High Energy SUB-Nanosecond Laser

The **SUB-1000** laser DATASHEET, **June 2024**

SUB-NANOSECOND E-O Q-SWITCHED LASER

The **SUB-1000** model is a water-cooled **Electro-Optically Q-switched** laser, which have **≈ 0.5 ns pulse duration** and **three modes of operation:** Low energy Pilot mode and High energy mode. In High Energy mode laser delivers up to 1000 mJ energy at 1064 nm wavelength and up to 500 mJ at second harmonic. Laser design comprising short cavity MO in conjunction with power amplifiers based on efficient flashlamp pumped gain modules, where **≈350 ps (PTP) optical jitter** is welcome point for laser use in any scientific and industrial application. Due to relatively high output energy and short sub-ns pulse duration, laser delivers peak power up to **2 GW** (1064 nm) and up to **1 GW** (532 nm). The harmonic conversion module to green (532 nm) is available in default laser configuration.

Typical Laser Specifications [1)]

Model	SUB- 1000
Wavelength	1064/532 nm
Laser Output Energy **High Energy (1064/532nm)** **Pilot/Low Energy mode (532nm)**	 up to 90…1000/20…500 mJ up to 0.12…20 mJ
Peak power (1064/532nm)	2/1 GW
Pulse duration [2)]	≈ 500 ps
Energy stability [3)]	≤ 2 % RMS
Pulse repetition rate [4)]	Pilot/ Low Energy mode: 1 shot per 3 seconds (0.33 Hz), High Energy mode: up to 1 shot per 2 minutes
Beam profile	Bell shaped
Beam divergence [5)]	< 1.3 mrad
Polarization (1064/532nm)	Linear (S/P)
Spectral linewidth	SLM
Beam pointing stability [6)]	≤ 50 µrad
Typical beam diameter [7)]	≈20 mm
Optical jitter [8)]	≤ 200 ps RMS
Dimensions (preliminary)	
Laser head (L ×W × H)	≈ 1130 x 426 x 238 mm
Controller unit (L ×W × H)	≈ 610 x 554 x 1279 mm
Umbilical length	2.5 m
Operating requirements	
Cooling requirements	Water/Air Chiller
Ambient temperature	20 – 29 °C
Relative humidity (non-condensing)	below 75 % non-condensing
Mains voltage [9)]	230 VAC, single phase, 50-60 Hz
Power consumption	≈700 W (average) 4 kW (at peak, charging)

1) *Due to continuous improvements all specifications are subjects to change. The 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) *FWHM level at 532 nm. Laser models with tunable pulse duration in the range either 350 – 2000 ps or 1 - 10 ns is also feasible.*
3) *Averaged from periodic measurements:*
   Pilot mode – 100 shots
   Low Energy mode – 100 shots
   High Energy mode – 15 shots
4) *Two modes of operation: High Energy Single shot and Weak Energy Repetitive Pilot Mode.*
5) *Full angle measured at the $1/e^2$ level at 532 nm*
6) *RMS value measured from 10 High Energy shots.*
7) *Beam diameter is measured 50 cm from laser output port.*
8) *In respect to External Q-switch triggering rising edge pulse.*
9) *Laser can be powered from appropriate different mains on*

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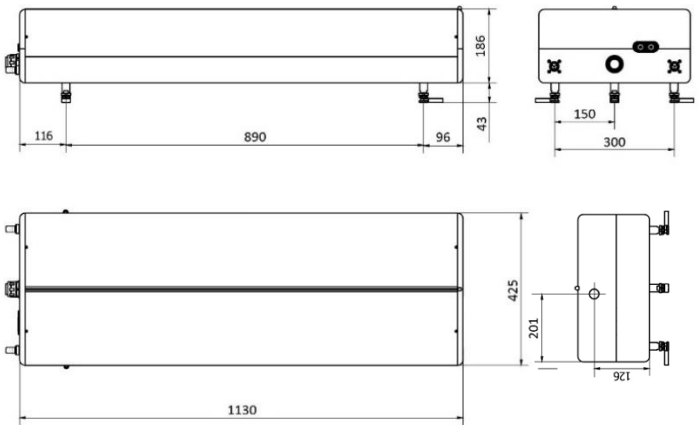
Application

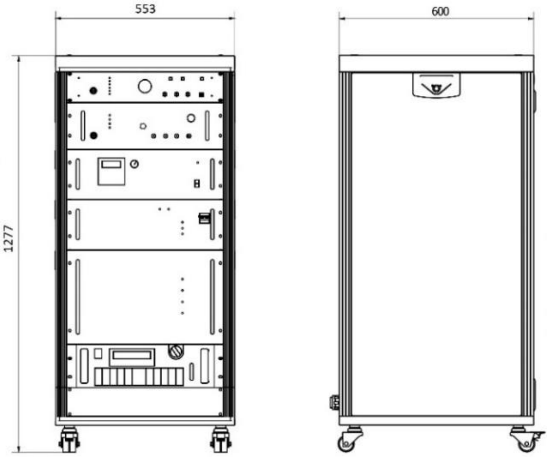
- Plasma generation and its R&D
- LIBS (Light Induced Breakdown Spectroscopy)
- TOF MS (Time of Flight Mass Spectroscopy)
- Your application is welcome..

Dimensions

Laser Head

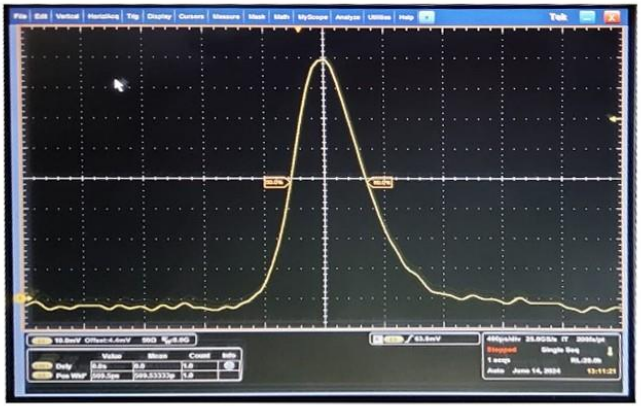


Laser Controller

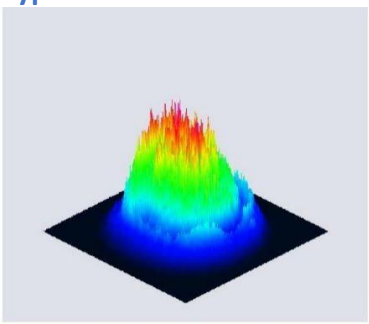


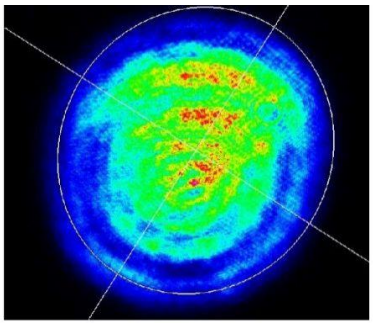
Temporal Beam Profile

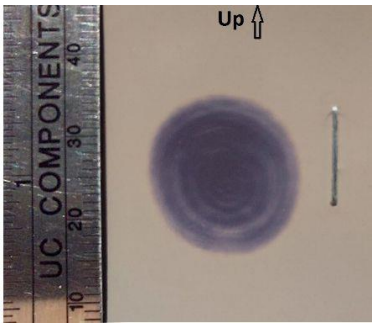
Typical view of the SUB1000
Laser pulse at High Energy Mode



Typical transversal Beam Profile







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