PL3140 SERIES

Picosecond Nd:YLF Lasers

FEATURES

- *Fiber master oscillator*
- *Diode pumped regenerative amplifier*
- *Flashlamp pumped power amplifier producing up to **80 mJ** per pulse at 1053 nm*
- ***10 ps** pulse duration*
- *Excellent pulse duration stability*
- *Up to **10 Hz** repetition rate*
- *PC control via USB (RS232 is optional) and LabView™ drivers*
- *Remote control pad*
- *Optional streak camera triggering pulse with <10 ps rms jitter*
- *Optional thermostabilized second, third or fourth harmonic generators*
- *Optical parametric generators for tunable wavelength output in 210–2600 nm range are available*

APPLICATIONS

- *Time resolved spectroscopy*
- *Nonlinear spectroscopy*
- *OPG pumping*
- *Other spectroscopic and nonlinear optics experiments*

Nd:YLF mode-locked PL3143 series picosecond lasers produces high energy pulses with as short as 10 ps pulse duration.

Rugged and reliable design

Diode pumped mode-locked quasi-CW master oscillator produces the train of the pulses that is guided to the regenerative amplifier for further amplification. The single pulse is cavity-dumped from regenerative amplifier and then amplified by linear amplifiers to up to 80 mJ pulse energy. The output pulse energy can be adjusted in approximately 1 % steps from 1 mJ to nominal output, at the same time pulse-to-pulse energy stability remains less than 1.5 % rms at 1053 nm.

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

Build in energy monitors continuously monitors output pulse energy. Data from the energy monitor can be seen on the remote keypad or on PC monitor.

The laser provides triggering pulse for synchronization of customer's equipment with lead up to 500 ns. The lead of triggering pulse can be adjusted in ~0.25 ns steps from control pad or PC.

PRETRIG option is offered for streak camera triggering and can provide pulse with up to 1000 µs lead that can be adjusted from PC with approx. 33 ns step.

Simple and convenient laser control

For customer convenience the laser can be controlled via user-friendly remote control pad. The remote pad allows easy control of all the parameters and features a backlit display that is easy to read even when wearing laser safety eyewear.

Alternatively, the laser can be controlled from personal computer via USB port using supplied software for Windows™ operating system. LabView™ drivers are supplied as well.

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SPECIFICATIONS [1]

Model	PL3143	PL3143A	PL3143B
Pulse energy			
at 1053 nm	30 mJ	50 mJ	80 mJ
at 526.5 nm [2]	15 mJ	25 mJ	40 mJ
at 351 nm [3]	8 mJ	12 mJ	15 mJ
at 263 nm [3]	4 mJ	6 mJ	8 mJ
Pulse energy stability (StdDev) [4]			
at 1053 nm	<1.5 %		
at 526.5 nm	<3.0 %		
at 351 nm	<5.5 %		
at 263 nm	<7.0 %		
Pulse duration (FWHM) [5]	10±2 ps		
Pulse duration stability [6]	±0.5 ps		
Repetition rate	10 Hz	5 or 10 Hz	5 Hz
Polarization	linear, vertical		
Pre-pulse contrast	>200:1		
Triggering mode	internal / external		
SYNC OUT pulse jitter [7]	<30 ps		
SYNC OUT pulse lead/delay [8]	-500...50 ns		
Beam divergence [9]	<0.7 mrad	<0.6 mrad	<0.6 mrad
Beam pointing stability [10]	<20 µrad		
Beam diameter [11]	~6 mm	~7 mm	~8 mm
PHYSICAL CHARACTERISTICS			
Laser head size (W × L × H)	462 × 1245 × 255 mm		600 × 1600 × 260 mm
Electric cabinet size (W × L × H)	550 × 600 × 835 mm		
Umbilical length	2.5 m		
OPERATING REQUIREMENTS			
Water consumption (max 20 °C)	<15 l/min		
Room temperature	22±2 °C		
Relative humidity	20–80 % (non-condensing)		
Power requirements [12]	three phase, 208 or 380 V AC, 20 A, 50/60 Hz		
Power consumption	<2.5 kVA	< 3 kVA [13]	<4 kVA

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 1053 nm.

2) For -SH option. Outputs are not simultaneous. Please inquiry for pulse energies at other wavelengths.

3) With auxiliary H400 harmonics generator unit. Outputs are not simultaneous. Please inquiry for pulse energies at other wavelengths.

4) Averaged from 300 pulses.

5) Inquiry for optional pulse durations in 20–80 ps range.

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

7) With respect to optical pulse. <10 ps jitter is provided with PRETRIG option.

8) SYNC OUT lead or delay can be adjusted with ~0.25 ns steps in specified range. PRETRIG option provide -1000..5000 µs lead/delay time adjustment range.

9) Full angle measured at the $1/e^2$ point at 1053 nm.

10) RMS value measured from 300 shots.

11) Beam diameter is measured at 1053 nm at the $1/e^2$ level.

12) Mains voltage should be specified when ordering.

13) For 10 Hz version.

OPTIONS

- **PRETRIG** option provides low jitter pulse for streak camera triggering with delay in -1000...5100 μs range and <10 ps rms jitter.

BEAM PROFILE

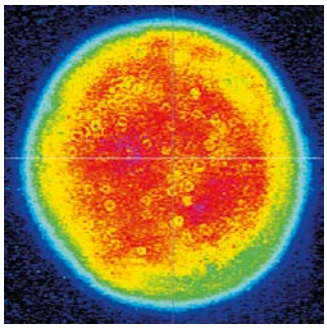

Fig 1. Typical beam profile at 1053 nm at 20 cm from PL3143B laser output at 80 mJ pulse energy

OUTLINE DRAWINGS

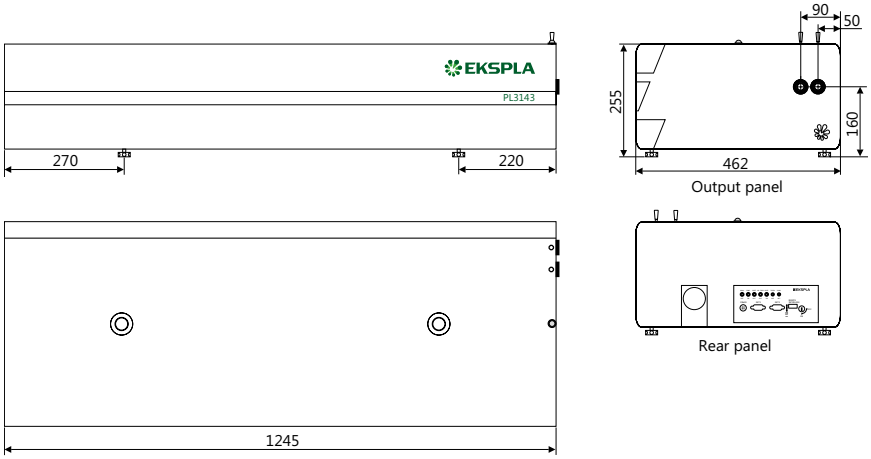

Fig 2. Dimensions of PL3143 and PL3143A lasers

ORDERING INFORMATION

PL3143A-10-SH/TH/FH-PRETRIG

Model

Pulse energy level:
A → 50 mJ output
no letter → 30 mJ output

Pulse repetition rate in Hz

Options:
AW → water-air heat exchanger

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

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