



Mephisto MOPA

Ultra-Narrow Linewidth High Power CW DPSS Laser

Mephisto MOPA (Master Oscillator Power Amplifier) is a high power single-frequency continuous-wave solid-state laser designed for demanding low noise scientific and OEM applications. Laser's unique stability originates from the properties of widely recognized Non-Planar Ring Oscillator (NPRO) which is in the heart of MOPA's seed unit. The MOPA provides combination of optical properties unmatched by any other commercial product, such as ultra-narrow linewidth of 1 kHz or extremely low intensity noise (-130 dB/Hz RIN), which is the result of an integrated Noise Eater (NE) technology. Laser user has full control over emission frequency which can be adjusted by temperature and PZT. MOPA emits at 1064 nm and is available at power levels of 8 W, 25 W, 42 W, and 55 W.

Unique parameters makes Mephisto MOPA the laser of choice for demanding applications like atom trapping and cooling, optical metrology, quantum optics, gravitational wave studies, LIDAR, OPO pumping.

FEATURES & BENEFITS

- Master oscillator power amplifier (MOPA) configuration
- Monolithic non-planar ring oscillator (NPRO) seed laser
- Extremely long coherence length
- Noise Eater – active intensity noise reduction technology
- User-installed, turn-key operation
- Low noise control electronics

APPLICATIONS

- Atom Trapping and Cooling
- Optical Lattices
- Gravitational Wave Studies
- Laser-based Metrology
- Quantum Optics and Phenomena
- Nonlinear Optics Pump Source (SHG, DFG, OPO)
- LIDAR



SPECIFICATIONS	Mephisto MOPA
Laser Power at 1064 nm	8, 25, 42, 55
Operational Mode	Continuous-wave
Spatial Mode	TEM ₀₀ (M ² <1.3)
Beam Roundness	<1.1
Thermal Tuning Coefficient (GHz/K)	-3
Thermal Tuning Range (GHz)	30
Thermal Response Bandwidth (Hz)	≅1
PZT Tuning Coefficient (MHz/V)	≅1
PZT Tuning Range (MHz)	±65
PZT Response Bandwidth (kHz)	100
Emission Spectrum	Single-frequency
Spectral Linewidth (kHz) (over 100 ms)	≅1
Coherence Length (km)	>1
Frequency Stability ¹ (MHz/min.)	≅1
Relative Intensity Noise (RIN) (dB/Hz), f >20 kHz	<-130
Intensity Noise, 10 Hz to 2 MHz (% rms)	<0.06
Waist Location (inside laser head) (mm)	≅105
Laser Head Size (L x W x H) for 8 W, 25 W and 42 W for 55 W	386 x 381 x 117 mm (15.2 x 15.0 x 4.6 in.) 386 x 461 x 117 mm (15.2 x 18.1 x 4.6 in.)
Laser Head Weight for 8 W, 25 W and 42 W for 55 W	26 kg (57.3 lbs.) 28 kg (61.7 lbs.)
Laser Controller Master Size (L x W x H)	340 x 235 x 90 mm (13.4 x 9.25 x 3.5 in.)
Laser Controller Amplifier Size (L x W x H)	420 x 450 x 135 mm (16.5 x 17.7 x 5.3 in.)
Laser Controller Master Weight	4.2 kg (9.3 lbs.)
Laser Controller Amplifier Weight ²	11.9 to 13.1 kg (26.2 to 28.9 lbs.)
Laser Head Cooling ³	Water cooling
Water Flow Rate (l/min.)	>3
Water Pressure at Laser Head (bar)	<4
Water Temperature ⁴ (°C)	25
Cooling Power ² (W) (chiller)	300 to 600

¹ Measured at constant room temperature.

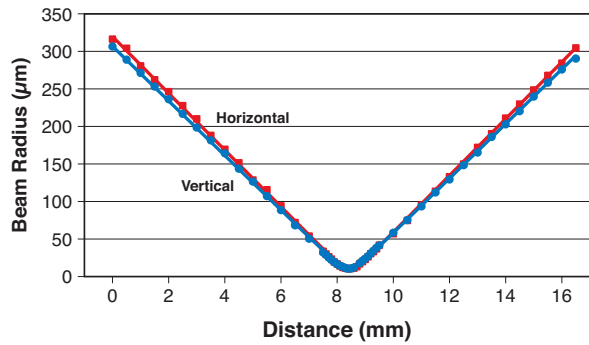
² Depending on model.

³ Non-deionized water recommended. Chiller available upon request.

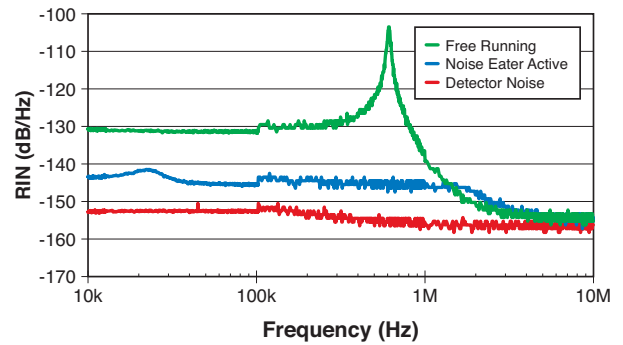
⁴ Operation above dew point required to avoid condensation.

TYPICAL PERFORMANCE DATA

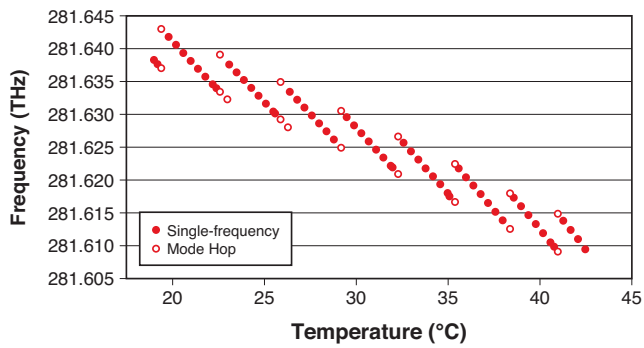
Beam Quality



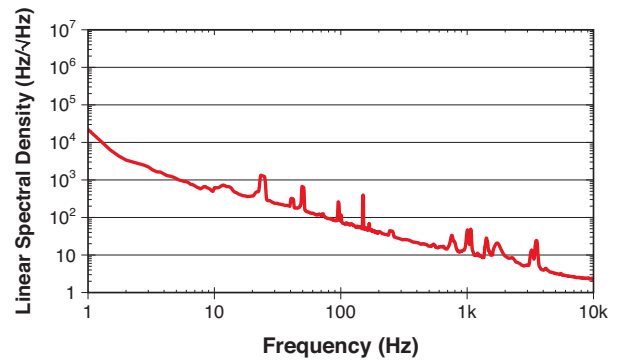
Relative Intensity Noise



Thermal Frequency Tuning

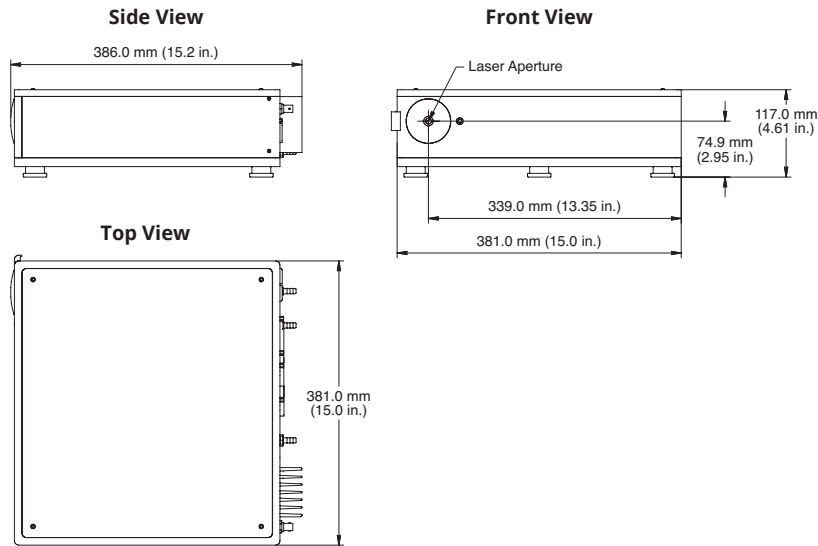


Frequency Noise

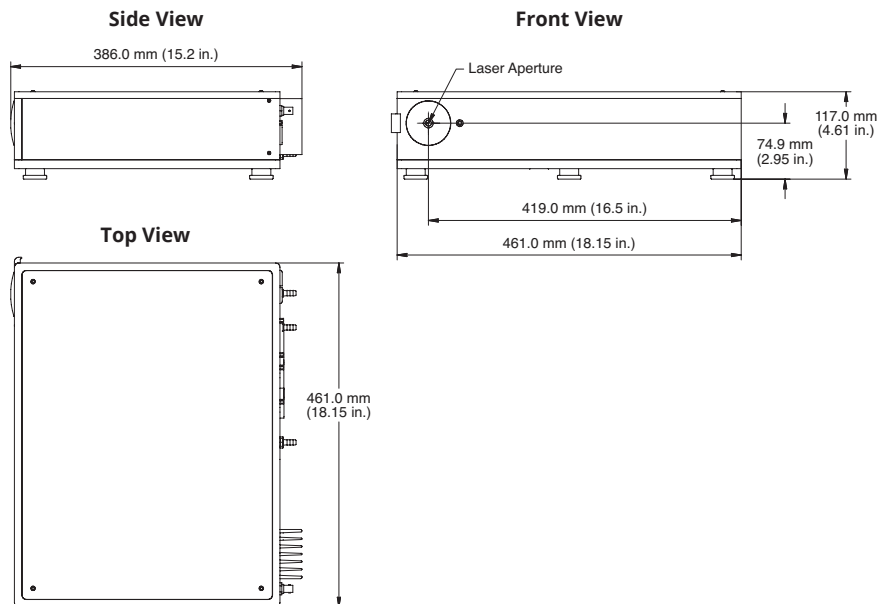


MECHANICAL SPECIFICATIONS

**Mephisto MOPA
8 W/25 W/42 W**



**Mephisto MOPA
55 W**



Coherent, Inc.,
5100 Patrick Henry Drive Santa Clara, CA 95054
p. (800) 527-3786 | (408) 764-4983
f. (408) 764-4646

tech.sales@coherent.com www.coherent.com

Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice. Coherent's scientific and industrial lasers are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by the Center for Devices and Radiological Health on all systems ordered for shipment after August 2, 1976.

Coherent offers a limited warranty for all Mephisto Lasers. For full details of this warranty coverage, please refer to the Service section at www.coherent.com or contact your local Sales or Service Representative.
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