To: Jožef Stefan Institute
Slovenia

Date: 2023-03-28

QUOTE No.: S230328JM1

No.	ITEM	QTY.	PRICE, EUR/Unit	TOTAL PRICE, EUR	COMMENT
1	Nanosecond tuneable laser model **NT242-1k**	1	€ 89,500	€ 89,500	405-2600nm tuning range, 1000 Hz PRR, <5 cm^{-1} bandwidth, >450 mW @450nm
2	Installation cost	1	€ 3,500	€ 3,500	Installation at customer's site
3	Shipping cost	1	€ 1,000	€ 1,000	DAP location in Slovenia
			TOTAL:	€ 94,000	

TERMS AND CONDITIONS

- **Price:** Without VAT.
- **Sales conditions:** Ekspla's general sales conditions apply, please see **here**.
- **Warranty conditions:** one-year general warranty excluding consumables (please see the list on the last page). Warranty conditions apply, please see **here**.
- **Manufacture term:** 4 months after receiving the PO.
- **Delivery conditions:** DAP location in Slovenia (Incoterms 2010).
- **Installation conditions:** includes installation-testing 1 working days, training 1 working days; arrival, accommodation of one engineer. EKSPLA trained engineer installation is compulsory due to warranty obligation.
- **Payment:** 20 days net. All bank charges outside Lithuania to be paid by payer.
- **Quotation is valid:** 90 days

Jonas Mikalauskas
Area Sales Manager

Encl.: Product technical description.

PRODUCT TECHNICAL DESCRIPTION

NT240 series. NANOSECOND OPO.

Applications

- Laser-induced fluorescence
- Flash photolysis
- Photobiology
- Remote sensing
- LIDAR
- Non-linear spectroscopy
- Telescope calibration

Features

- Integrates DPSS pump laser and OPO into a single housing
- Hands-free no-gap wavelength tuning from 405 to 2600 nm
- 1000 Hz pulse repetition rate
- Up to 450 μJ pulse energy in visible spectral range
- Less than 5 cm^{-1} linewidth in signal and idler ranges
- 3 – 6 ns pulse duration
- Remote control via PC or keypad
- Optional separate output port for 355/532/1064 nm beam

Specifications [1)]

Model	**NT242**
OPO	
Wavelength range[2)]	
Signal	405–710 nm[3)]
Idler	710–2600 nm
Output pulse energy	
OPO [4)]	450 μJ
Tuning resolution [7)]	
Signal (405–710 nm)	1 cm^{-1}
Idler (710–2600 nm)	1 cm^{-1}

Pulse and beam parameters	
Pulse duration [8]	3–6 ns
Linewidth [9]	<5 cm^{-1}
Typical beam diameter [10]	3 mm × 6 mm
Typical beam divergence [11]	< 2 mrad × 5 mrad
Beam pointing stability (StDev) [12]	≤ 50 µrad
Polarization[13]	
Signal beam	horizontal
Idler beam	vertical
Pump laser [14]	
Pump wavelength	**355 nm /1064 nm [15]**
Typical pump pulse energy	3/ 1 mJ
Pulse duration	4–6 ns
Beam quality	Hat-top in near field, without hot spots
Beam divergence	<2 mrad
Pulse energy stability (StdDev)	<2.5 %
Pulse repetition rate	1 kHz
Nominal lifetime for pump diodes	5×10^9 shots
Typical warm-up time [16]	15 min
Physical characteristics	
Unit size (w × L × H) [17]	456 × 1040 × 297 ± 3 mm
Power supply size (w × L × H)	520 × 400 × 286± 3 mm
Umbilical length	2.5 m
Maximal weight	
Laser head (without options)	60 kg ±10%
Power supply	40 kg ±10%
Operating requirements	
Cooling [18]	Built-in chiller
Room temperature	18–27 °C
Relative humidity	20–80 % (non-condensing)
Power requirements	100–240 VAC, single phase 50/60 Hz
Power consumption	<1.5 kW
Cleanliness of the room	Not worse than ISO Class 9

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 450 nm.
2) Hands-free tuning range is from 210 nm to 2600 nm.
3) Tuning range extension to 400–709 nm is optional.
4) Measured at 450 nm. See tuning curves for typical outputs at other wavelengths.
5) Measured at 230 nm. See tuning curves for typical outputs at other wavelengths.
6) Measured at 320 nm. SF generator is optimized for maximum output in 300–405 nm range. See tuning curves for typical outputs at other wavelengths.
7) For manual input from PC.
8) FWHM measured with photodiode featuring 1 ns rise time and 300 MHz bandwidth oscilloscope.
9) Linewidth is <8 cm^{-1} for 210–405 nm range.
10) Beam diameter is measured at 450 nm at the $1/e^2$ level and can vary depending on the pump pulse energy.
11) Full angle measured at the FWHM level at 450 nm.
12) Beam pointing stability is evaluated as movement of the beam centroid in the focal plane of a focusing element.
13) With -SCU option the polarizations are different.
14) Laser output will be optimized for OPO operation and specifications may vary with each unit we manufacture.
15) 1064 nm is used for SF and SH/SF option
16) Starting from 22°C and stand-by mode.
17) Please refer to dimensions table bellow.
18) Air cooled. Water cooled under request.

Note: The laser and auxiliary units must be settled in such a place void of dust and aerosols. It is advisable to operate the laser in air conditioned room, provided that the laser is placed at a distance from air conditioning outlets. The laser should be positioned on a solid and flat worktable in horizontal position. Access from one side should be ensured. Intensive sources of vibration should be avoided near the laboratory (ex. railway station or similar).

Typical beam profile

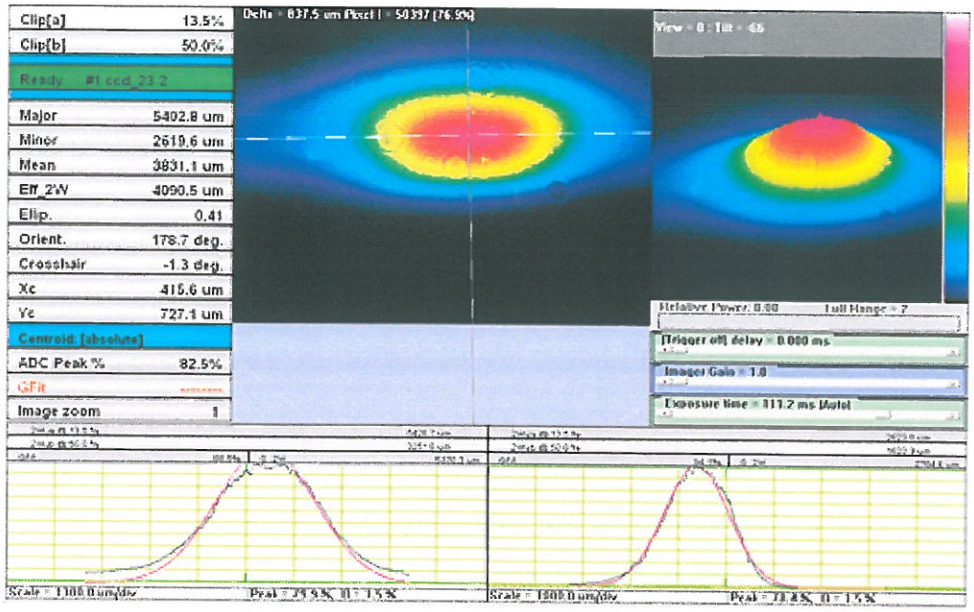

Fig. 1 NT242 laser beam profile at 450 nm in near field

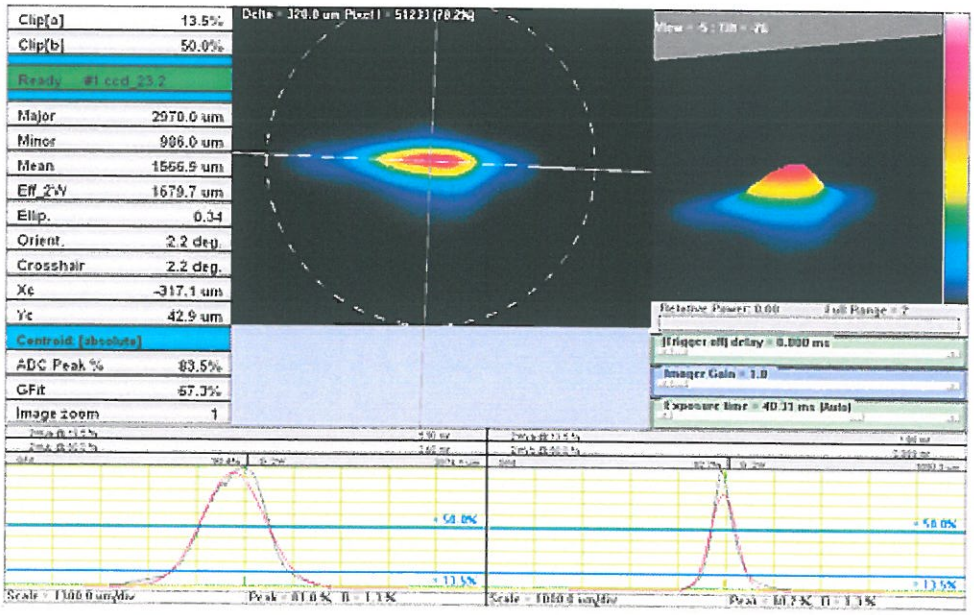

Fig. 2 NT242 laser beam profile at 450 nm in far field

Output energy

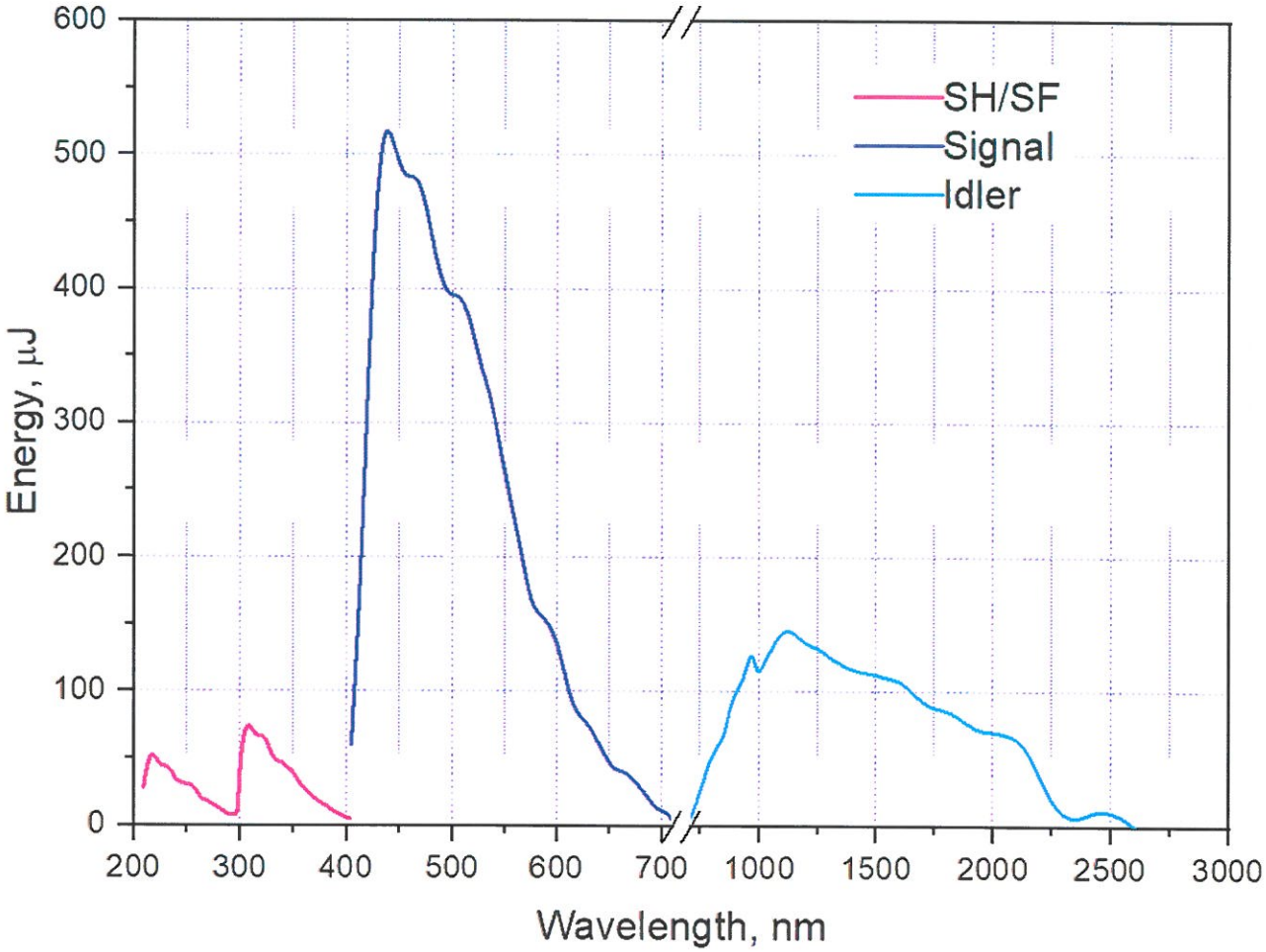

Fig. 3 Typical (smoothed) NT242 laser tuning curves in signal (405 – 710 nm), idler (710 – 2600 nm) and – SH/SF (210-405 nm) ranges.

Design description

a) Laser head

- Precision machined monolithic aged aluminum alloy chassis.
- Diode pumped pump laser with cavity dumped resonator.

b) Power supply/Cooling cabinet

- Includes control, communication, power units.
- Compact case. The front panel includes:
  - Mains key-lock;
- Microprocessor control unit for laser operation control via remote control pad or PC interface.
- Power supply for harmonic generators' crystal heaters.
- Water to air heat exchanger.

c) Remote Control functions

- Internal operation mode:
- Laser operation control (ON/OF);
- Internal or external triggering mode setting;
- Q-switch timing control;
- Q-switch burst mode (from 1 to 9999 pulses in the burst)*;
- Q-switch off mode (no laser output beam, diodes operating);
- Single shot mode*;
- Frequency divider*
- External operation mode using one or two external sync pulses
- Pump diode and Q-switch triggering with rise fronts of sync pulses;
- Control of delay between pump diode and Q-switch triggering by adjusting of the time delay between sync pulses (optional)
- Adjustment of output wavelength

** Output specifications might change when using this function.*

d) Software

- Installable control, diagnostic and servicing Windows executable utility.
- Remote control implemented through DLL calls. To support customer development, LabVIEW and C++ applications together with source codes are provided:
    - LabVIEW drivers,
    - Control panel application, Windows executable control application together with C++ sources.
    - Some Delphi and Visual Basic examples that are not product specific and intended for demonstration of concept.
- PC interface module with USB/RS232 interface, remote control through Windows DLL function calls.
- Communication module* adds the following interfaces:
    - USB - virtual serial port, ASCII commands
    - RS232 - ASCII commands
    - LAN - REST API
    - WLAN - REST API (optional)

**Communication module allows control from Windows and non-Windows OS machines: Windows, Windows CE, Linux, LabVIEW RT and etc.*

Safety

a) Standards

– Laser complies to IEC60825 and IEC61010 safety standards;
– Laser is class IV product according to IEC60825-1.

b) Application

The laser system is designed as scientific device and is intended for laboratory use for research, measurements, and as an optical source. It is classified as a Class 4 laser device and should only be used in a controlled environment with properly installed safety measures and operated by properly equipped and trained personnel. Use in any other way and/or for any other purpose will be deemed improper. Ekspla cannot accept any responsibility for the consequences of improper use.

Pictures

Fig. 4 Outside view of the NT242 laser.

Dimensions of laser

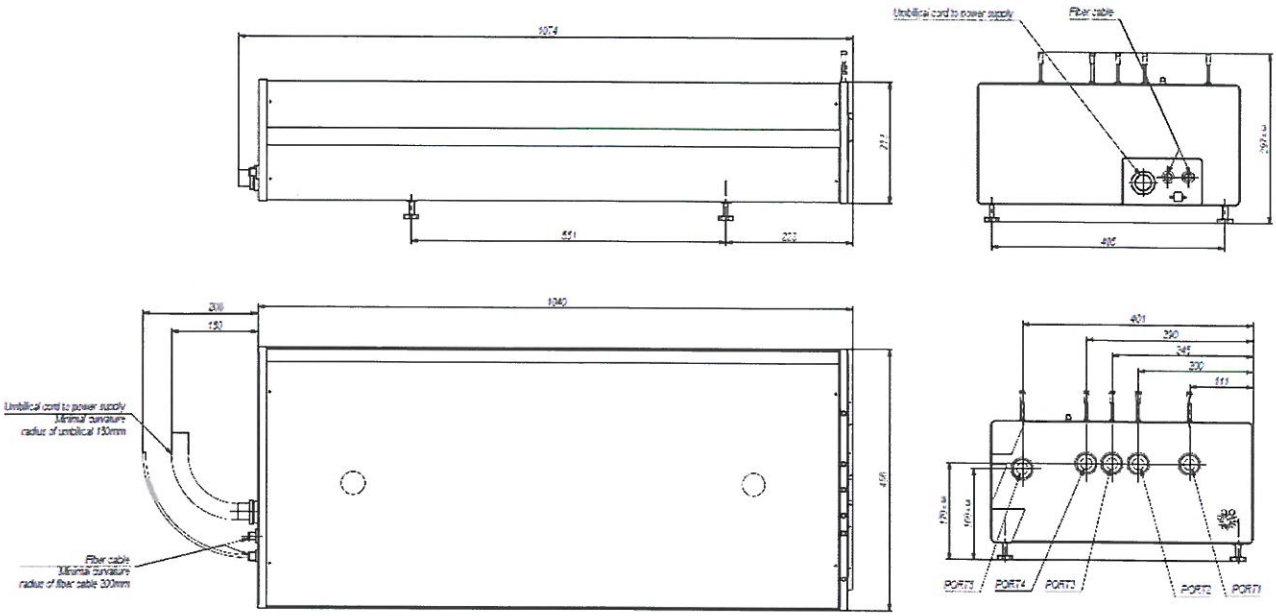

Fig. 5 External dimensions of NT242 laser.

Dimensions of power supply cabinet

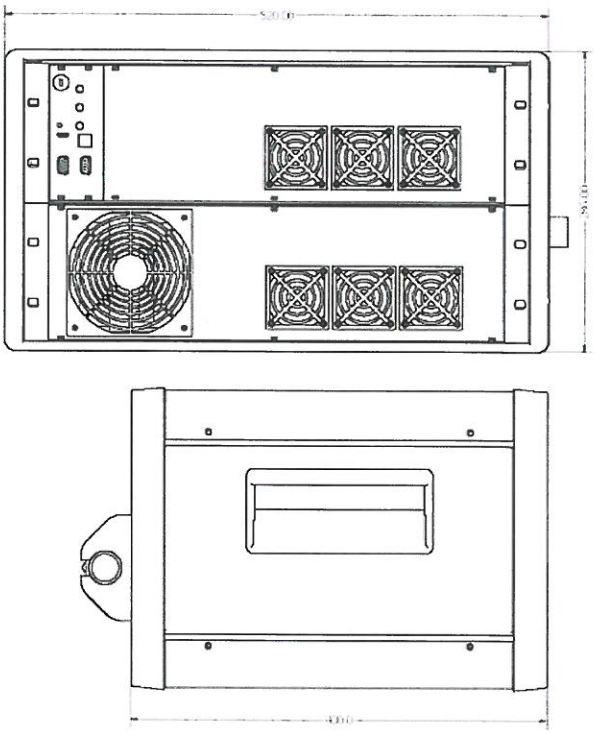

Fig. 6 Dimensions of NT242 laser power supply/cooling rack. Desktop case.

NT242 laser with all possible standard options

Maintenance schedule and list of consumables

valid from 1st May, 2021

No.	Consumable	Recommended periodicity	Warranty applied	Personnel qualification[1)]	Environment cleanliness[1)]	Unit/set price (EUR)[2)]
1	UV optics set[3)]	1500 wh[6)]	90 days	service engineer	Room air (ISO 7)	2 500
2	OPO optics set[4)]	2000 wh[6)]	90 days	service engineer	Room air (ISO 7)	6 600
3	355 nm output optics set[5)]	1500 wh[6)]	90 days	service engineer	Room air (ISO 7)	1 300

1) Required for replace procedure.
2) The prices are EXW Vilnius, for end user (EUP) and do not include component replacement charge.
3) UV optics set: TH1 crystal, mirrors M5, M6, M7.
4) OPO optics set- crystals OPO1+OPO2, mirrors M8, M9.
5) 355 nm output optics set- crystals THG2, mirrors M16, M17.
6) Wh- working hours.

Note: The Consumables list is prepared for the product operation time up to 2000 hours per year. For more intense exploitation of the product, additional Consumables components might be included in the list.