

ANL SERIES

High Energy and High Repetition Rate DPSS Nanosecond Lasers



ANL series electro-optically Q-switched nanosecond Nd:YAG amplifier systems deliver high energy pulses at high repetition rates.

A diode-pumped Q-switched nanosecond laser, based on industry-tested technology is used as a master oscillator of the system. It produces high-intensity, high-brightness pulses and is well suited for further amplification in linear amplifiers for high-energy Super-Gaussian output pulses. Employing electro-optical cavity dumping, the master oscillator can produce pulses which are as short as several ns with uniform beam profile and low divergence.

Alternatively customers own seed source can be implemented as master oscillator and amplified to required energy level for further amplification in main power amplifiers.

Power amplifiers are a chain of low-maintenance diode-pumped single and double pass amplifiers where pulses are amplified up to the required energy. During amplification, spatial beam shaping is employed in order to get a flat top shape at the output. Optional second and third harmonic generators are based on angle-tuned nonlinear crystals placed in heaters.

For convenience, PC software for Windows™ is used for laser operation, monitoring and internal system diagnostics.

To tailor the laser for specific applications or requirements, various customization possibilities are available such as industrial grade, portable laser housing with integrated power supplies and cooling units; customer's seed integration; multi-channel outputs; burst amplification and various other.

Highly Customizable to Meet Customer Needs

FEATURES

- ▶ Up to **2 J** at **1064 nm** output pulse energy
- ▶ Up to **1 kHz** repetition rate
- ▶ Multi-channel version providing up to **8 channels** and **2 J** per channel at 1064 nm
- ▶ **2 – 50 ns** pulse duration
- ▶ Spatial Super-Gaussian beam profile
- ▶ Low maintenance cost and long diode lifetime
- ▶ Burst version providing bursts of 20 kHz every 20 s
- ▶ Variable pulse duration and temporal pulse shape control (AWG) option available
- ▶ Various customization possibilities to tailor for specific application
- ▶ Optional thermally stabilized second and third harmonics generators
- ▶ High efficiency diode pumping chambers
- ▶ Small laser head footprint and OEM integration upon request
- ▶ Internal system diagnostics
- ▶ Thermally induced birefringence compensation for high pulse repetition rates
- ▶ Integrated vacuum system for image translation for smooth Super-Gaussian beam profile
- ▶ Optional industrial grade, portable laser housing with integrated power supplies and cooling units

APPLICATIONS

- ▶ Thomson Scattering

SPECIFICATIONS ¹⁾

Model	ANL 2001k	ANL 4001k	ANL 1k200	ANL2k20k-Burst	ANL2k100-SH
MAIN SPECIFICATIONS					
Pulse energy					
at 1064 nm	> 200 mJ	> 400 mJ	> 1000 mJ	2000 mJ	2 × 1700 mJ
at 532 nm ²⁾	-				2 × 900 mJ
Pulse energy stability (StdDev): ³⁾					
at 1064 nm	1.0 %				
at 532 nm	-				2.0 %
Power drift ⁴⁾					
	± 2 %				
Pulse duration ⁵⁾					
	2 – 4 ns	~ 5 ns	5 ns	50 ns	
Repetition rate					
	1000 Hz	200 Hz	bursts of 20 kHz every 20 s		100 Hz
Polarization at 1064 nm					
	horizontal			vertical, > 90 %	
Optical pulse jitter ⁶⁾					
	-			< 30 ps	
Linewidth					
	-			< 1 cm ⁻¹	
Beam profile					
	Hat-Top (at laser output), without diffraction rings				
Typical beam diameter ⁷⁾					
	~6 mm	~10 mm	~12 mm	~10 mm	
Beam divergence ⁸⁾					
	< 1.0 mrad		< 0.5 mrad		
Beam pointing stability					
	± 30 μrad ³⁾			± 50 μrad	
PHYSICAL CHARACTERISTICS					
Laser head (W × L × H)					
	1000 × 2000 × 490 mm		1000 × 2000 × 400 mm	1000 × 2000 × 1800 mm	
Power supply unit (W × L × H)					
	553 × 600 × 700 mm		550 × 600 × 500 mm	-	
Umbilical length					
	2.5 m		3 m	-	
OPERATING REQUIREMENTS					
Facility water consumption (max 20° C)					
	10 l/min	14 l/min	10 l/min	8 l/min	20 l/min
Ambient temperature					
	22 ± 2 °C				
Relative humidity					
	20 – 80 % (non-condensing)				
Power requirements ⁹⁾					
	208, 380 or 400 V AC, three phase, 50/60 Hz				
Power consumption					
	<10 kW	<12 kW	<6 kW	<2 kW	<9.4 kW

¹⁾ Due to continuous improvement, all specifications subject to change without notice. Parameters marked typical may vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm and for basic system without options.

²⁾ For ANLxxx-SH harmonic generator option. Harmonic outputs are not simultaneous; only single wavelength beam is present at the output at once.

³⁾ Standard deviation value averaged over 30 s after 20 minutes of warm-up.

⁴⁾ Deviation from average value measured over 8 hours of operation when room temperature variation is less than ±2 °C.

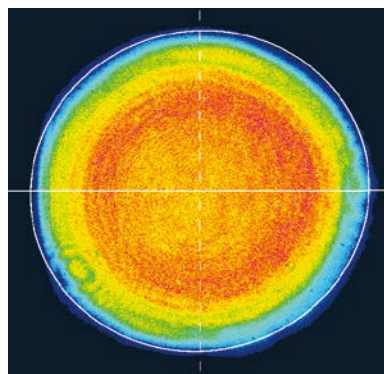
⁵⁾ Measured with photodiode with 100 ps rise time and oscilloscope with 600 MHz bandwidth.

⁶⁾ Standard deviation value, measured with respect to triggering pulse.

⁷⁾ Beam diameter is measured at 1064 nm at laser output at the 1/e² level and can vary with each unit we manufacture.

⁸⁾ Full angle measured at the 1/e² level at 1064 nm.

⁹⁾ Voltage fluctuations allowed are +10 % / -15 % from nominal value. Mains voltage should be specified when ordering.



Typical beam profile of ANL4001k laser

