

# 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 CO<sub>2</sub> 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**
- **CO<sub>2</sub> 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**

[www.Coherent.com/DIAMONDJ-3-5\\_COlaser](http://www.Coherent.com/DIAMONDJ-3-5_COlaser)

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### System Specifications<sup>1</sup>

### J-3-5 CO Laser

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

### Coolant

Heat Load (kW)	$\leq$ 4.5
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 <sup>9</sup>	Anti-corrosion treated water
Coolant Differential Pressure <sup>10</sup> (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 <sup>11</sup> (non-condensing)(%)	$\leq$ 95
Altitude	$\leq$ 2000 m ( $\leq$ 6500 ft.)
Dry Purge Gas Requirements <sup>12</sup> (cfm)	>1

<sup>1</sup> All specifications apply when the product is operated in accordance with the guidelines defined in the operators manual.

<sup>2</sup> Measured at 1 kHz PRF, 60% duty cycle.

<sup>3</sup> Output stability specification may not be met at lowest power or at acoustic resonances.

<sup>4</sup> Measured for a 300  $\mu\text{s}$  pulse width at 1 kHz repetition frequency.

<sup>5</sup> Measured as  $\pm(P_{\text{max}} - P_{\text{min}})/2P_{\text{max}}$ .

<sup>6</sup> Measured at waist location  $\sim$ 1.0 m from the laser output.

<sup>7</sup> Measured at 10 kHz PRF, 25% duty cycle.

<sup>8</sup> At 10 kHz PRF, maximum duty cycle operation.

<sup>9</sup> See manual for details.

<sup>10</sup> 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.

<sup>11</sup> Do not operate at or below dew point.

<sup>12</sup> Clean dry air or nitrogen are acceptable as purge gases. Coherent can recommend suitable commercial gas filter/dryers.

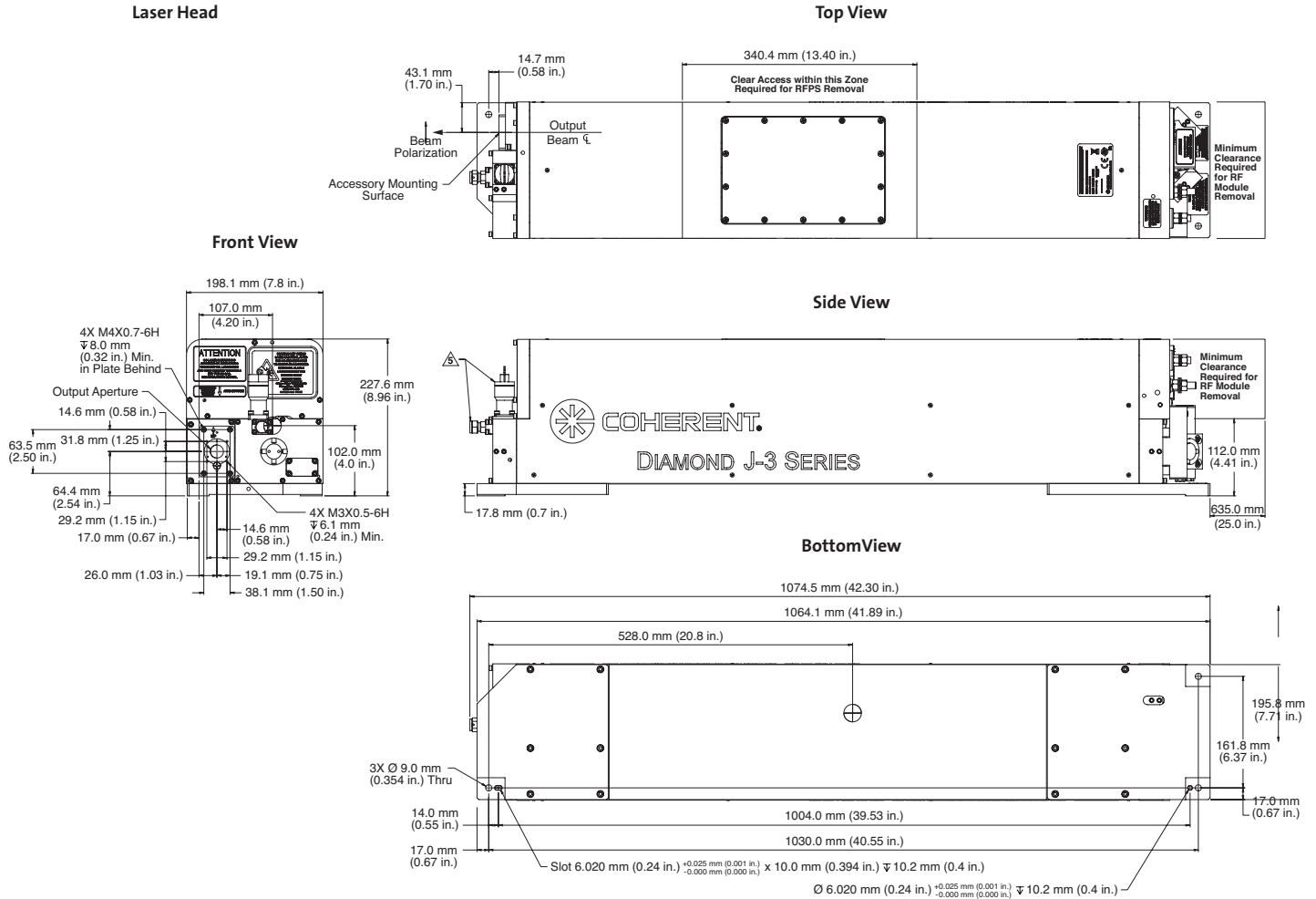
<sup>13</sup> Measured at 1 kHz, 300  $\mu\text{s}$  RF pulse width.

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## Mechanical Specifications

### Laser Head



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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.

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