ns Photoacoustic Imaging Sources

PhotoSonus M

See list of publications written by employing **PhotoSonus** series lasers



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Rev. 260807

High Energy, Mobile, Tunable Wavelength Laser Source for Photoacoustic Imaging

PhotoSonus M

Following the demand for high output energies in the photoacoustic market for imaging larger volumes of tissue, PhotoSonus M, an updated high energy tunable laser source for photo-acoustic imaging, was introduced.

Time-tested EKSPLA nanosecond pump laser, parametric oscillator, power supply and cooling unit are integrated in a single robust housing to provide mobility, ease of use and low maintenance cost. The highly flexible PhotoSonus M platform makes it easily integrated and used in a photoacoustic imaging system. It is fully motorized and computer controlled, with user trigger outputs and inputs and special options such as motorized switching between OPO signal and idler, motorized attenuator, internal energy meter and electromechanical output shutter.

Recently, a fast wavelength switching option was introduced that enables each laser pulse to have a different wavelength within the entire signal or idler range and at any sequence. This new feature, combining high pulse energy (up to 180 mJ) and wide wavelength tuning range (330 – 2300 nm) makes PhotoSonus M the irreplaceable imaging source for any photo acoustic system.

For even higher sample imaging depth and resolution a PhotoSonus M+, with up to 250 mJ maximum pulse energy, was introduced.

For convenience, the outputs of PhotoSonus M and PhotoSonus M+ lasers can be coupled with almost any type of fiber bundle.

Features

- High up to **250 mJ** output energy
- Wide tuning range from **330** to **2300 nm**
- Ultra-wide OPO signal tuning range from **660** to **1320 nm**
- **10 Hz** or **20 Hz** pulse repetition rate
- Integrated pump laser, OPO and PSU in single mobile unit
- Low maintenance cost
- Fiber bundle connectors with safety interlock
- Fast wavelength switching within entire signal or idler range between two consecutive pulses
- Integrated energy meter (optional)
- Motorized attenuator (optional)
- Access to pump laser wavelengths 1064/532 nm (optional)

330 – 2300 nm / 250 mJ / 10 Hz 20 Hz

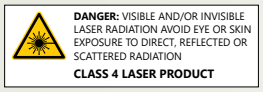
Learn more about PhotoSonus M
www.ekspla.com

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Specifications [1)]

Model		PhotoSonus M-10	PhotoSonus M-20	PhotoSonus M+
OPO				
Wavelength range	Signal	660 – 1320 nm		660 – 1064 nm [2)]
	SH extension range (optional) [3)]	330 – 659 nm		330 – 530 nm (330 – 659 nm [4)])
	Idler (optional)	1065 – 2300 nm		
OPO output MAX pulse energy [5)]		> 180 mJ	> 160 mJ	> 250 mJ
Pulse repetition rate		10 Hz	20 Hz	10 Hz
Scanning step	Signal	0.1 nm		
	Idler	1 nm		
Pulse duration [6)]		3 – 5 ns		
Signal linewidth [7)]		< 15 cm^{-1}		
Typical signal beam diameter ($1/e^2$) [8)]		7 ± 2 mm		9 ± 2 mm
Physical characteristics				
Unit size (W × L × H mm)		434 × 672 × 887 mm		
Operating requirements				
Room temperature		18 – 27 °C		
Relative humidity		20 – 80 % (non-condensing)		
Power requirements [9)]		200 – 240 VAC, single phase, 50/60 Hz		
Power consumption		< 1.5 kVA	< 2.5 kVA	< 2.5 kVA

1) Due to continuous improvement, all specifications are subject to change without notice. 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 700 nm.
2) Optional signal extended range: 660 – 1320 nm.
3) This option results lower pulse energy in the main OPO range. Please contact EKSPLA for more details.
4) When extended signal range is selected.
5) Measured at the free space output. See tuning curves for typical energy levels at different wavelengths.
6) FWHM measured with photodiode featuring 1 ns rise time and 300 MHz bandwidth oscilloscope.
7) At 700 nm or higher wavelengths.
8) Measured at the free space output at 700 nm. Can be adjusted as per request.
9) Mains voltage should be specified when ordering.



Performance

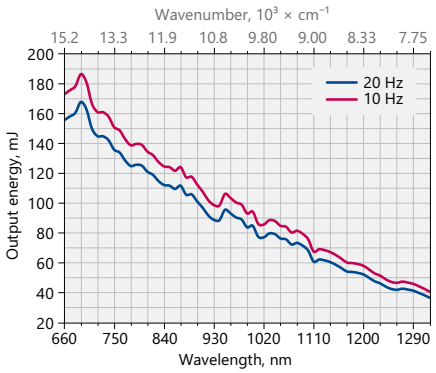


Fig 1. Typical PhotoSonus M-10 and M-20 Extended signal output pulse energy vs. wavelength curve

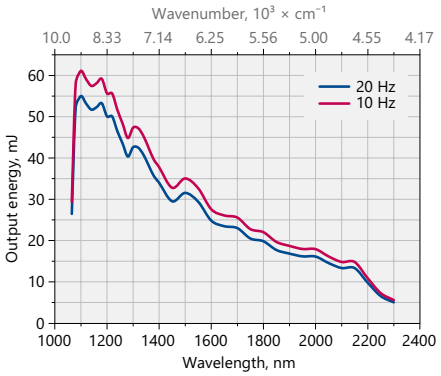


Fig 2. Typical PhotoSonus M-10 and M-20 Idler output pulse energy vs. wavelength curve

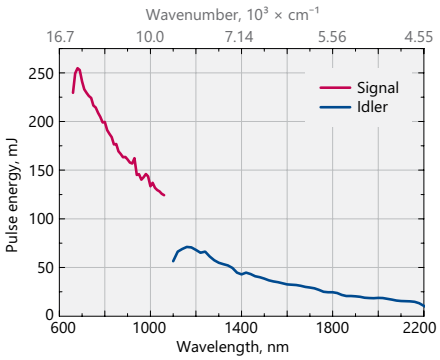
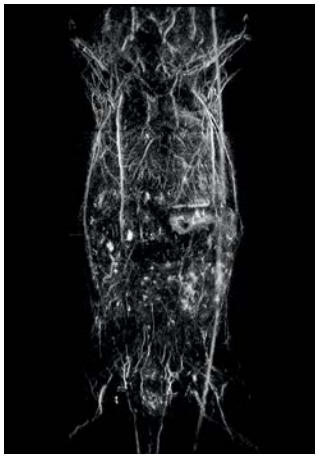


Fig 3. Typical PhotoSonus M+ signal and idler output pulse energy vs. wavelength curve

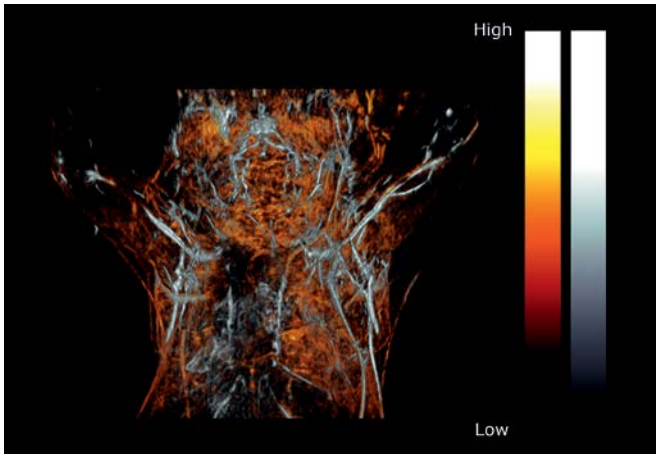
Sample Photoacoustic Images



Photoacoustic image of a mouse.



Photoacoustic image of the mouse liver.



Photoacoustic image of the upper torso and brain of a female mouse.

Courtesy of PhotoSound Technologies, Inc.

Drawings

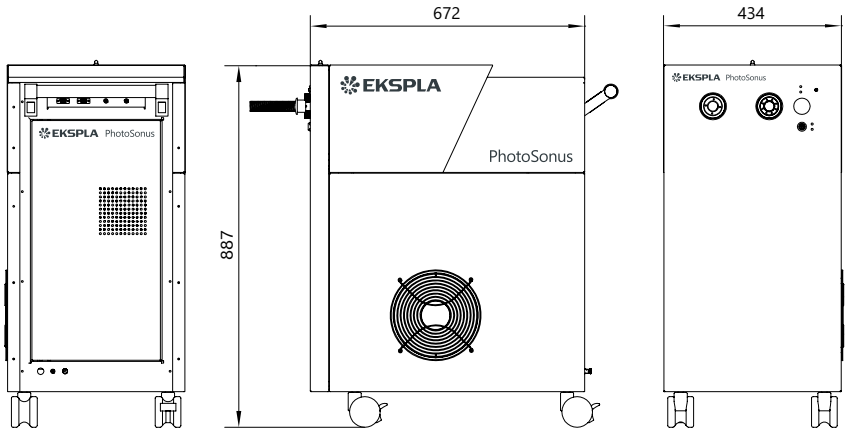


Fig 4. PhotoSonus M outline drawings (mm)

Ordering information

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.

PhotoSonus M-10-IDL-SH-ATTN-H-EM-PD

Model

M → Mobile version
M+ → Mobile highest energy version (10 Hz only)

Repetition rate:
10 → 10 Hz
20 → 20 Hz

IDL → idler option

PD → footswitch laser emission control

EM → OPO energy meter

H → 1064 nm pump wavelength output
2H → 532 nm pump wavelength output

ATTN → OPO attenuator

OPO extension:
SH → OPO SH extension range
ER → extended OPO signal range (for M+ model only)