

Spirit-OPA®

High Repetition Rate Automated
Optical Parametric Amplifier

mks | Spectra-Physics®

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 optical parametric amplifier 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 (620–2700 nm). To further enhance its wavelength tuning capabilities, the OPA can be equipped with an optional harmonics. The result is straightforward access to a broad, gap-free wavelength range from UV to the mid IR (210 nm – 16 μm).

The Spirit-OPA can be factory optimized for a wide range of pump pulse energies (up to 120 μJ). 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. The Spirit-OPA-30 is optimized for high power application and can be pumped with up to 30 W.

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

The 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-30 Specifications^{1, 6}

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)	>0.8% at peak
210–315 nm (TH of signal)	>3% at 3000 nm
2200–4200 nm (DFG1)	>0.2% at 10000 nm
4000–16000 nm (DFG2)	
Pump Requirements from Spirit⁴	
Wavelength	1030 nm or 1040 nm
Pulse Energy ⁴	20 – 120 μJ
Average Power ⁵	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 pulse energy >40 μJ.

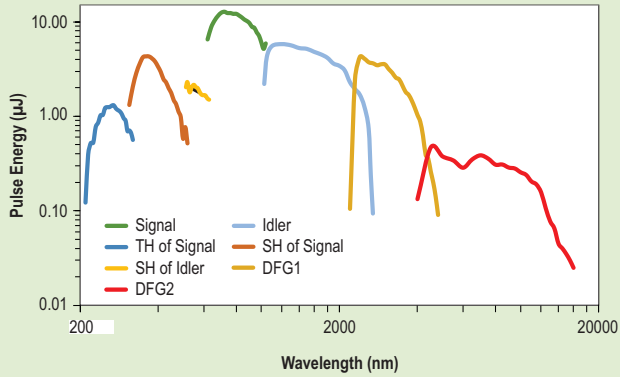
3. Efficiency defined as OPA output power divided by Spirit pump power at the OPA input port.

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

5. Please contact Spectra-Physics for available options at higher average pump power.

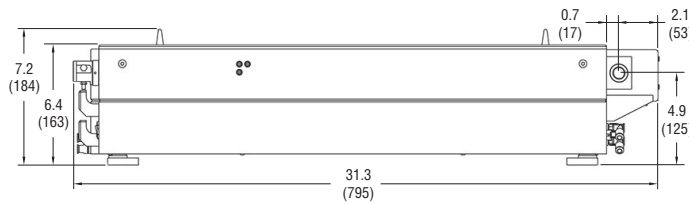
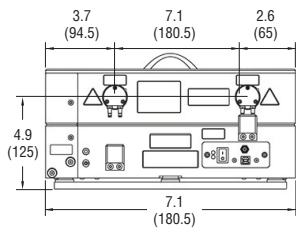
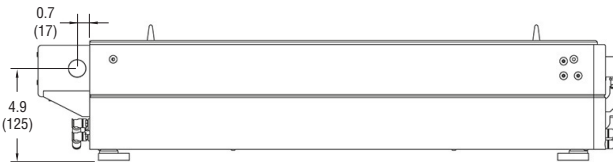
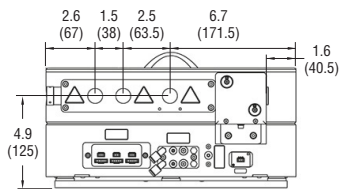
6. The Spirit-OPA is a Class IV – High Power Laser, whose beam is, by definition, a safety and fire hazard. Take precautions to prevent exposure to the direct and reflected beams. Diffuse as well as specular reflections can cause severe skin or eye damage.

Typical Spirit-OPA-30 Performance
(Spirit pump pulse energy 120 μJ)¹



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

Spirit-OPA-30 Dimensions



Dimensions in inch (mm)