

PL2250

SERIES

High Energy Picosecond Mode-locked 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 **50 Hz** repetition rate
- Streak camera triggering pulse with **<30 ps** jitter
- Excellent beam pointing **stability**
- Thermo stabilized **second, third or fourth** harmonic generator options
- **PC control** via USB and LabVIEW™ drivers (RS232 control is optional)
- Remote control via keypad

APPLICATIONS

- Time resolved spectroscopy
- SFG/SHG spectroscopy
- Nonlinear spectroscopy
- OPG pumping
- Remote laser sensing
- Satellite ranging
- Other spectroscopic and nonlinear optics experiments



PL2250 series lasers set a new standard in high pulse energy picosecond lasers. Their innovative and 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 from 1 mJ to nominal output, 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. Harmonics

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 μ s lead of triggering pulse is available as a pretrigger option.

Precise pulse energy control, excellent short-term and long-term stability, an up to 50 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 controlled from a user-friendly remote control pad or USB interface.

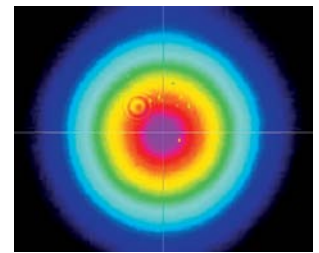
The remote pad allows easy control of all parameters and features a backlit display that is easy to read even while wearing laser safety eyewear.

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

SPECIFICATIONS ¹⁾

MODEL	PL2250	PL2251	PL2251A	PL2251B	PL2251C
Pulse energy					
At 1064 nm	1 mJ	30 mJ	50 mJ ⁸⁾	80 mJ ⁸⁾	100 mJ
At 532 nm ²⁾	0.45 mJ	15 mJ	25 mJ	40 mJ	50 mJ
At 355 nm ³⁾	0.3 mJ	10 mJ	15 mJ	24 mJ	30 mJ
At 266 nm ⁴⁾	0.15 mJ	3 mJ	7 mJ	10 mJ	12 mJ
Pulse energy stability (StDev) ⁵⁾					
At 1064 nm	0.2 %		< 0.8 %		
At 532 nm	0.4 %		< 1.0 %		
At 355 nm	0.5 %		< 1.1 %		
At 266 nm	0.5 %		< 1.2 %		
Pulse duration (FWHM) ⁶⁾					
	30 ± 3 ps				
Pulse duration stability ⁷⁾					
	± 1.0 ps				
Repetition rate					
	0-50 Hz	50 or 10 Hz	50, 20 or 10 Hz	20 or 10 Hz	10 Hz
Polarization					
	linear, vertical, > 100:1				
Pre-pulse contrast					
	> 200:1				
Triggering mode					
	internal/external				
SYNC OUT pulse jitter ⁹⁾					
	< 0.1 ns				
SYNC OUT pulse delay ¹⁰⁾					
	-500...50 ns				
Beam divergence ¹¹⁾					
	< 1.5 mrad	< 0.6 mrad	< 0.5 mrad	< 0.5 mrad	< 0.5 mrad
Beam pointing stability ¹²⁾					
	< 10 µrad	< 50 µrad			
Typical beam diameter ¹³⁾					
	~ 2.5 mm	~ 6 mm	~ 8 mm	~ 10 mm	~ 12 mm
Typical warm-up time					
	5 min	30 min			
PHYSICAL CHARACTERISTICS					
Laser head size (W×L×H)	453×1024×260 mm	453×1224×250 mm			
Electric cabinet size (W×H×L)	12 VDC power adapter, 85×41×170 mm	550×550×600 mm			
Umbilical length, m					
	2.5 m				
OPERATING REQUIREMENTS					
Water consumption (max 20 °C), l/min					
	Air cooled	< 8 l/min			
Room temperature					
	22 ± 2 °C				
Relative humidity (non-condensing)					
	20 – 80 %				
Mains requirements ¹⁴⁾					
	110-240 VAC, 50/60 Hz	Single phase, 208 or 230 VAC, 16 A, 50/60 Hz			
Power ¹⁵⁾					
	< 0.15 kVA	< 1.5 kVA	< 1.5 kVA	< 2 kVA	< 2.5 kVA

- 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 -SH option. Outputs are not simultaneous. Please inquire for pulse energies at other wavelengths.
- ³⁾ For -TH option. Outputs are not simultaneous. Please inquire for pulse energies at other wavelengths.
- ⁴⁾ For -FH option. Outputs are not simultaneous. Please inquire for pulse energies at other wavelengths.
- ⁵⁾ Averaged from 300 pulses.
- ⁶⁾ Inquire for optional pulse durations in 20-150 ps range.
- ⁷⁾ Measured over 1 hour period when ambient temperature variation is less than ± 1 °C.
- ⁸⁾ PL2251A-50 has 40 mJ at 1064 nm, PL2251B-20 has 70 mJ at 1064 nm output energy. Inquire for these energies at other wavelengths.
- ⁹⁾ 10 ps jitter is provided with PRETRIG option.
- ¹⁰⁾ SYNC OUT lead or delay can be adjusted with 0.25 ns steps in specified range.
- ¹¹⁾ Full angle measured at the 1/e² point at 1064 nm.
- ¹²⁾ RMS value measured from 300 shots.
- ¹³⁾ Beam diameter is measured at 1064 nm at the 1/e² point.
- ¹⁴⁾ Three phase 208 or 380 VAC mains are required for 50 Hz versions.
- ¹⁵⁾ For 10 Hz version.



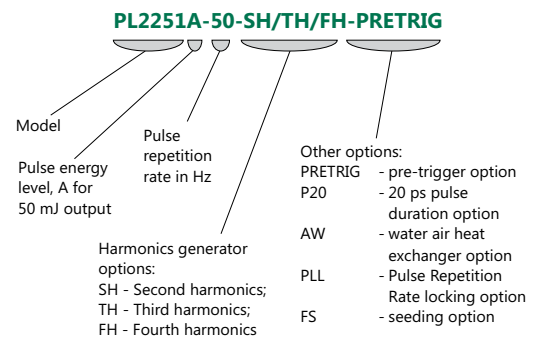
PL2250 laser output beam profile

OPTIONS

1. **Option PRETRIG** provides low jitter pulse for streak camera triggering with delay in -1000...5100 µs range and < 10 ps rms jitter.
2. **Option P20** provides 20±2 ps output pulse duration. Pulse energies are 30% lower in comparison to 30 ps pulse duration version.
3. **Option P80** provides less than 80 ps output pulse duration. Pulse energy specifications are presented below:

MODEL	PL2250	PL2251	PL2251A	PL2251B	PL2251C
Pulse energy at 1064 nm	1.5 mJ	60 mJ	100 mJ	160 mJ	200 mJ
Pulse duration (FWHM) *	< 80 ps				

* Inquire for other pulse durations in 20-150 ps range.



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