

NL740 SERIES



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.

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

APPLICATIONS

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

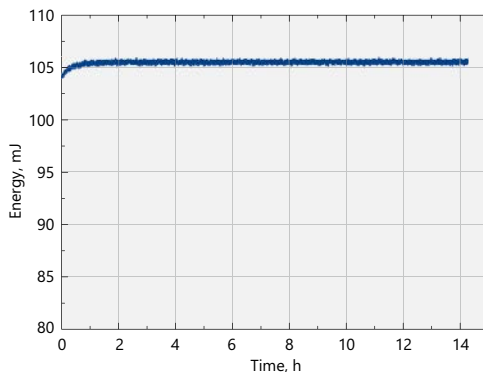


Fig 1. Typical NL740 long-term energy stability

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/e² level.
- ⁸⁾ Full angle measured at the 1/e² 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 than 1 hour then laser (system) needs warm up for a few hours before switching on.

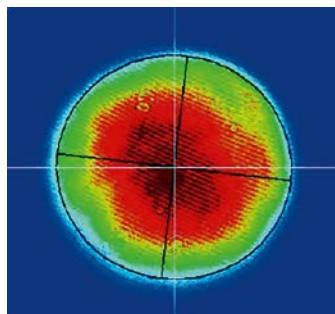


Fig 2. Typical NL740 near field beam profile at 532 nm

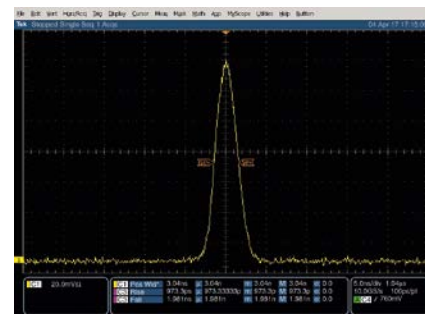


Fig 3. Typical NL740 pulse shape