RF-Excited OEM Industrial CO₂ Laser

Coherent DIAMOND J-5 Series are fully sealed, pulsed CO₂ lasers offering average power greater than 400 Watts in a fully integrated and compact package. The unique pulsing characteristics derived from its slab discharge design enable the J-5 Series laser to reach peak powers well in excess of 1 kW in contrast to CW modulated lasers. The J-5 Series lasers are available at 10.6 µm, 10.2 µm, and 9.4 µm and can be operated with pulse repetition rates up to 200 kHz with fast pulse rise and fall times. This combination of wavelength selection, high peak power and fast rise and fall time times, together with power on demand and excellent beam quality makes the J-Series an ideal laser for a wide range of materials processing applications.

The J-5 Series is part of the J-Series family spanning a power range from 150W to greater than 400W. The J-Series family is built on a common platform with common mechanical and electrical interfaces, common optical interfaces, common software, and a common service and support strategy. All J-Series lasers offer proactive maintenance capability enabled by the integrated yet field replaceable RF power supply design and overall systems monitoring using Coherent's field proven full suite of on-board diagnostics.

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

APPLICATIONS
- Converting
- Drilling
- Cutting
- Scribing
- Engraving
- Marking
<table>
<thead>
<tr>
<th>Specifications</th>
<th>Diamond J-5-9.4</th>
<th>Diamond J-5-10.2</th>
<th>Diamond J-5-10.6</th>
<th>Diamond J-5-10.6NB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength (μm)</td>
<td>9.36 ±0.05</td>
<td>10.25 ±0.5</td>
<td>10.2 to 10.8</td>
<td>10.6 ±0.05</td>
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<tr>
<td>Output Power (W)</td>
<td>≥400</td>
<td>≥400</td>
<td>≥450</td>
<td>≥450</td>
</tr>
<tr>
<td>Power Range (W)</td>
<td>40 to 400</td>
<td>40 to 400</td>
<td>45 to 450</td>
<td>45 to 450</td>
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<tr>
<td>Typical Peak Power (W)</td>
<td>1700</td>
<td>1450</td>
<td>1800</td>
<td>1800</td>
</tr>
<tr>
<td>Power Stability (%)</td>
<td>±6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mode Quality (M²)</td>
<td>&lt;1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Waist Diameter (mm)</td>
<td>7.0 ±1.0</td>
<td>8.5 ±1.0</td>
<td>8.5 ±1.0</td>
<td>8.5 ±1.0</td>
</tr>
<tr>
<td>Full-Angle Beam Divergence (mrad)</td>
<td>≤2.2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Polarization (parallel to baseplate)</td>
<td>Linear ±100:1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Beam Ellipticity (%)</td>
<td>≥0.83, ≤1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse Frequency (kHz)</td>
<td>Single-shot to 200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF Excitation Pulse Width Range (μsec)</td>
<td>2 to 800</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Duty Cycle Limit (%)</td>
<td>≤40</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fall Time (μs)</td>
<td>≤40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>58 kg (127 lbs.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>1225 x 198.1 x 227.6 mm (48.23 x 7.8 x 8.96 in.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part Number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Shutter</td>
<td>1320426</td>
<td>1320428</td>
<td>1319117</td>
<td>1319118</td>
</tr>
<tr>
<td>Shutter</td>
<td>1320427</td>
<td>1320429</td>
<td>1319327</td>
<td>1319119</td>
</tr>
</tbody>
</table>

### ELECTRICAL POWER REQUIREMENTS

- **DC Input Voltage (VDC)**: 48 ±1.0%
- **Continuous DC Current (A)**: ≤190
- **Peak Current (A)**: ≤380 for ≤6 ms

### COOLANT

- **Heat Load (kW)**: ≤9
- **Dynamic Coolant Flow Rate (l/min.)**: ≥9.5
- **Coolant Setpoint Temperature Range**: 21 to 25°C (69.8 to 77°F)
- **Coolant Temperature Stability (max.)**: ±1.0°C (±1.8°F)
- **Coolant**: Anti-corrosion treated water
- **Coolant Differential Pressure (kPa)**: 241 (35 psi) at 9.5 l/min. (2.5 gpm)
- **Coolant Maximum Static Pressure (kPa)**: 827 (120 psi)

### ENVIRONMENTAL CONDITIONS

- **Ambient Temperature**: 5 to 45°C (41 to 113°F)
- **Relative Humidity (%)**: ≤95
- **Altitude**: ≤2000 m (6500 ft.)

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1. All specifications apply when the product is operated in accordance with the guidelines defined in the operators manual.
2. Output stability specification may not be met at lowest power or at acoustic resonances.
3. Measured for a 100 μs pulse width at 1 kHz repetition frequency.
4. Measured as s1Pmax–Pmin/P2Pmax.
5. Measured at waist location ~1.0 m from the laser output.
6. Measured at 10 kHz PRF, 18% duty cycle.
7. Do not operate at or below dew point.
# MECHANICAL SPECIFICATIONS

## Laser Head

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>mm</td>
</tr>
<tr>
<td>Height</td>
<td>mm</td>
</tr>
<tr>
<td>Length</td>
<td>mm</td>
</tr>
<tr>
<td>Width</td>
<td>mm</td>
</tr>
</tbody>
</table>

### Accessory Mounting Surface

- Minimum Clearance Required for RF Module Removal
- Minimum Clearance Required for RF Module Replacement

### Output Beam Aperture

- Diameter: mm
- Diameter: mm

### Output Aperture

- Diameter: mm
- Diameter: mm

### Beam Polarization

- Width: mm
- Width: mm

### Front View

- Width: mm
- Width: mm

### Side View

- Width: mm
- Width: mm

### Top View

- Width: mm
- Width: mm

### Bottom View

- Width: mm
- Width: mm