

# ORPHEUS | ONE

## Mid-Infrared Collinear Optical Parametric Amplifier

### FEATURES

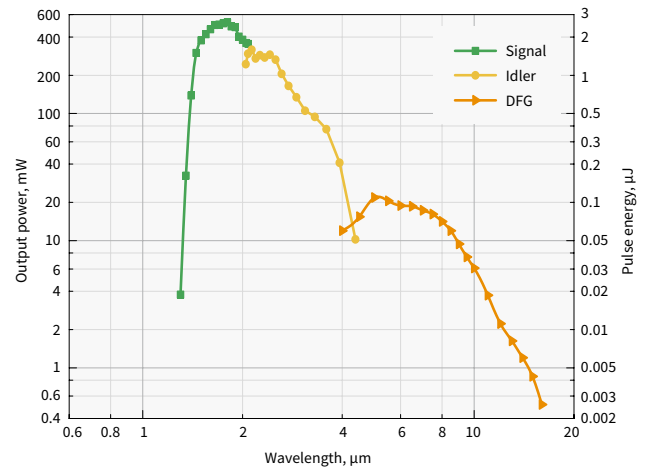
- High conversion efficiency in MIR
- 1350 – 16000 nm tuning range
- Single-shot – 2 MHz repetition rate
- Up to 80 W pump power
- Up to 2 mJ pump pulse energy



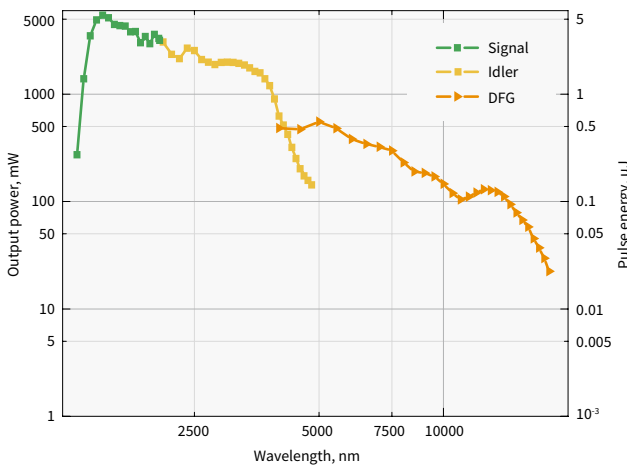
ORPHEUS-ONE is an optical parametric amplifier (OPA) designed for the mid-infrared (MIR) spectral range from 1350 to 16000 nm. Compared to ORPHEUS-HP, it has fewer wavelength extension options but provides higher pump laser conversion efficiency into MIR.

Three models of ORPHEUS-ONE offer the same tuning range, are reliable and easy to use, but vary based on the design automation and pump parameters. The basic ORPHEUS-ONE model is a cost-effective choice but is limited to 8 W pump power. The ORPHEUS-ONE-HP enables up to 80 W pump power, while the ORPHEUS-ONE-HE accepts the same pump power but also pulse energy of up to 2 mJ. Finally, the most recent addition is the ORPHEUS-ONE-UP that is optimized for the PHAROS-UP ultrashort-pulse laser with pump pulse duration down to < 100 fs.

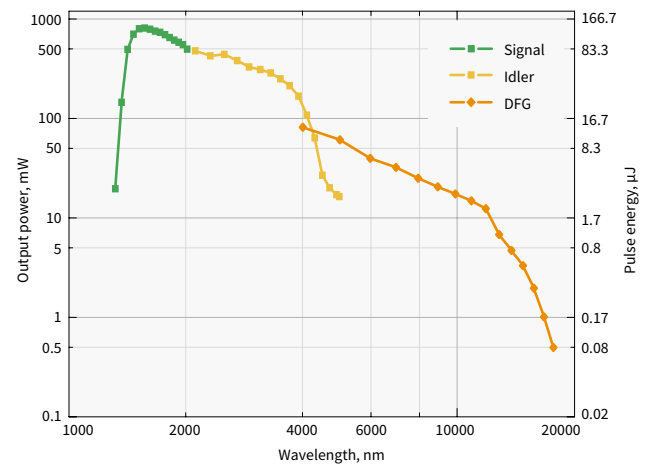
The spectral bandwidth of ORPHEUS-ONE output is defined by the pump laser pulses; thus, for sum-frequency generation (SFG) spectroscopy and other applications requiring broad-bandwidth infrared pulses – refer to ORPHEUS-MIR.



Typical tuning curves of **ORPHEUS-ONE**.  
Pump: 6 W, 30 µJ, 200 kHz



Typical tuning curves of **ORPHEUS-ONE-HP**.  
Pump: 40 W, 40 µJ, 1000 kHz



Typical tuning curves of **ORPHEUS-ONE-HE**.  
Pump: 6 W, 1 mJ, 6 kHz

For custom tuning curves visit <http://toolbox.lightcon.com/tools/tuningcurves/>

# SPECIFICATIONS

**NEW**

Model	ORPHEUS-ONE	ORPHEUS-ONE-HP	ORPHEUS-ONE-HE	ORPHEUS-ONE-UP <sup>1)</sup>
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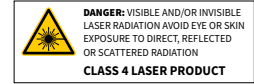
## MAIN OUTPUT

Tuning range	1350 – 2000 nm (Signal) 2100 – 4500 nm (Idler)		1450 – 2000 nm (Signal) 2100 – 4000 nm (Idler)	
Maximum pump power	8 W	80 W		20 W
Pump pulse energy	12 – 400 μJ		400 – 2000 μJ	100 – 400 μJ
Conversion efficiency at peak <sup>2)</sup> (Signal @ 1550 nm)	> 9%, 30 – 2000 μJ pump > 6%, 12 – 30 μJ pump			> 9%
Spectral bandwidth	60 – 150 cm <sup>-1</sup> @ 1450 – 2000 nm			150 – 250 cm <sup>-1</sup> @ 1500 – 1900 nm & 2200 – 3500 nm
Long-term power stability, 8 h <sup>3)</sup>	< 2% @ 1550 nm			
Pulse-to-pulse energy stability, 1 min <sup>3)</sup>	< 2% @ 1550 nm			

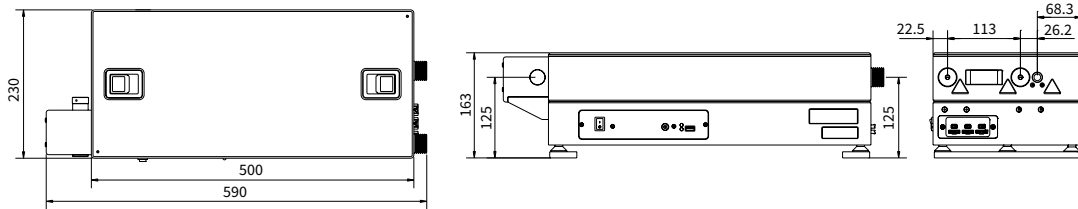
## WAVELENGTH EXTENSION (MIR)

DFG	Tuning range	4500 – 16000 nm		4000 – 16000 nm	
	Conversion efficiency <sup>2)</sup>	> 0.3% @ 10000 nm, 30 – 2000 μJ pump > 0.2% @ 10000 nm, 12 – 30 μJ pump			> 0.1% @ 10000 nm
	Spectral bandwidth	60 – 150 cm <sup>-1</sup> @ 5000 – 8000 nm	60 – 120 cm <sup>-1</sup> @ 5000 – 8000 nm	150 – 250 cm <sup>-1</sup> @ 4000 – 12000 nm	

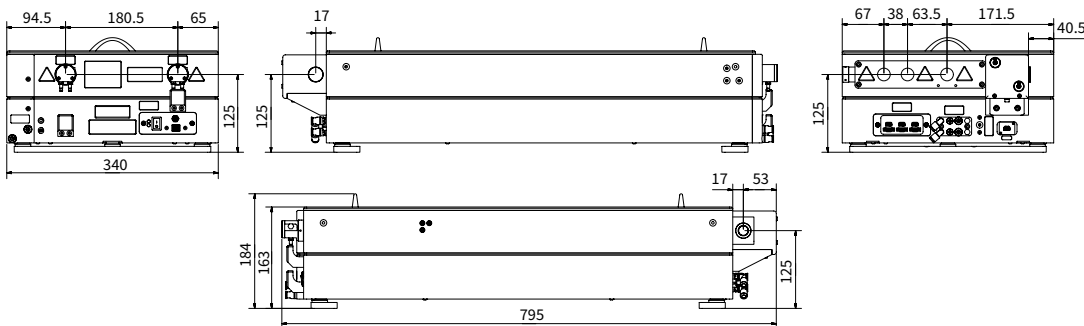
<sup>1)</sup> For PHAROS-UP only, ask sales@lightcon.com for more details in pump laser requirements.  
<sup>2)</sup> Specified as percentage of pump power.  
<sup>3)</sup> Expressed as NRMSD (normalized root mean squared deviation).



# DRAWINGS



ORPHEUS-ONE drawings



ORPHEUS-ONE-HP drawings