

DIAMOND E-1000/E-1000i

Liquid-Cooled, RF-Excited OEM Industrial CO₂ Laser

DIAMOND E-1000 Series are sealed, pulsed CO₂ 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 E-Series completely eliminates the RF umbilical increasing laser reliability and simplifying integration into a workstation or robotic tool.

Available at both 10.6 μm and 9.4 μm wavelengths, the unique E-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 supply is detachable and a full suite of on-board diagnostics (accessible via the Internet) is available that allows for proactive maintenance.

The unique pulsing characteristics derived from its slab discharge design enables the E-1000 Series laser to reach peak powers in excess of 3 kW in contrast to CW modulated lasers. And the E-1000 Series can be operated with pulse repetition rates up to 200 kHz with fast pulse rise and fall times. This combination of high peak power and fast rise and fall time times, together with power on demand and excellent beam quality makes the E-1000 Series an ideal laser for a wide range of materials processing applications.



Superior Reliability & Performance

DIAMOND E-1000/E-1000i Features:

- **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**

DIAMOND E-1000/E-1000i 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**
- **3D Printing**
- **Semiconductor Processing**

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System Specifications ¹	DIAMOND E-1000	PRELIMINARY DIAMOND E-1000i
Wavelength (μm)	10.2 to 10.8	9.1 to 9.5
Output Power ² (W)		≥1000
Power Range ³ (W)		100 to 1000
Peak Effective Power ⁴ (W)		>2800
Power Stability ⁵ (%)		±5
Mode Quality (M ²)		<1.2
Near Field Beam Diameter ⁶ at 1/e ² (mm)		12 ±1.5
Beam Waist Diameter ⁷ at 1/e ² (mm)		10 ±1.5
Full-Angle Beam Divergence ⁶ (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 ⁴ (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		
DC 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 ⁸		Anti-corrosion treated water
Coolant Differential Pressure ⁹ (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 ¹⁰ (%)		<95 (non-condensing)
Altitude		<2000 m (<6500 ft.)

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

² Measured at 60% duty and 10kHz prf.

³ Output stability specification may not be met at lowest power or at acoustic resonances.

⁴ Measured at 10% duty cycle and 1 kHz prf.

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

⁶ Measured at approximately 0.5m from the laser output.

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

⁸ See manual for details.

⁹ 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.

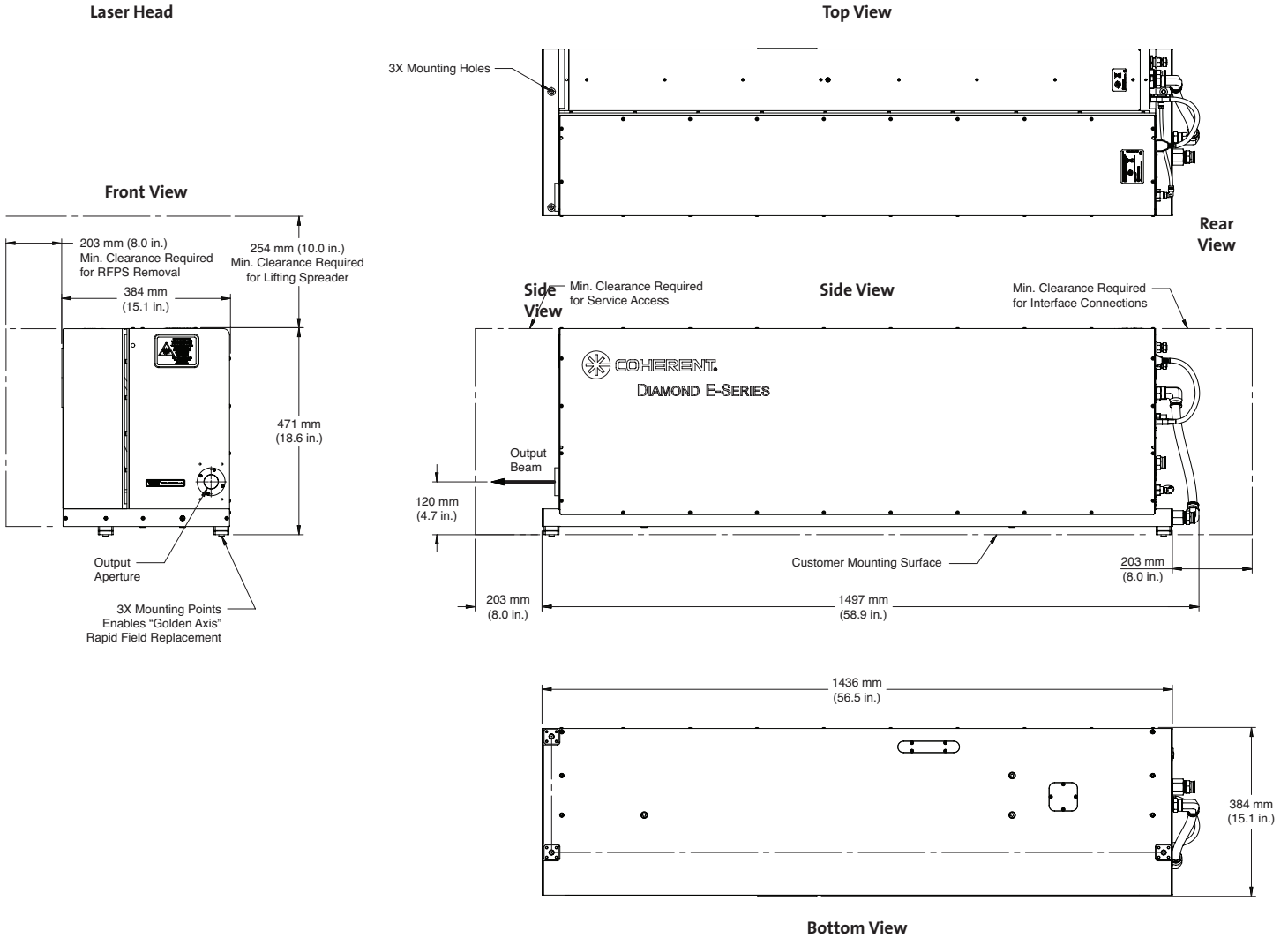
¹⁰ Do not operate at or below dew point.

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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 shipment that the DIAMOND E-1000/E-1000i 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 DIAMOND E-1000/E-1000i is a laser 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.

