

# PhotoSonus T

## BENEFITS

High pulse energy (up to 230 mJ)  
is highly beneficial for photoacoustics  
imaging applications

Superior tuning resolution ( $1 - 2 \text{ cm}^{-1}$ ) allows  
recording of high quality spectra

High integration level saves space in the laboratory

Flashlamps replacement without misalignment of the  
laser cavity saves on maintenance costs

In-house design and manufacturing of complete systems,  
including pump lasers, guarantees on-time warranty and  
post warranty services and spares supply

Variety of control interfaces: USB, RS232,  
optional LAN and WLAN ensures easy control and integration  
with other equipment

Attenuator and fiber bundle coupling options  
facilitate incorporation of PhotoSonus T systems into various  
experimental environments





# High Energy Table-Top Tunable Wavelength Lasers for Photoacoustic Imaging

## PhotoSonus T

**PhotoSonus T series tunable laser seamlessly integrates in a compact housing a nanosecond optical parametric oscillator and Nd:YAG Q-switched laser.**

Three models with different output pulse energy values and different repetition rates are offered. The most powerful model has more than 230 mJ pulse energy. Narrow linewidth ( $< 10 \text{ cm}^{-1}$ ) is nearly constant trough almost whole tuning range, which makes laser suitable for many spectroscopy application.

The device is controlled from the remote keypad or PC using LabVIEW™ drivers that are supplied with the system. The remote pad features a backlit display that is easy to read even while wearing laser safety glasses.

System is designed for easy and cost-effective maintenance. Replacement of flashlamps can be done without misalignment of the laser cavity and deterioration of laser performance. OPO pump energy monitoring system helps to increase lifetime of the optical components.

## Options

Optional items are available allowing optimization of the laser system for Your application, for example:

- / Fiber bundle coupled output;
- / Energy meter;
- / Efficient second harmonic generator for 330–660 nm range;
- / Pulse energy attenuator;
- / Water-air cooled power supply.

Please inquire custom-build versions and options.

## Features

Hands-free, automated wavelength tuning from **330 to 2600 nm**

Ultra-wide OPO signal tuning range from **660 to 1320 nm**

Up to **230 mJ** in range 660 – 2600 nm, **35 mJ** in range 330 – 660 nm

Narrow linewidth across tuning range

**3–5 ns** pulse duration

Remote control via key pad or PC

Separate output port for 532 nm beam. Output for 1064 nm is optional

OPO pump energy monitoring

Fast wavelength switching within entire signal or idler ranges

## Applications

- / Photoacoustic imaging
- / Flash photolysis
- / Photobiology
- / Remote sensing
- / Non-linear spectroscopy

330 – 2600 nm / 230 mJ / 3 – 5 ns

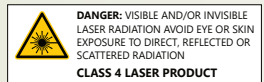


Learn more  
about PhotoSonus T  
[www.ekspla.com](http://www.ekspla.com)



## Specifications <sup>1)</sup>

Model		PhotoSonus T-10	PhotoSonus T-20	PhotoSonus T+
<b>OPO</b>				
Wavelength range	Signal	660 – 1320 nm	660 – 1320 nm	660 – 1064 nm <sup>2)</sup>
	Idler	1065 – 2600 nm	1065 – 2600 nm	1065 – 2600 nm
	SH (optional)	330 – 660 nm	330 – 660 nm	330 – 530 nm (330 – 659 nm) <sup>3)</sup>
Output max pulse energy <sup>4)</sup>	OPO	150 mJ	130 mJ	230 mJ
	SH	25 mJ	21 mJ	35 mJ
Linewidth <sup>5)</sup>		< 10 cm <sup>-1</sup>	< 10 cm <sup>-1</sup>	< 20 cm <sup>-1</sup>
Tuning resolution <sup>6)</sup>	Signal		1 cm <sup>-1</sup>	
	Idler		1 cm <sup>-1</sup>	
	SH		2 cm <sup>-1</sup>	
Pulse duration <sup>7)</sup>			3 – 5 ns	
Typical beam diameter <sup>8)</sup>		7 mm	7 mm	9 mm
Typical beam divergence <sup>9)</sup>			<2 mrad	
Polarization	Signal beam		horizontal	
	Idler beam		vertical	
	SH beam		vertical	
<b>Pump laser <sup>10)</sup></b>				
Pump wavelength			532 nm	
Pulse duration			4 – 6 ns	
Beam quality		"Hat-Top" in near field. Close to Gaussian in far field		
Beam divergence			<0.6 mrad	
Pulse energy stability (StdDev)			<2.5 %	
Pulse repetition rate		10 Hz	20 Hz	10 Hz
<b>Physical characteristics</b>				
Unit size (W × L × H)			456 × 821 × 270 mm	
Power supply size (W × L × H)			330 × 490 × 585 mm	
Umbilical length			2.5 m	
<b>Operating requirements</b>				
Water consumption (max 20 °C) <sup>11)</sup>			<10 l/min	
Room temperature			18–27 °C	
Relative humidity			20–80 % (non-condensing)	
Power requirements <sup>12)</sup>			200 – 240 VAC, single phase, 50/60 Hz	
Power consumption			< 1.5 kW	
Cleanliness of the room			not worse than ISO Class 9	
<div> <div> <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 and for basic system without options.                  <sup>2)</sup> Optional signal extended range: 660 – 1320 nm.                  <sup>3)</sup> When extended signal range is selected.                  <sup>4)</sup> See tuning curves for typical outputs at different wavelengths.                  <sup>5)</sup> At 700 nm or higher wavelengths.                  <sup>6)</sup> When wavelength is controlled from PC. When wavelength is controlled from keypad, tuning resolution is 0.1 nm for signal, 1 nm for idler and 0.5 nm for SH.             </div> <div> <sup>7)</sup> FWHM measured with photodiode featuring 1 ns rise time and 300 MHz bandwidth oscilloscope.                  <sup>8)</sup> Beam diameter is measured at 700 nm at the 1/e<sup>2</sup> level and can vary depending on the pump pulse energy.                  <sup>9)</sup> Full angle measured at the FWHM level at 700 nm.                  <sup>10)</sup> Separate output port for the 532 nm beam is standard. Output for 1064 nm beam is optional. Pump laser output will be optimized for the best OPO operation and specification may vary with each unit we manufacture.                  <sup>11)</sup> Air cooled power supply is available as option.                  <sup>12)</sup> Mains voltage should be specified when ordering.             </div> </div>				





Performance

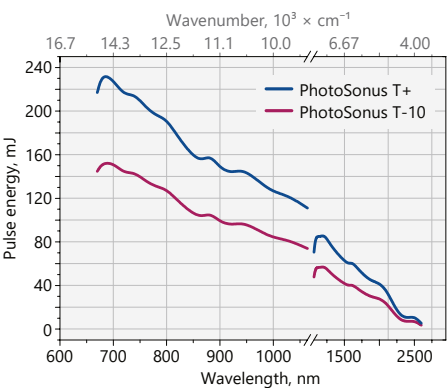


Fig 1. Typical output energy of the PhotoSonus T tunable wavelength systems

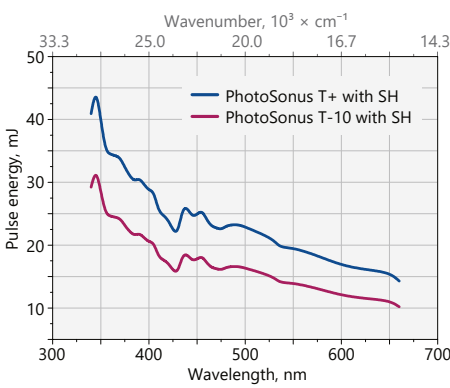


Fig 2. Typical output energy of the PhotoSonus T tunable wavelength systems with SH option

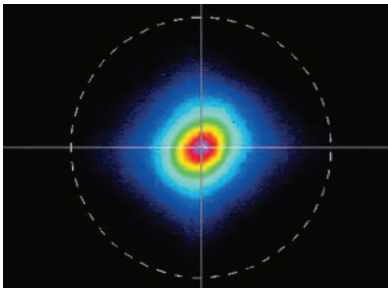


Fig 3. Typical far field beam profile of PhotoSonus T laser at 800 nm

Ordering information

**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.

PhotoSonus T-10-SH-FBC-ATTN-H-EM-AW10-TrigBox-110VAC	
Model	110VAC → transformer for 110 V AC mains
T → Table-top version	
T+ → Table-top highest energy version (10 Hz only)	TrigBox → synchronization box
Repetition rate:	Water-air cooling unit:
10 → 10 Hz	AW10 → for 10 Hz models
20 → 20 Hz	AW20 → for 20 Hz models
OPO extension:	EM → OPO energy meter
SH → OPO SH extension range	
ER → extended OPO signal range (for T+ model only)	H → additional output for 1064 nm pump wavelength
FBC → fiber or fiber bundle coupling of OPO output without attenuator	ATTN → OPO attenuator
	ATTN/FBC → OPO attenuator for FBC output
	ATTN/FBC/FS → OPO attenuator for both FBC and free space outputs