

DIAMOND J-3-5 CO Laser

Fully Sealed Carbon Monoxide Laser

A new generation of carbon monoxide (CO) lasers from Coherent, promise 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.



Superior Reliability & Performance

DIAMOND J-3-5 CO Laser Features:

- >200W output at 5 μm (mid-IR)
- Stable pulsed and CW operation
- Beam focusability down to 25 μm
- CO₂ Laser-like low cost of ownership

DIAMOND J-3-5 CO Laser Applications:

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

DIAMOND J-3-5 CO Laser

Fully Sealed Carbon Monoxide Laser

System Specifications¹

J-3-5 CO Laser

Wavelength (μm)	5.5 \pm 0.25
Output Power ² (W)	>200
Power Range ³ (W)	30 to 200
Nominal Peak Power ⁴ (W)	>450
Power Stability ^{2,5} (%)	\pm 3
Mode Quality (M^2)	<1.2
Beam Waist Diameter ^{6,7} at $1/e^2$ (mm)	4.0 \pm 1.0 ¹³
Full-Angle Beam Divergence ⁷ (mrad)	\leq 2.0
Polarization (parallel to baseplate) Linear	\geq 100:1
Beam Ellipticity ^{6,7}	\geq 0.83, \leq 1.2
Pulse Frequency (kHz)	Single-shot to 200
RF Excitation Pulse Width Range (μsec)	2 to 1000
Duty Cycle Limit (%)	\leq 60
Fall Time ⁴ (μs)	\leq 140 ¹³
Weight	45 kg (99.2 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 \pm 1.0%
Continuous DC Current ⁸ (A)	<100
Peak Current (A)	\leq 200 for \leq 6 ms

Coolant

Heat Load (kW)	\leq 4.8
Dynamic Coolant Flow Rate (l/min.)	\geq 5.7
Coolant Setpoint Temperature Range	21 to 25°C (69.8 to 77°F)
Coolant Temperature Stability (max.)	\pm 1.0°C (\pm 1.8°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)(%)	\leq 95
Altitude	\leq 2000 m (\leq 6500 ft.)
Dry Purge Gas Requirements ¹² (cfm)	>2

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 $\pm(P_{\text{max}} - P_{\text{min}})/2P_{\text{max}}$.

⁶ Measured at waist location \sim 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.

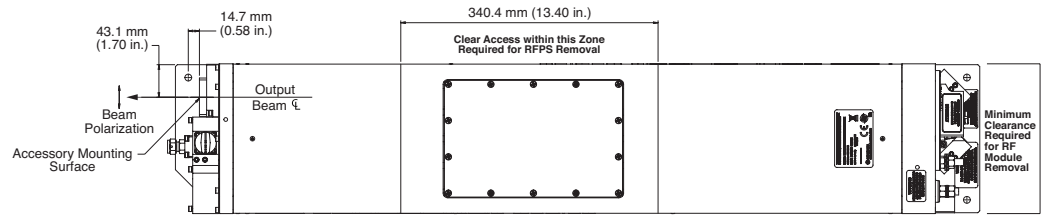
DIAMOND J-3-5 CO Laser

Fully Sealed Carbon Monoxide Laser

Mechanical Specifications

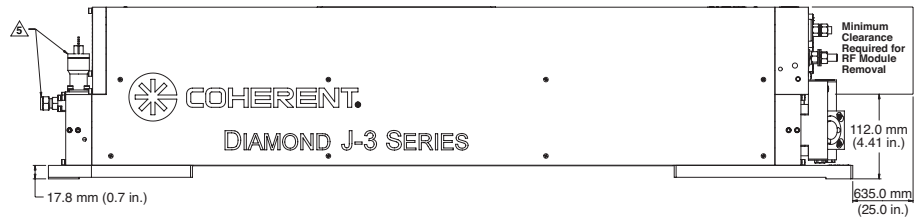
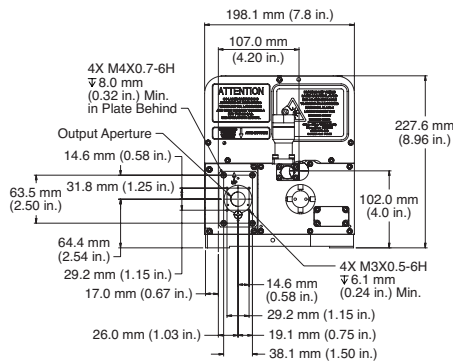
Laser Head

Top View

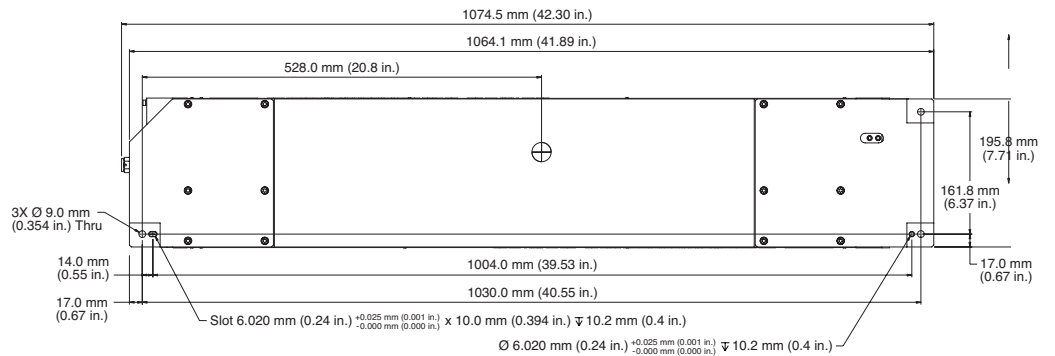


Front View

Side View



Bottom View



www.Coherent.com

Coherent, Inc.,
 5100 Patrick Henry Drive
 Santa Clara, CA 95054
 phone (800) 527-3786
 (408) 764-4983
 fax (408) 764-4646
 e-mail tech.sales@Coherent.com

Benelux +31 (30) 280 6060
 China +86 (10) 8215 3600
 France +33 (0)1 8038 1000
 Germany/Austria/Switzerland
 Denmark +49 (6071) 968 333
 Italy +39 (02) 31 03 951
 Japan +81 (3) 5635 8700
 Korea +82 (2) 460 7900
 Taiwan +886 (3) 505 2900
 UK/Ireland +44 (1353) 658 833

All specifications subject to change without notice. Coherent, Inc. warrants to the original purchaser for a period of two years from the date of delivery that the DIAMOND J-3 Series product is free from defects in material and workmanship. The warranty does not apply to any unit damaged by accident, abuse or operation in a manner inconsistent with the procedures and specifications outlined in the manual supplied with the laser.

The DIAMOND J-3-5 CO laser is a component that does not include all safety features as required by the FDA and the Center for Devices and Radiological Health (CDRH). It is sold solely to qualified manufacturers who in their end product will supply all interlocks and indicators, and will comply fully with CDRH regulations and/or local regulatory agencies.