

Diamond J-3-5 CO Laser

Fully Sealed Carbon Monoxide Laser

A new generation of carbon monoxide (CO) lasers from Coherent promises enhanced processing characteristics in applications ranging from glass, ceramic and film cutting and drilling, through medical and aesthetics fractional skin resurfacing. While CO lasers were first developed decades ago, practical limitations in their lifetime and operating characteristics restricted them to a handful of niche low power laboratory applications. Now, technological breakthroughs at Coherent have yielded a new class of high power CO lasers with similar lifetime, reliability and maintenance characteristics to the company's, highly regarded, slab and waveguide based discharge CO₂ lasers, opening up a range of possible uses.



FEATURES

- >250 W output power at 5 μm (mid-IR)
- Stable pulsed and CW operation
- Beam focusability down to 25 μm
- CO₂ Laser-like low cost of ownership

APPLICATIONS

- Glass Processing
- Film Cutting
- Micro Via Drilling
- Ceramic Processing
- Metal Processing
- Selective Laser Sintering
- Surgical – Tissue Cutting and Cauterization
- Aesthetics – Fractional Skin Resurfacing

Specifications ¹		Diamond J-3-5 CO Laser	
Wavelength (μm)		5.5 ±0.25	
Output Power ² (W)		≥250	
Power Range ³ (W)		10 to 250	
Typical Peak Power ⁴ (W)		≥750	
Power Stability ^{2,5} (%)		±3	
Mode Quality (M ²)		<1.2	
Beam Waist Diameter ^{6,7} at 1/e ² (mm)		4.0 ±1.0 ¹³	
Full-Angle Beam Divergence ⁷ (mrad)		≤2.0	
Polarization (parallel to baseplate)		Linear ≥100:1	
Beam Ellipticity ^{6,7}		≥0.83, ≤1.2	
Pulse Frequency (kHz)		Single-shot to 200	
RF Excitation Pulse Width Range (μsec)		2 to 1000	
Duty Cycle Limit (%)		≤60	
Fall Time ⁴ (μs)		≤140 ¹³	
Weight		45 kg (99.27 lbs.)	
Dimensions (L x W x H)		1064.1 x 198.1 x 227.6 mm (41.89 x 7.8 x 8.96 in.)	
Electrical Power Requirements			
DC Input Voltage (VDC)		48 ±1%	
Continuous DC Input Current ⁸ (A)		≤100	
Peak Current (A)		≤200 for ≤6 ms	
Coolant			
Heat Load (kW)		≤4.8	
Dynamic Coolant Flow Rate (l/min.)		≥5.7	
Coolant Setpoint Temperature Range		21 to 25 °C (69.8 to 77 °F)	
Coolant Temperature Stability (max.)		±1.0 °C (±0.18 °F)	
Coolant ⁹		Anti-Corrosion Treated Water	
Coolant Differential Pressure ¹⁰ (kPa)		103 (15 psi) at 5.7 l/min. (1.5 gpm)	
Coolant Maximum Static Pressure (kPa)		827 (120 psi)	
Environmental Conditions			
Ambient Temperature		5 to 45°C (41 to 113°F)	
Relative Humidity ¹¹ (non-condensing) (%)		≤95	
Altitude		≤2000 m (6500 ft.)	
Dry Purge Gas Requirements ¹² (cfm)		>2	

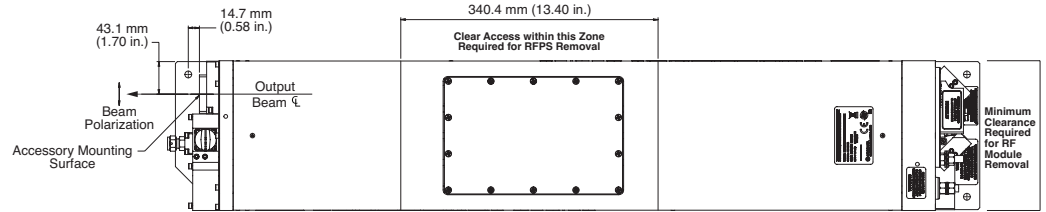
Notes:

1. All specifications apply when the product is operated in accordance with the guidelines defined in the operators manual.
2. Measured at 1 kHz PRF, 60% duty cycle.
3. Output stability specification may not be met at lowest power or at acoustic resonances.
4. Measured for a 300 μs pulse width at 1 kHz repetition frequency.
5. Measured as $\pm(P_{\max} - P_{\min})/2P_{\max}$.
6. Measured at waist location ~1.0 m from the laser output.
7. Measured at 10 kHz PRF, 25% duty cycle.
8. At 10 kHz PRF, maximum duty cycle operation.
9. See manual for details.
10. This differential pressure is from system input to output and does not include the pressure drop from chiller fittings and the supply and return hose.
11. Do not operate at or below dew point.
12. Clean dry air or nitrogen are acceptable as purge gases. Coherent can recommend suitable commercial gas filter/dryers.
13. Measured at 1 kHz, 300 μs RF pulse width.

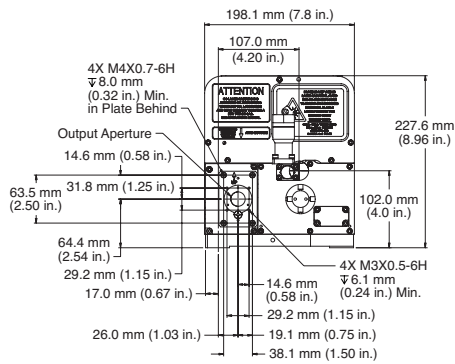
Mechanical Specifications

Diamond J-3-5 Laser Head

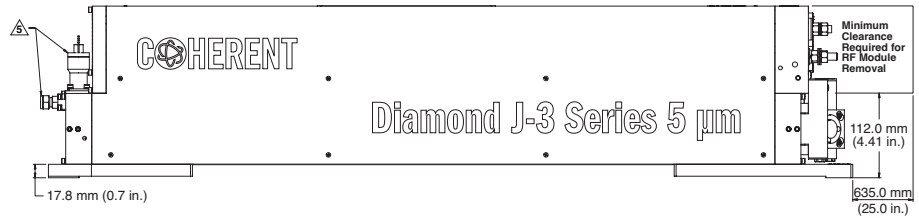
Top View



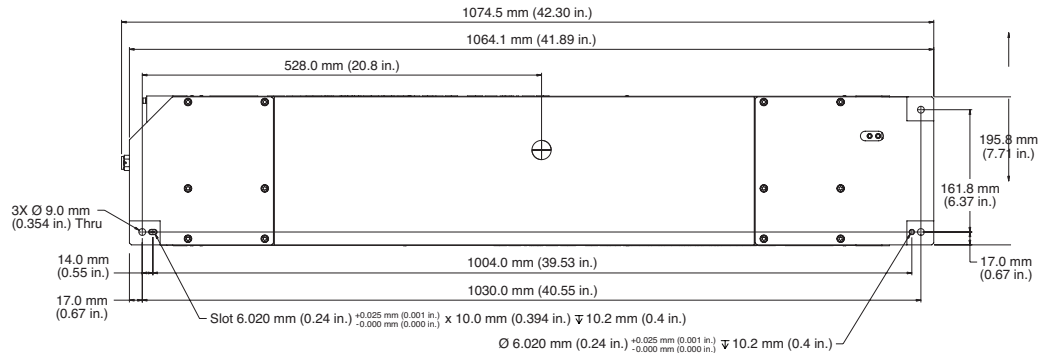
Front View



Side View



Bottom View



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