

# PhotoSonus



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

Highly flexible PhotoSonus platform makes it easy to be integrated and used in a photoacoustic imaging system: it is fully motorized and computer controlled, have user

trigger outputs /inputs and special options such as motorized switching between OPO and pump wavelengths. Parametric oscillator generates output energies up to 180 mJ at peak of wide wavelength tuning range (660 – 2300 nm). Customizable and interlocked fiber bundle connector ensures safety and ability to fit various size fiber bundles.

For customers who demand even higher output energy, we are introducing PhotoSonus with **High Energy option**. 250 mJ output energy is achieved at the peak from OPO at 10 Hz. For more details inquire separately.

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

## FEATURES

- ▶ High **180 mJ** output energy
- ▶ Wide tuning range **from 660 to 1064 nm and from 1065 to 2300 nm**
- ▶ **10 Hz or 20 Hz** pulse repetition rate
- ▶ Integrated pump laser, OPO and PSU in single portable unit
- ▶ One year warranty
- ▶ Low maintenance cost
- ▶ Fiber bundle connectors with safety interlock

## OPTIONS

- ▶ Fast wavelength tuning
- ▶ **High energy (250 mJ)** – inquire separately
- ▶ Motorized switching between OPO and pump wavelengths
- ▶ Access to pump laser wavelengths (1064 / 532 nm)
- ▶ Idler output 1065 – 2300 nm
- ▶ Motorized attenuator
- ▶ Energy meter
- ▶ Fiber bundle

SPECIFICATIONS <sup>1)</sup>

| Model  | PhotoSonus                              |
|--|---|
| <b>OPO</b>   |   |
| Wavelength range   |   |
| Signal   | 660 – 1064 nm                           |
| Idler (optional)   | 1065 – 2300 nm                          |
| Pulse repetition range   | 10 or 20 Hz                             |
| OPO output pulse energy <sup>2)</sup>                          | >180 mJ at 10 Hz or<br>>160 mJ at 20 Hz |
| Scanning step:   |   |
| Signal (660 – 1064 nm)   | 0.1 nm                                  |
| Idler (1065 – 2300 nm)   | 1 nm                                    |
| Pulse duration <sup>3)</sup>                                   | 3 – 5 ns                                |
| Signal linewidth   | < 10 cm <sup>-1</sup>                   |
| Typical signal beam diameter (1/e <sup>2</sup> ) <sup>4)</sup> | 7 ± 2 mm                                |
| Control interfaces   | USB, LAN, RS232                         |
| <b>PHYSICAL CHARACTERISTICS</b>                                |   |
| Cooling  | Closed loop air-water cooled            |
| Unit size (W × L × H)  | 434 × 672 × 887 mm                      |
| <b>OPERATING REQUIREMENTS</b>                                  |   |
| Room temperature   | 18 – 27 °C                              |
| Relative humidity  | 20 – 80 % (non-condensing)              |
| Power requirements <sup>5)</sup>                               | 208 or 240 VAC, single phase 50/60 Hz   |
| Power consumption  | < 1.8 kW at 10 Hz,<br>< 3.4 kW at 20 Hz |

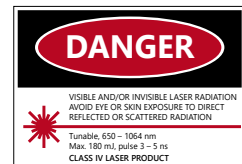
<sup>1)</sup> Due to continuous improvement, all specifications are subject to change without notice. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise all specifications are measured at 700 nm.

<sup>2)</sup> Free space measurement at 700 nm. See tuning curves for typical outputs at other wavelengths.

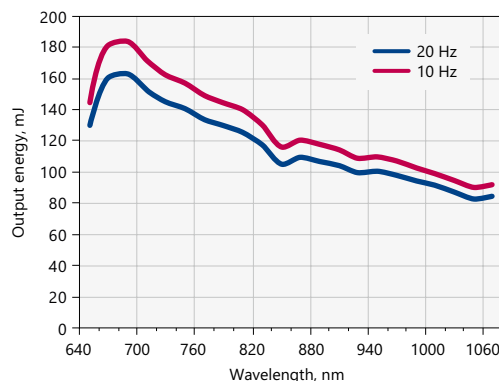
<sup>3)</sup> FWHM measured with photodiode featuring 500 ps rise time and 600 MHz bandwidth oscilloscope.

<sup>4)</sup> Measured at the output at 700 nm wavelength. Can be adjusted as per request.

<sup>5)</sup> Mains voltage should be specified when ordering.

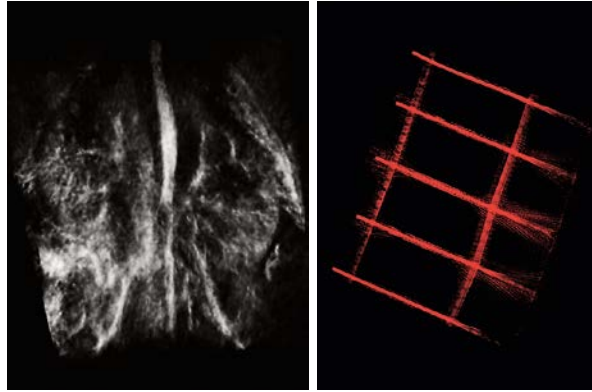


PERFORMANCE



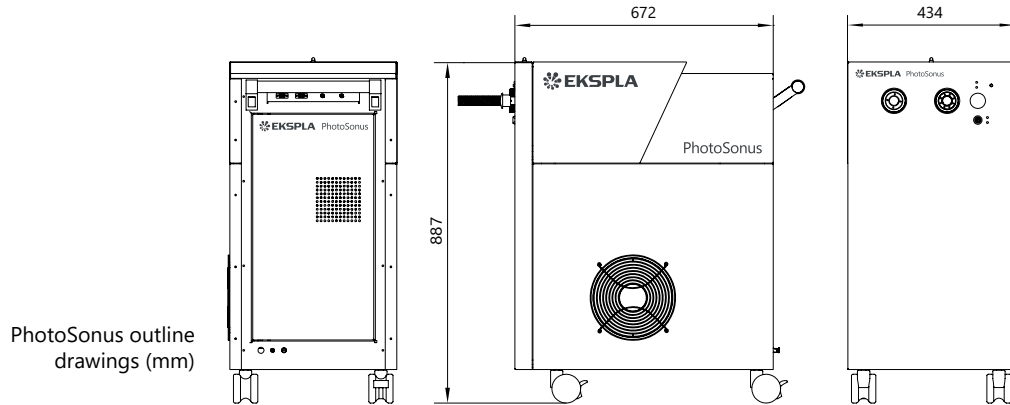
Typical PhotoSonus signal output pulse energy vs. wavelength curve

## SAMPLE PHOTOACOUSTIC IMAGES



Courtesy of PhotoSound Technologies, Inc.

## DRAWINGS



# PhotoSonus X

NEW



PhotoSonus X is a perfect solution for photoacoustic imaging. It has high output energy of more than 50 mJ at the peak, a broad wavelength tuning range from 665 to 2600 nm.

It operates at 100 Hz pulse repetition rate. This set of parameters is perfect choice for gaining good photoacoustic signal strength and ensuring high data collection rate. Diode pumped laser technology

and well-engineered system design ensures reliability and low-cost system maintenance. System comes with one-year warranty.

PhotoSonus X has a fiber bundle connector with safety interlock. Bundle connector adapter and beam size are adapted to fiber bundle input ferule dimensions.

PhotoSonus X can be certified for clinical photoacoustic applications.

## High Output Power DPSS Tunable Laser for Photoacoustic Imaging

### FEATURES

- ▶ Hands-free wavelength tuning from 665 to 1064 nm and 1065 – 2600 nm
- ▶ Fully motorized wavelength tuning
- ▶ Externally triggerable
- ▶ High, up to 50 mJ pulse energy from OPO
- ▶ 100 Hz pulse repetition rate
- ▶ Low-cost maintenance
- ▶ Certification ready
- ▶ Integrated DPSS pump laser and OPO into a single housing
- ▶ Fiber bundle holder with safety interlock

### OPTIONS

- ▶ Fast wavelength tuning
- ▶ Idler output
- ▶ Lower fixed pulse repetition rates

### PERFORMANCE

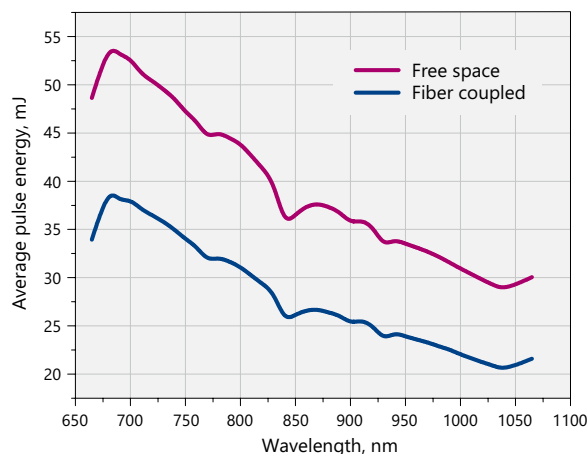


Fig 1. PhotoSonus X signal output typical energy vs. wavelength

SPECIFICATIONS <sup>1)</sup>

| Model  |  | PhotoSonus X                               |
|--|--|--|
| <b>OPO</b>   |  |  |
| Wavelength range   |  |  |
| Signal   |  | 665 – 1064 nm                              |
| Idler (optional)   |  | 1065 – 2600 nm                             |
| OPO output pulse energy <sup>2)</sup>                          |  | > 50 mJ                                    |
| Pulse repetition rate <sup>3)</sup>                            |  | 100 Hz                                     |
| Scanning step  |  |  |
| Signal (665–1064 nm)   |  | 0.1 nm                                     |
| Idler (1065 –2600 nm)  |  | 1 nm                                       |
| Pulse duration <sup>4)</sup>                                   |  | 2 – 5 ns                                   |
| Signal linewidth   |  | < 10 cm <sup>-1</sup>                      |
| Typical signal beam diameter (1/e <sup>2</sup> ) <sup>5)</sup> |  | 5 ± 1 mm                                   |
| Control interfaces   |  | USB, LAN, RS232                            |
| <b>PHYSICAL CHARACTERISTICS</b>                                |  |  |
| Cooling  |  | Closed loop air-water cooled <sup>6)</sup> |
| Unit size (W × L × H)  |  | 551 × 400 × 162 mm                         |
| Power supply size (W × L × H)                                  |  | 2 units, 471 × 391 × 147 mm each           |
| Umbilical length   |  | 2.5 m                                      |
| <b>OPERATING REQUIREMENTS</b>                                  |  |  |
| Room temperature   |  | 18 – 27 °C                                 |
| Relative humidity  |  | 20 – 80 % (non-condensing)                 |
| Power requirements   |  | 100 – 240 VAC, single phase 50/60 Hz       |
| Power consumption  |  | < 2 kW                                     |

<sup>1)</sup> 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.

<sup>2)</sup> Free space measurement at 700 nm. See tuning curves for typical outputs at other wavelengths.  
<sup>3)</sup> Lower fixed pulse repetition rates are available upon request.  
<sup>4)</sup> FWHM measured with photodiode featuring 500 ps rise time and 600 MHz bandwidth oscilloscope.  
<sup>5)</sup> Measured at the output at 700 nm wavelength.  
<sup>6)</sup> Using external chiller.



OUTLINE DRAWINGS

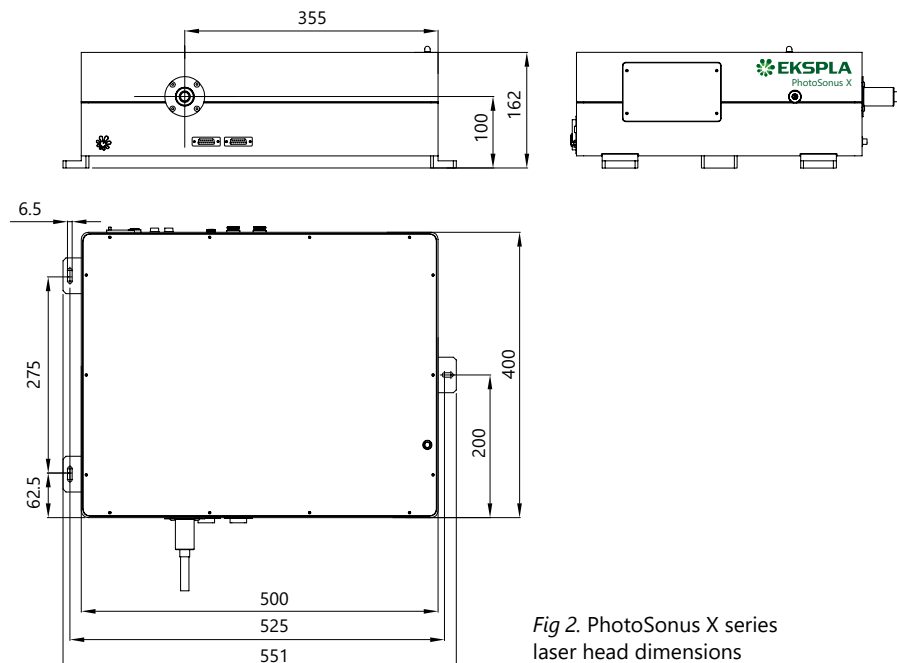


Fig 2. PhotoSonus X series laser head dimensions

**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.