

DIAMOND J-6

RF Excited OEM Industrial CO₂ Laser

The Coherent DIAMOND J-6 is a fully sealed, pulsed CO₂ laser offering average power greater than 500 Watts in a fully integrated and compact package. The unique pulsing characteristics derived from its slab discharge design enable the J-6 laser to deliver optimized pulsed and quasi-CW performance in contrast to regular CW modulated lasers. The J-6 laser can be operated with pulse repetition rates up to 200 kHz at duty cycles up to 65%. This combination of high duty cycle at high pulse repetition frequency, together with power on demand and excellent beam quality makes the J-6 an ideal laser for applications benefitting from high power quasi-CW operation. These include galvo scanner based converting applications such as flexible packaging, folding cartons, perforation, and label kiss-cutting. Also included are textile patterning and engraving applications. The J-6 laser is also optimized for other non-scanner based quasi-CW applications like flat panel display and automotive glass cutting, and reprographics.

Features and Benefits

- Wide operating power range
- Pulse frequency from single-shot to 200 kHz
- Pulse duty cycle up to 65%
- Optimized pulsed and quasi-CW operation
- Outstanding beam quality
- Excellent power stability
- Low-cost OEM configuration
- Field serviceable RF power supply
- Compact design
- Onboard internet-accessible diagnostics

Applications

- Converting
- Textile Patterning
- Engraving
- Cutting
- Marking
- Reprographics



SPECIFICATIONS¹

DIAMOND J-6-10.6

Wavelength (μm)	10.2 to 10.8
Output Power ² (W)	≥500
Typical Output Power (W)	650
Power Range ³ (W)	50 to 500
Typical Peak Power ⁴ (W)	1200
Power Stability ^{2,5} (%)	≤±6
Power Stability with CL option ⁶ (%)	≤±2
Beam Diameter ^{7,8} (mm)	8.5 ±1.0
Beam Waist Diameter ^{7,9} at 1/e ² (mm)	8.0 ±1.0
Full-Angle Beam Divergence ⁷ (mrad)	≤2.0
Beam Ellipticity ^{7,9}	≥0.83, ≤1.2
Polarization (parallel to baseplate)	Linear ≥100:1
RF Excitation Pulse Width Range (μs)	2 to 130
Pulse Repetition Frequency Range (kHz)	Single-Shot to 200
Duty Cycle Limit ¹⁰ (%)	≤65
Fall Time ⁴ (μs)	≤50
Weight	58 kg (127 lbs.)
Dimensions (L x W x H)	1225 x 198.1 x 227.6 mm (48.23 x 7.8 x 8.96 in.)

ELECTRICAL POWER REQUIREMENTS

DC Input Voltage (VDC)	48 ±1%
Continuous DC Input Current ¹¹ (A)	≤190
Peak Current (A)	≤380 for ≤6 ms

COOLANT

Heat Load ¹² (kw)	≤9
Dynamic Coolant Flow Rate ¹² (l/min.)	≥9.5
Coolant Setpoint Temperature Range	21 to 25°C (69.8 to 77°F)
Coolant Temperature Stability (max.)	±1.0C (±0.18°F)
Coolant ¹³	Anti-Corrosion Treated Water
Coolant Differential Pressure ¹⁴	241 (35 psi) at 9.5 l/min. (2.5 gpm)
Coolant Maximum Static Pressure (kPa)	827 (120 psi)

ENVIRONMENTAL CONDITIONS

Ambient Temperature	5°C to 45°C (41 to 113°F)
Relative Humidity ¹⁵ (non-condensing) (%)	≤95
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 20 kHz, max. duty cycle. Guaranteed in warranty period.

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

4 Measured for a 100 μs pulse width at 1 kHz repetition frequency.

5 Measured as $(P_{max}-P_{min})/(2*P_{avg})$.

6 See J-series Closed Loop (CL) option for full specifications.

7 Measured at 10 kHz PRF, 30% duty cycle.

8 Measured at ~1.4 m from the laser output.

9 Measured at waist location ~3.4 m from the laser output.

10 For PRF <5 kHz duty cycle will be limited by 130 μs max pulse width.

11 At 10 kHz PRF, maximum duty cycle operation.

12 Laser only. Does not include margin for water cooled DCPS.

13 See manual for details.

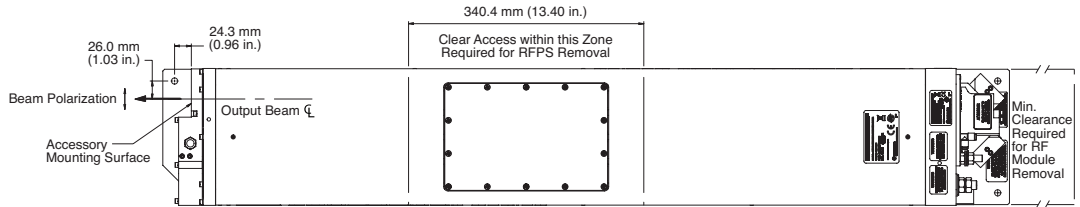
14 Differential pressure is from laser input to output and does not include pressure drop from chiller fittings and supply and return hose.

15 Do not operate at or below dew point.

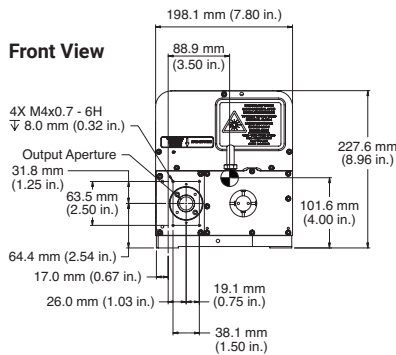
MECHANICAL SPECIFICATIONS

DIAMOND J-6

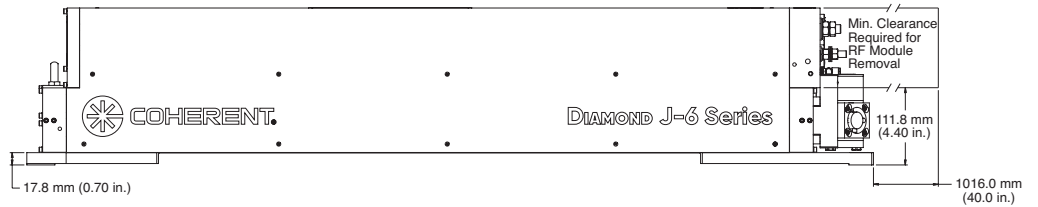
Top View



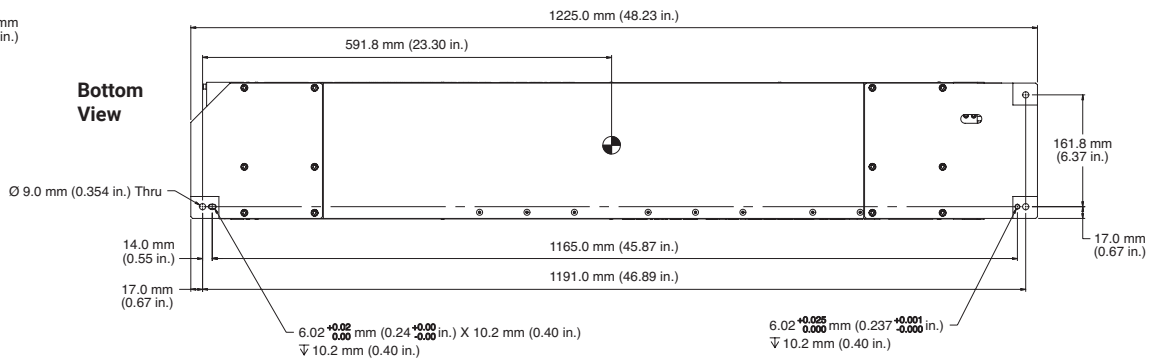
Front View



Side View



Bottom View



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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-6 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-6 CO₂ 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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