NL740 SERIES

Ultra-stable Nanosecond Laser

FEATURES

- *Narrow bandwidth, **stable**, true SLM pulses*
- *Excellent pulse energy (typically 0.1 % StDev @ 1064 nm) and pulse duration stability*
- *Excellent spatial mode stability*
- *Excellent output power stability (typically < ±0.5 % peak-to-peak)*
- ***3 – 10 ns tunable** pulse duration*
- *Up to **100 mJ** output energy*
- *Up to **100 Hz** repetition rate*
- *1064, 532 nm or 355 nm output wavelength*
- *Reliable 24/7 operation*

BENEFITS

- *Stable SLM pulses make the NL740 suitable for metrology (LIDT), interferometry, holography and DIAL (LIDAR) applications*
- *Excellent pulse energy and spatial and temporal mode stability ensure high quality experiment statistical data and saves on the cost and time spent for tests and investigation*
- *High repetition rate (up to 100 Hz) ensures fast acquisition of experiment data*
- *3 – 10 ns tunable pulse duration enables experiments using a wide range of durations; no need to purchase separate lasers for experiments requiring different pulse duration*
- *Reliable 24/7 operation is excellent for metrology, especially Laser-Induced Damage Threshold (LIDT) applications*
- *Variety of interfaces: USB, RS232, LAN and WiFi ensures easy integration with other equipment*

APPLICATIONS

- *Metrology, especially Laser-Induced Damage Threshold (LIDT)*
- *Front end for power amplifiers*
- *Interferometry and holography*
- *Material processing and others*

The main feature of NL740 series is the output of ultra-stable tunable duration (2 – 10 ns) narrow bandwidth nanosecond pulses based on temporally driven CW diode laser seeder and amplification stages.

Start of the system is the single mode DFB laser with temporal output power modulator. Such front-end ensures reliable generation of SLM mode that is highly beneficial for formation of low temporal modulation ultra-stable pulses. Then light is amplified in diode pumped regenerative amplifier in order to reach energy sufficient to amplify in diode pumped amplifiers. Power amplifier is a chain of double pass amplifiers where pulse is amplified up to 100 mJ energy at 100 Hz repetition rate. Before amplification spatial beam shaping is employed in order to get flat top shape at the output. The harmonic generators are based on angle tuned nonlinear crystals placed in a heater. All diode pumped design ensures reliable operation of system at high repetition rates as well as simple and convenient maintenance.

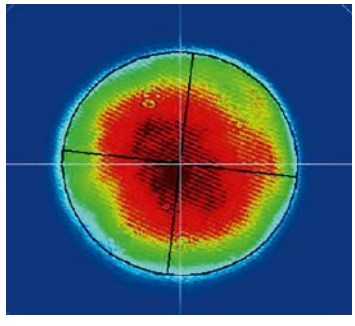

Fig 1. Typical NL740 near field beam profile at 532 nm

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SPECIFICATIONS [1]

Model	NL740	NL742
Pulse energy (for 5 ns pulse [5])		
at 1064 nm	2 mJ	100 mJ
at 532 nm [2]	NA	50 mJ
at 355 nm [2]	NA	30 mJ
Pulse energy stability (StdDev) [3]		
at 1064 nm	< 0.5 %	
at 532 nm	< 1.0 %	
at 355 nm	< 1.5 %	
Power drift [4]	± 2 %	
Pulse duration [5]	3 – 10 ns	
Repetition rate	100 Hz	
Polarization at 1064 nm	vertical, > 98 %	
Optical pulse jitter [6]	< 150 ps	
Linewidth	<0.1 cm^{-1}	
Beam profile	Gaussian	Top-Hat (at laser output), without diffraction rings
Typical beam diameter [7]	~2 mm	~5 mm
Beam divergence [8]	1.0 mrad	0.7 mrad
Beam pointing stability (StdDev)	< 30 µrad	
PHYSICAL CHARACTERISTICS		
Laser head (W × L × H)	456 × 1031 × 249 mm	600 × 1200 × 330 mm
Power supply unit (W × L × H)	85 × 170 × 41 mm	520 × 500 × 210 mm
Umbilical length	2.5 m (other length on request)	
OPERATING REQUIREMENTS		
Cooling	air-cooled	air-cooled chiller
Ambient temperature	stabilized; from range 18–25 °C	
Relative humidity	20–80 % (non-condensing)	
Power requirements [9]	100–240 V AC, single phase 50/60 Hz	
Power consumption	< 200 W	< 1.5 kW

1) Due to continuous improvement, all specifications are subject to change. Parameters marked typical are illustrative; 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.

2) Harmonic outputs are not simultaneous; only single wavelength beam is present at the output at once. Manual reconfiguration is required to switch wavelength.

3) Standard deviation value averaged from pulses, emitted during 30 sec time interval 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) FWHM. 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 $1/e^2$ level.

8) Full angle measured at the $1/e^2$ level at 1064 nm.

9) Mains voltage should be specified when ordering.

PERFORMANCE

Note: Laser must be connected to the mains electricity all the time. If there will be no mains electricity for longer that 1 hour then laser (system) needs warm up for a few hours before switching on.

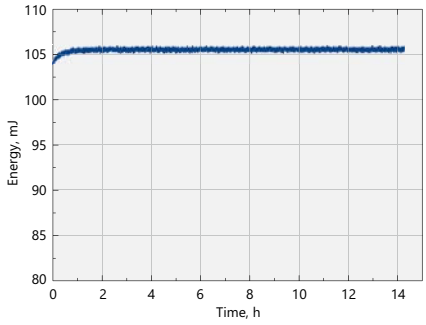

Fig 2. Typical NL740 long-term energy stability

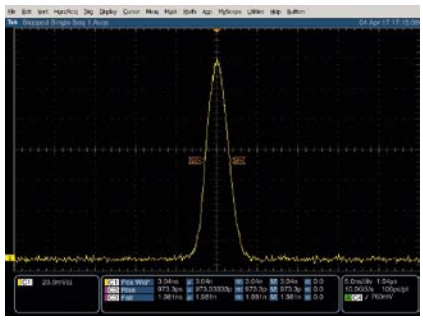

Fig 3. Typical NL740 pulse shape