

1300 or 1700 nm, High Pulse Energy Fiber Laser-Based Optical Parametric Amplifier (FLOPA)



Applications

- Multiphoton microscopy
- Deep tissue imaging
- Harmonic generation imaging
- Optogenetics
- Nonlinear spectroscopy
- Semiconductor metrology

Features

- 1300 nm or 1700 nm output
- Up to 200 nJ pulse energy
- Pulse width < 200 fs
- Repetition rate 0.1 - 27 MHz
- Optional 1030 nm output
- Low maintenance fiber-based architecture
- Turn-key operation
- Air-cooled

The Bodega FLOPA extends the wavelength capabilities of our successful, robust fiber laser-based chirped pulse amplifier platform. Bodega integrates an optical parametric amplifier with the high energy ultrafast fiber laser to provide sub 200 fs, > 200 nJ output pulses at either 1300 nm or 1700 nm with MHz repetition rates and outstanding beam quality. Since these wavelengths have low water absorption and low scattering properties, they are ideal for deep tissue penetration and three-photon brain imaging. Furthermore, the pulse width, pulse energy, and repetition rate constitute a sweet spot for nonlinear imaging applications: the pulse energy is higher than that from legacy Ti:sapphire/OPO oscillators at repetition rates higher than Ti:sapphire amplifier/OPA systems. The net result is the perfect combination for optimum signal levels and imaging speed without excessive sample heating.

The Bodega FLOPA is based upon Calmar's time-proven, passively mode-locked fiber-based femtosecond laser oscillator, with a proprietary chirped pulse fiber amplifier which provides superior performance and a more cost-effective robust design to conventional Ti:sapphire based OPA systems. A fully air-cooled architecture and intuitive GUI ensure simple turn-key operation without the need for any alignment.

Technical Specifications

Model Number	FLOPA-		
Suffix	02O	02W	02OU or 02WU
Output Wavelength	OPA ¹	OPA ¹	Pump (optional) ²
OPTICAL			
Central Wavelength (nm)	1300	1700	1030 ± 5
Minimum Pulse Width ³ (ps)	< 0.20	< 0.20	< 0.35
Average Power (W)	0.4	0.3	3.0
Pulse Energy	200 nJ @ 2 MHz	150 nJ @ 2 MHz	1.5 μJ @ 2 MHz
Repetition Rate (MHz)	0.1 - 27	0.1 - 27	0.1 - 27
Polarization Extinction Ratio	> 100:1		
Beam Quality, M ²	< 1.2		
Beam Diameter at Exit, 2ω ₀ (mm)	~ 2		
Beam Divergence (mrad, full angle)	< 0.55		
Pulse Energy Stability (%rms, 8 hours) ⁴	< 3	< 3	< 0.5
Termination / Output	Free space collimated OPA beams, optional pump 1030 nm pump beam is available from a separate port, single wavelength available at one time, manually switchable		
Cold Start Time (min.)	< 10		
Warm Start Time (min.)	< 2		
ELECTRICAL			
Supply Voltage (VAC)	85 - 264 auto-ranging		
Supply Frequency (Hz)	47 - 63 auto-ranging		
Power Consumption (VA)	< 200 (150 typical)		
Synchronization Output	LVCMOS laser clock signal		
MECHANICAL			
Dimensions (cm): Laser Head	48 (W) x 76 (D) x 14 (H)		
Dimensions (cm): Laser Controller	48 (W) x 50 (D) x 18 (H)		
Weight (kg): Laser Head	27.3 (typical)		
Weight (kg): Laser Controller	13.6 (typical)		



Technical Specifications

Model Number	FLOPA-
ENVIRONMENTAL	
Cooling	Air-low noise fan
Operating Temperature (°C)	17 - 32
Storage Temperature (°C)	0 - 50
I/O CONTROL	
Communication Interface Type	RS232, Gate in and Sync (optional); LabVIEW VI for monitor of laser output, sensor reading, and report of error conditions
Laser status Indicators on Controller Front Panel	Electrical Power On/Off, Laser On and Operational, Emergency Stop

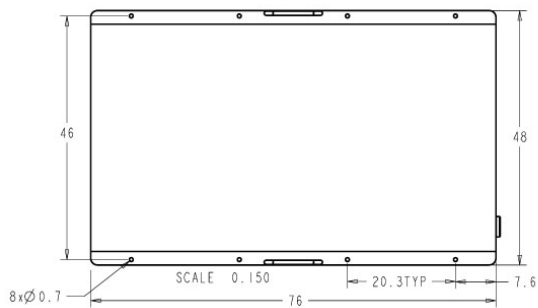
¹ The OPA output wavelength is set at the factory and needs to be specified at the time of purchase.

² The 1030 pump beam is also available from a separate port, switchable with the OPA output. This option should be specified at the time of purchase.

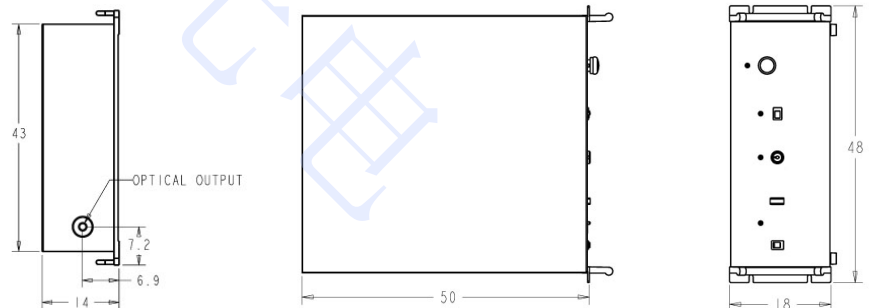
³ A sech^2 pulse shape (deconvolution factor of 0.65) is used to determine the pulse width from the second harmonic autocorrelation trace.

⁴ With a temperature range of 25 ± 1 °C.

Due to our continuous improvement program, specifications are subject to change without notice.



Dimensions of Bodega FLOPA head



Dimensions of Bodega FLOPA controller

