

Spirit-OPA[®]

High Repetition Rate Automated Optical Parametric Amplifiers



The Spirit-OPA is an automated collinear optical parametric amplifier (OPA) specifically built and optimized for the Spirit[®] ultrafast laser. The turn-key, high repetition rate Spirit femtosecond laser combines with the widely tunable Spirit-OPA family to create a powerful, user-friendly tunable source for high repetition rate ultrafast spectroscopy.

The Spirit-OPA includes a built-in second harmonic generator to convert the Spirit IR output into a 520 nm pump beam for the OPA, which then generates signal and idler in the red-infrared range (630–2600 nm). To further enhance its wavelength tuning capabilities, the OPA can be equipped with an optional harmonics module. The result is straightforward access to a broad, gap-free wavelength range from UV to the mid IR (210 nm – 16 μ m).

The Spirit-OPA family can be factory optimized for a wide range of pump pulse energies (up to 120 μ J). This versatility allows for multiple configurations such as pumping a single OPA for maximum output energy or simultaneously pumping two or more OPAs for multi-beam, multi-color time resolved experiments. There are two Spirit-OPA versions available: The Spirit-OPA-8 which can be pumped with up to 8 W and the Spirit-OPA-30 which is specifically optimized for high power applications (up to 30 W pump power).

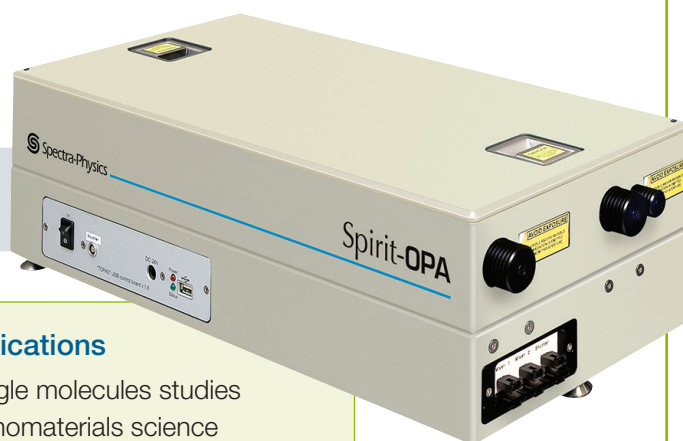
With its high repetition rate (100 kHz and above) and μ J level pulse energy, the Spirit family complements Spectra-Physics' kHz, multi-mJ class Spitfire[®] Ace[™] and Solstice[®] ultrafast amplifiers.

Spirit-OPA Advantage

- Built and optimized for Spirit ultrafast laser
- High repetition rate operation (up to 1 MHz)
- Computer controlled operation
- Ultra-wide gap-free wavelength coverage from UV to mid IR
- Access to SHG with high efficiency

Applications

- Single molecules studies
- Nanomaterials science
- Ultrafast surface dynamics
- Multi-dimensional spectroscopy



Spirit-OPA Specifications¹

	Spirit-OPA-8	Spirit-OPA-30
Tuning Range	Conversion Efficiency ^{2,3}	
630–1020 nm (signal) 1040–2600 nm (idler)	>12% at peak (signal and idler combined)	
Output from Optional Harmonics Module		
315–510 nm (SH of signal)	>2.4% at peak	
520–630 nm (SH of idler)		
210–255 nm (FH of signal)	>0.6% at peak	NA
260–315 nm (FH of idler)		
210–315 nm (TH of signal)	NA	>0.8% at peak
2200–4200 nm (DFG1)	>3% at 3000 nm	
4000–16000 nm (DFG2)	>0.2% at 10000 nm	
Pump Requirements from Spirit⁴		
Wavelength	1030 nm or 1040 nm	
Pulse Energy ⁵	20 μJ–120 μJ	
Average Power	Up to 8 W	Up to 30 W
Pulse Width (typical)	350 fs	

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

2. Specified at 100 kHz repetition rate.

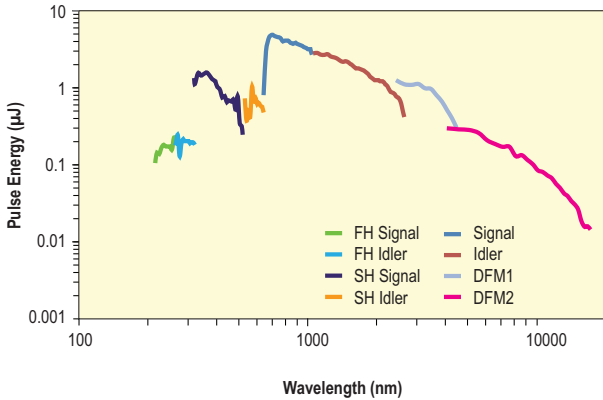
3. Efficiency defined as OPA output power divided by Spirit pump power at the OPA input port.

4. Spirit-OPA-8 and Spirit-OPA-30 pump parameters are determined at the time of order and factory set. Spirit-OPA can be factory optimized for one pump pulse energy level only.

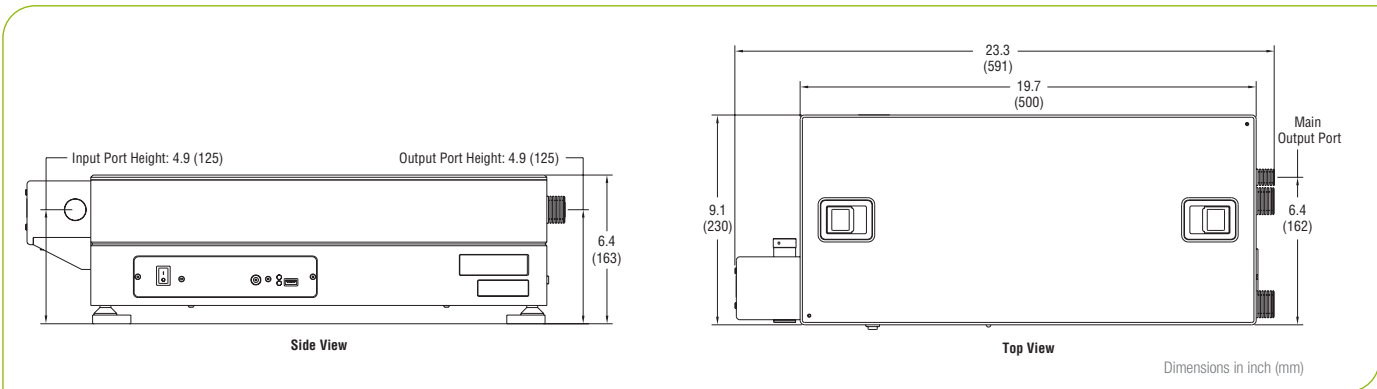
5. Please contact Spectra-Physics for available options at lower or higher pump pulse energy levels.

Spirit-OPA

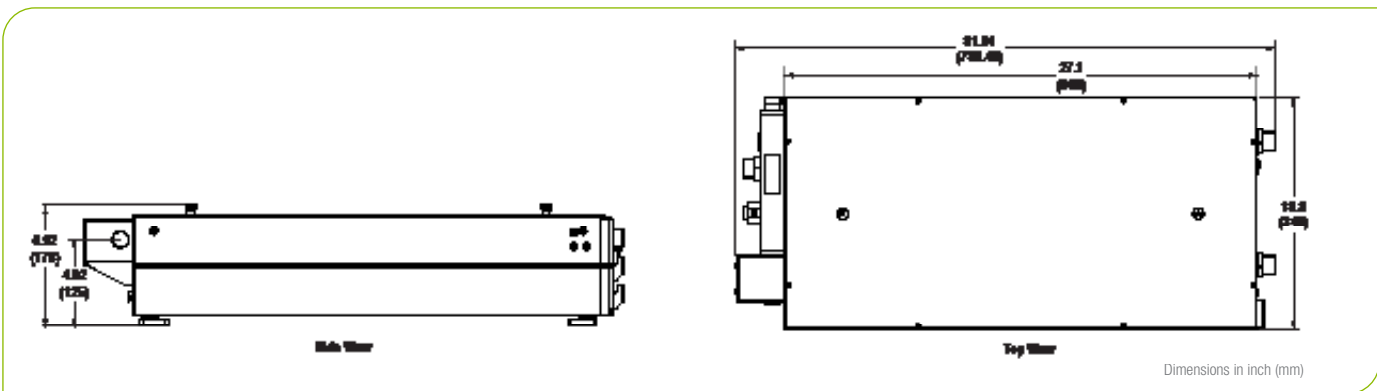
Typical Spirit-OPA-8 Performance
(Spirit pump pulse energy 40 μJ)¹



1. Typically measured performance; not a guaranteed or warranted specification.



Spirit-OPA-8 Dimensions



Spirit-OPA-30 Dimensions



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