

# DIAMOND J-1000

## Liquid-Cooled, RF-Excited OEM Industrial CO<sub>2</sub> Laser

DIAMOND J-1000 Series are sealed, pulsed CO<sub>2</sub> lasers offering maximum powers up to 1 kW in a fully integrated and compact package. By incorporating the RF power supply within the laser head the J-Series completely eliminates the RF umbilical increasing laser reliability and simplifying integration into a workstation or robotic tool.

Available at both 10.6  $\mu\text{m}$  and 9.4  $\mu\text{m}$  wavelengths, the unique J-1000 Series design packs a host of high performance features making it uniquely suited for use in space-sensitive applications involving converting, cutting, engraving, perforating and drilling of paper, plastic films, plastics, glass, carbon composites, textiles, wood and even thin metals. The RF power module is field serviceable with no soldering. A full suite of on-board diagnostics (accessible via the Internet) enables proactive service management.



### FEATURES & BENEFITS

- Wide operating power range
- Typical peak power >3 kW
- Pulse frequency from single-shot to 200 kHz
- Fast rise/fall time
- Outstanding beam quality
- Excellent power stability
- Low-cost OEM configuration
- Integrated but detachable RF power supply
- Compact design
- Equipped with on-board internet-accessible diagnostics

### APPLICATIONS

- High Speed Digital Converting
- Through-cutting, Kiss-cutting, and Perforation
- Engraving
- Die Board Cutting
- Glass Cutting and Thermal Processing
- Ceramic Drilling and Scribing
- Automotive: Interiors and Airbag Cutting, E-Mobility processes
- 3D Printing
- Semiconductor Processing



| SPECIFICATIONS <sup>1</sup>                                    | DIAMOND J-1000-10.6                          | DIAMOND J-1000-9.4 |
|--|--|--------------------|
| Wavelength (μm)  | 10.2 to 10.8                                 | 9.1 to 9.5         |
| Output Power <sup>2</sup> (W)                                  | ≥1000  |                    |
| Power Range <sup>3</sup> (W)                                   | 100 to 1000                                  |                    |
| Peak Effective Power <sup>4</sup> (W)                          | >2800  |                    |
| Power Stability <sup>5</sup> (%)                               | ±5   |                    |
| Mode Quality (M <sup>2</sup> )                                 | <1.2   |                    |
| Near Field Beam Diameter <sup>6</sup> at 1/e <sup>2</sup> (mm) | 12 ±1.5                                      |                    |
| Beam Waist Diameter <sup>7</sup> at 1/e <sup>2</sup> (mm)      | 10 ±1.5                                      |                    |
| Full-Angle Beam Divergence <sup>6</sup> (mrad)                 | 1.6 typical, 2.0 max.                        |                    |
| Polarization (perpendicular to baseplate)                      | Linear >100:1                                |                    |
| Beam Ellipticity   | >0.83, <1.20                                 |                    |
| Pulse Frequency (kHz)  | Single-shot to 200                           |                    |
| RF Excitation Pulse Width Range (μsec)                         | 2 to 1000                                    |                    |
| Duty Cycle Limit (%)   | ≤60  |                    |
| Fall Time <sup>4</sup> (μs)                                    | <55  |                    |
| Weight   | 173 kg (381 lbs.)                            |                    |
| Dimensions (L x W x H)   | 1497 x 384 x 471 mm (58.9 x 15.1 x 18.6 in.) |                    |
| ELECTRICAL POWER REQUIREMENTS                                  |  |                    |
| CC Input Voltage (VDC)   | 48 ±1.0%                                     |                    |
| Continuous DC Current (A)                                      | ≤425   |                    |
| Peak Current (A)   | <628 for up to 1 ms                          |                    |
| COOLANT  |  |                    |
| Heat Load (kW)   | <22  |                    |
| Dynamic Coolant Flow Rate (l/min.)                             | >25 (6.5 gpm)                                |                    |
| Coolant Temperature Stability (max.)                           | ±1.0°C (±1.8°F)                              |                    |
| Coolant Setpoint Temperature Range                             | 21 to 25°C (69.8 to 77°F)                    |                    |
| Coolant <sup>8</sup>   | Anti-corrosion treated water                 |                    |
| Coolant Differential Pressure <sup>9</sup> (kPa)               | 344 (50 psi) at 25 l/min. (6.5 gpm)          |                    |
| Coolant Maximum Static Pressure (kPa)                          | 827 (120 psi)                                |                    |
| ENVIRONMENTAL CONDITIONS                                       |  |                    |
| Ambient Temperature  | 5 to 45°C (41 to 113°F)                      |                    |
| Relative Humidity <sup>10</sup> (%)                            | <95 (non-condensing)                         |                    |
| Altitude   | <2000 m (<6500 ft.)                          |                    |

<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 60% duty and 10 kHz prf.

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

<sup>4</sup> Measured at 10% duty cycle and 1 kHz prf.

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

<sup>6</sup> Measured at approximately 0.5 m from the laser output.

<sup>7</sup> Beam diameter at the waist location, located at approximately 5m from the laser output.

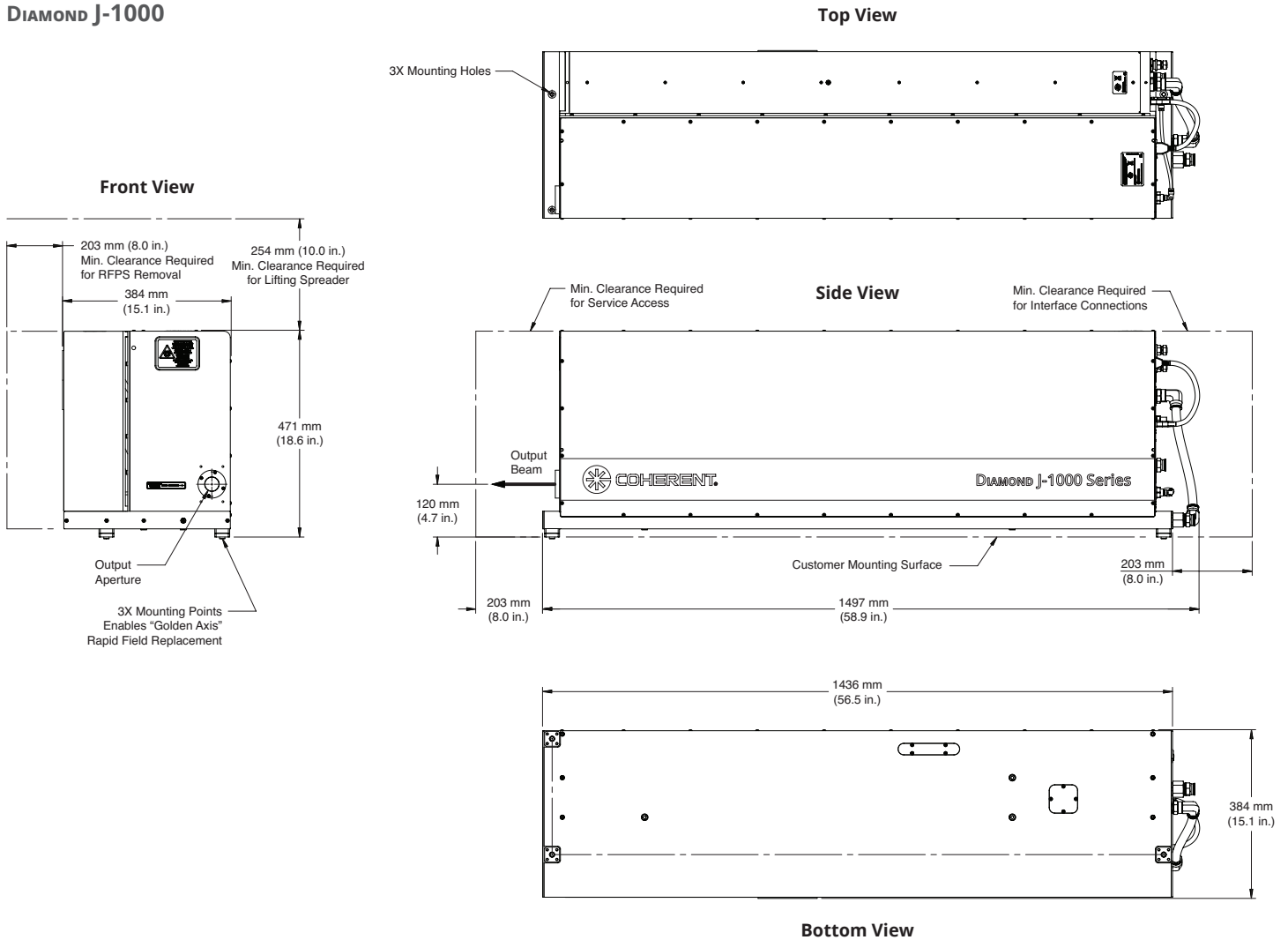
<sup>8</sup> See manual for details.

<sup>9</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>10</sup> Do not operate at or below dew point.

## MECHANICAL SPECIFICATIONS

### DIAMOND J-1000



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](mailto:tech.sales@coherent.com) [www.coherent.com](http://www.coherent.com)

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-1000 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-1000 CO<sub>2</sub> 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. MC-040-20-0M1220 Copyright ©2020 Coherent, Inc.

