

SL330

SERIES

Picosecond High Energy Nd:YAG Lasers

FEATURES

- Innovative and **cost-efficient design**
- Up to **500 mJ** per pulse at 1064 nm
- **150 ps** pulse duration
- Self seeding SLM master oscillator
- More than **10⁵:1** pre-pulse contrast ratio
- **Low jitter** external triggering
- Versatile synchronization possibilities
- Variable pulse duration option
- LabVIEW™ drivers for convenient control from PC via RS232 port
- Remote control via keypad
- Compact laser head and power supply cabinet

APPLICATIONS

- Plasma research
- Material ablation and deposition
- Holography
- Absorption spectroscopy of laser induced plasmas
- Satellite ranging
- EUV light source development for photolithography
- OPCPA pumping



SL 300 series lasers are an excellent solution for applications that require high energy picosecond pulses.

Pulse compression during backward-stimulated Brillouin scattering (SBS), used in EKSPLA SL300 series lasers, is a simple and cost-efficient way to generate picosecond pulses, with the unique capability of producing pulses with tunable duration.

An electro-optically Q-switched Single Longitudinal Mode (SLM) nanosecond generator is the heart of the system. Instead of external narrow linewidth diode lasers, the selective properties of Fabry-Perrot etalon, and a laser cavity are used to produce SLM pulses with a smooth temporal envelope. In scientific literature this method of generating SLM pulses is known as a selfseeding technique.

Pulse compression is done in a SBS-cell with CCl₄ liquid. Depending on the geometry of interaction, a pulse with duration in the 150 – 1500 ps range can be produced. Pulse duration can be tuned in discrete steps when a variable pulse duration option (-VPx) is installed.

After SBS compression, the pulse is directed to a multi-pass power amplifier system for amplification to up to 500 mJ energy. Temperature controlled harmonics generators, based on angle-tuned KD*P and KDP crystals and harmonic separation optics, are available as standard options. Each wavelength has a separate output port. A power supply and water/water type cooling units are placed in a standard 19" rack that requires little space under an optical table.

The very low jitter of the optical pulse relative to the Q-switch triggering pulse ensures reliable synchronization of the laser with external equipment.

For customer convenience the laser can be controlled from a user-friendly remote control pad or RS232 interface.

The remote pad allows easy control of all laser parameters and features a backlit display that is easy to read even when 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	SL330	SL332	SL333	SL334
Max. pulse energy:				
at 1064 nm	30 mJ	150 mJ	250 mJ	500 mJ
at 532 nm ²⁾	12 mJ	70 mJ	120 mJ	240 mJ
at 355 nm ³⁾	7 mJ	40 mJ	80 mJ	140 mJ
at 266 nm ⁴⁾	4 mJ	25 mJ	40 mJ	80 mJ
Pulse energy stability (StDev) ⁵⁾:				
at 1064 nm	6%		4%	
at 532 nm	8%		7%	
at 355 nm	10%		9%	
at 266 nm	13%		12%	
Pulse duration at 1064 nm (FWHM) ⁶⁾	150 ± 20 ps			170 ± 20 ps
Pulse duration stability at 1064 nm ⁷⁾	10 % (StDev)			
Repetition rate ⁸⁾	10 or 50 Hz	10 Hz		5 Hz
Linewidth	≤ 0.1 cm ⁻¹			
Polarization	linear, >50:1			
Optical pulse jitter ⁹⁾	0.5 ns			
Beam profile ¹⁰⁾	Hat Top, >70% fit to Gaussian			
Beam divergence ¹¹⁾	< 0.5 mrad			
Beam height	165 ± 5 mm	170 ± 10 mm		
Pre-pulse contrast ratio	10 ⁵ :1			
Beam diameter ¹²⁾	~6 mm	~ 8 mm	~ 10 mm	~12 mm
PHYSICAL CHARACTERISTICS				
Laser Head Size (W×H×L)	255 × 240 × × 790 mm	305 × 260 × 990 mm		
Electric Cabinet Size (W×H×L)	550 × 530 × × 600 mm	550 × 850 × 600 mm		
Umbilical length	2.5 m			
OPERATING REQUIREMENTS				
Water consumption (max. 20 °C)	< 10 liters/min			
Room temperature	18 – 27 °C			
Relative humidity (non-condensing)	10 – 80 %			
Mains requirements ¹³⁾	208 or 230 V AC, single phase, 50/60 Hz			208 or 380 V AC, three phase, 50/60 Hz
Power consumption, VA ¹⁴⁾	< 1.5 VA	< 2.5 VA	< 3.5 VA	< 3.5 VA

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⁾ Variable pulse duration options are available with 170-500 ps or 500-1000 ns tuning range.

⁷⁾ Measured from 300 shots using 40 Gs/s oscilloscope and photodetector with 50 ps rise time.

⁸⁾ Inquire for up to 50 Hz custom pulse repetition rates.

⁹⁾ In external triggering mode with two separate triggering pulses for flashlamps and Q-switch. Low jitter sync pulse is available for user equipment triggering.

¹⁰⁾ Improved Gaussian fit profile is available on request.

¹¹⁾ Full angle measured at the 1/e² point at 1064 nm.

¹²⁾ Beam diameter is measured at 1064 nm at the 1/e² point.

¹³⁾ Three phase 208 or 380 V AC mains are required for 20 or 50 Hz versions.

¹⁴⁾ For 5 or 10 Hz pulse repetition rate.

ORDERING INFORMATION

SL332-10-SH-VP1

Model
Pulse repetition rate in Hz

Harmonics generator options:
SH – Second Harmonics
TH – Third Harmonics
FH – Fourth Harmonics

Other options:
VP1 or VP2 – variable pulse duration, manual control
VPC1 or VPC2 – variable pulse duration, computer control
AW – water-air heat exchanger option

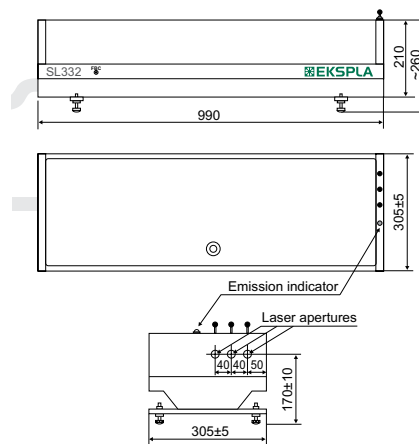
OPTIONS

Variable pulse duration options –VPx and -VPCx

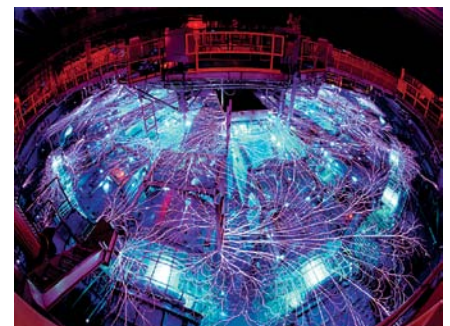
SL series lasers offer a unique capability for tuning pulse duration. The tuning is done by changing the geometry of interaction in the SBS compressor. Two tuning ranges – 150-500 ps (option -VP1) and 500-1000 ps (option -VP2) – are available as standard options, other ranges are available on request.

While the -VPx option requires manual tuning of optical layout components for pulse duration change, the -VPCx option provides motorized tuning that allows a change in pulse duration from a personal computer or laser control pad.

Note. Certain specifications may change when the laser is configured for variable pulse duration. Contact Ekspla for detailed datasheets.



Dimensions of SL332, SL333 and SL334 lasers



SL330 series laser used as a flash in high speed photography to illuminate wires as they explode

Courtesy of Dr. Randy Montoya, Sandia National Laboratories, USA



EKSPLA
Savanoriu av. 231
02300 Vilnius
LITHUANIA

Ph.: +370 5 2649629
Fax: +370 5 2641809
sales@ekspla.com
www.ekspla.com

Find local distributor at
www.ekspla.com



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