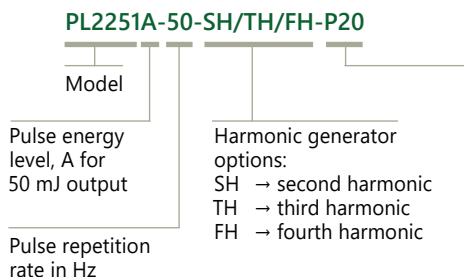


Fig 2. Dimensions of PL2250 series laser head

**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.



- Other options:
- P20 → 20 ps pulse duration option
  - P80 → 80 ps pulse duration option
  - AW → water-air heat exchanger option
  - FS → seeding option

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