Monaco

Diode-Pumped Femtosecond Industrial Laser

Monaco is a femtosecond industrial laser with a MOPA architecture. Designed for high-uptime, 24/7 applications, the laser family provides up to 60 µJ/pulse at 1035 nm, or 30 µJ/pulse at 517 nm. Standard repetition rates to 50 MHz at 40W enables current and future throughput requirements in materials processing and microelectronics applications. Homogeneous materials such as glass and metals, as well as complex, layered structures for the FPD and mobile markets are readily addressed with Monaco's sub-400 fs pulsewidth. Additionally, the on-the-fly variable pulsewidth enables tuning out to >10 ps.

Monaco's compact laser head is machined from a single block of stress-relieved aluminum. This monolithic structure ensures an optical alignment that is maintained during the life of the laser. This head encases all of the optical, electrical, and control elements. There are no umbilicals, no outmoded wiring harnesses between power supply boards, nor remotely located pump diodes. Furthermore, the laser head acts as its own cleanroom environment, thanks to the onboard PureFemto™ cleaning engine that is constantly cleaning the interior of the laser.

Finally, Monaco's reliability is assured through the HALT (Highly Accelerated Life Test) and HASS (Highly Accelerated Stress Screen) protocols employed during development and throughout production. Commonly used in the consumer electronics and automotive industries, Coherent has introduced HALT/HASS to the laser industry to bring an unrivaled standard of reliability and quality to laser-based manufacturing applications. Monaco is tested to extremes like no other femtosecond laser.

FEATURES

- 60 µJ/pulse at 1035 nm
- 30 µJ/pulse at 517 nm
- 1 MHz to 50 MHz repetiton rate
- Variable pulsewidths <400 fs to >10 ps
- Exceptional beam quality M^2 <1.2
- Burst Mode capable
- Single-box solution
- HALT designed/HASS certified
- Remote access via ethernet interface

APPLICATIONS

- Glass Cutting and Drilling
- Thin Film Ablation
- Wafer Scribing
- Complex Layer Processing
- Precise Metal Marking and Cutting
- Stent Fabrication
- Ophthalmic Applications
- OPA Pumping

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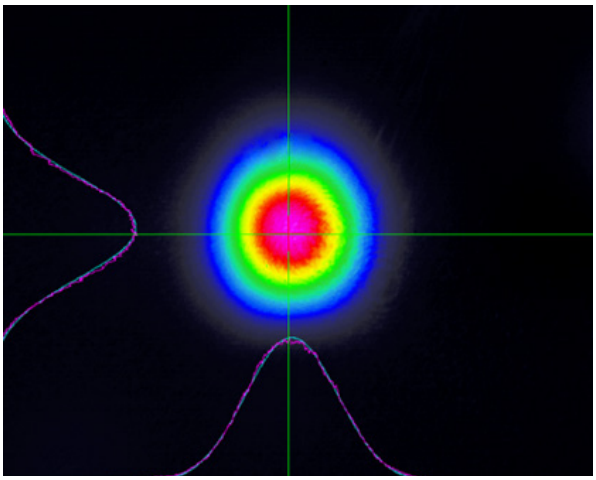
SPECIFICATIONS[1]	Monaco 1035-40	Monaco 1035-60	Monaco 517-20	Monaco 517-30
Fundamental Center Wavelength (nm)	1035 ±5	1035 ±5	517 ±5	517 ±5
Output Power (W)	40	40	20	20
Energy (µJ)	40 (at 1 MHz)	60 (at 670 kHz)	20 (at 1 MHz)	30 (at 670 kHz)
Repetition Rate	Single-shot to 1MHz, Higher rep rates without AOM pulsepicking: 2, 3, 4, 5, 10, 50 MHz			
Pulsewidth (fs)	<400			
Tuning Range	<400 fs to >10 ps	<400 fs to >10 ps	–	–
Spatial Mode	TEM_{00}, M^2 <1.2			
Beam Divergence (mrad, 2θ)	<1			
Beam Diameter at 1m from Output[2] (mm, $1/e^2$)	2.7 ±0.3	2.7 ±0.3	2.0 ±0.2	2.0 ±0.2
Astigmatism (%)	±25			
Beam Circularity (%)	>85			
Polarization Ratio	>100:1			
Polarization Direction[3]	Vertical, ±3°			
Beam Pointing Stability (µrad/°C)	<25			
Pulse Energy Stability (%) (RMS)	<2			
Power Stability (%) (RMS, 2σ)	<2			
Warm-up Time (minutes) Cold Start Warm Start	 <45 <15			
Long-term Pointing Stability at Fixed Rep-rate (µrad)	±25 over 8 hours			
Head Weight	32 kg (70 lbs.)			
External Comms	RS-232, Ethernet, USB			
Power Consumption[4] (typical)	48VDC, <500W			
OPERATING SPECIFICATIONS				
Temperature (non-condensing) Laser Head Power Supply Non-Operation (storage)	 +10 to 30°C (50 to 86°F) -20 to +60°C (-4 to 140°F) 5 to 65°C (41 to 149°F)			
Relative Humidity (%)	<90, non-condensing			
SHIPPING SPECIFICATIONS				
Temperature	-20 to +60°C (-4 to 140°F)			

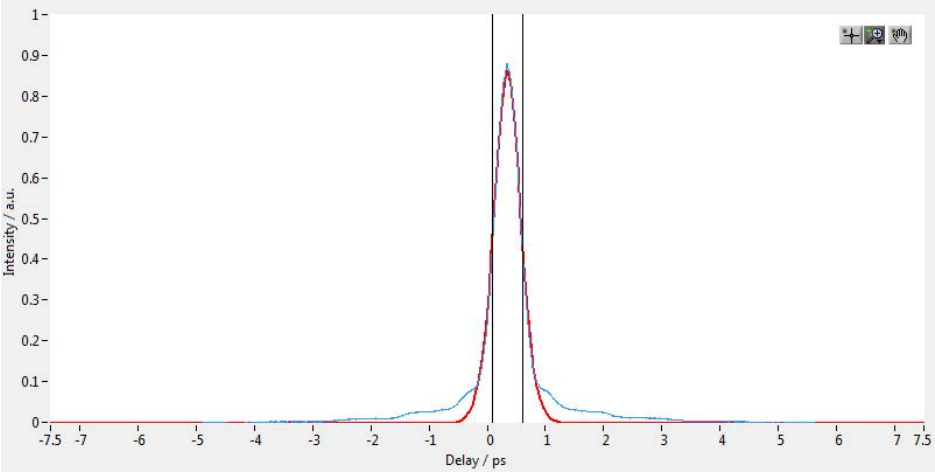
1 All specifications at full energy and repetition rate.
2 Measured at 1m from laser output window.
3 External isolation required depending on application.
4 Optional 110-240VAC power supply available.

TYPICAL PERFORMANCE DATA

Monaco Sample Spatial Mode at 1 MHz

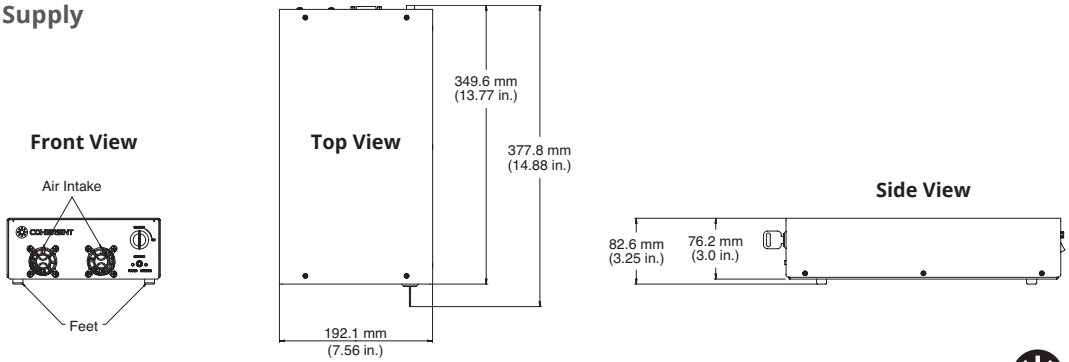


Monaco Sub 400 fs Temporal Profile



MECHANICAL SPECIFICATIONS

Monaco Power Supply



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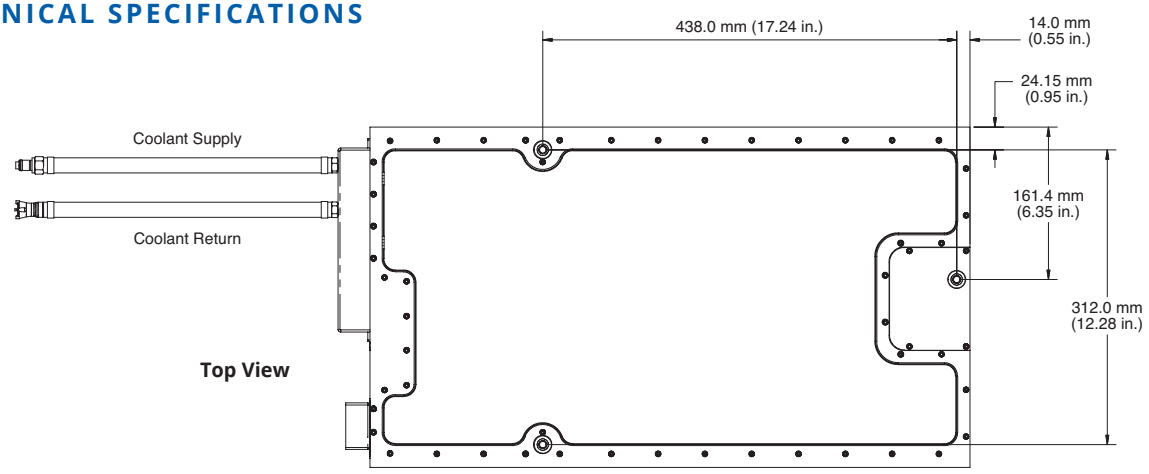

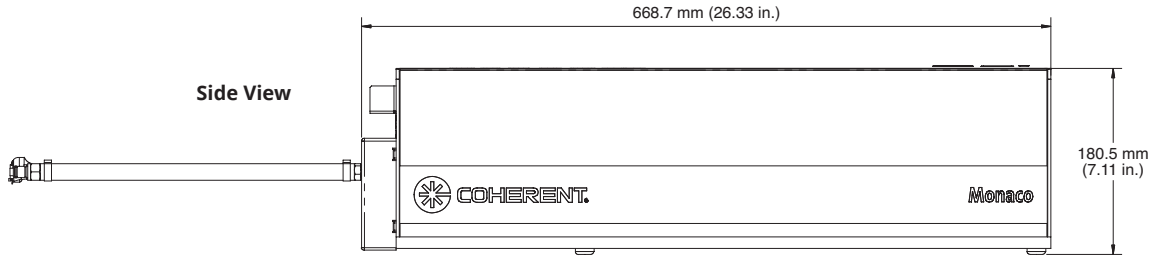

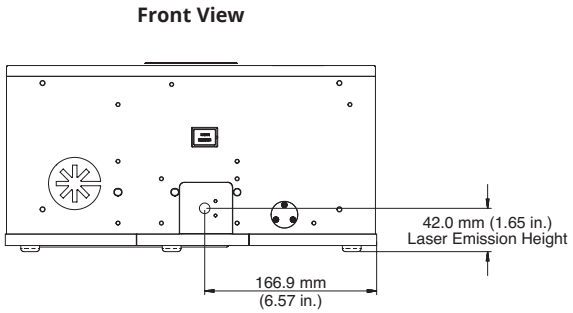

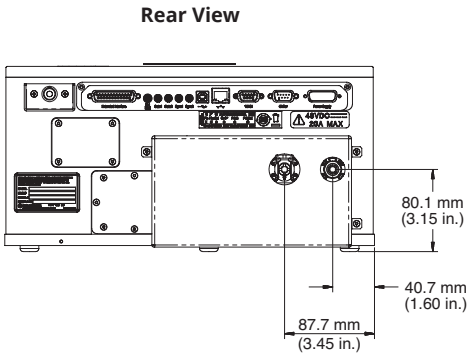

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