Diamond Cx-10LDE+
Sealed CO₂ Laser with Integrated AOM

As part of the C/Cx-series from Coherent, the Cx-10LDE+ CO₂ laser provides superior pulse control and power stability with its fully integrated acoustic optical modulator (AOM). Based on the Cx-10 laser platform, the Cx-10LDE+ is a production-ready, easy-to-integrate laser system enabling the highest quality laser processing with low maintenance and operating cost. The extreme pulse control provided by the AOM makes this laser especially useful for high precision applications such as film cutting in flat panel display manufacturing, high resolution marking, and other functions requiring a true “on/off” pulse.

**FEATURES & BENEFITS**

- Fully integrated AOM providing excellent pulse control.
- Superior power stability improves processing consistency and repeatability.
- Modular RF board and AOM design allows for easy serviceability.
- Small footprint for easy integration.
- Pulse rise/fall times of <1 µs minimize heat effected zones and provide high precision process control.

**APPLICATIONS**

- High volume marking, cutting, and engraving.
- Film cutting and processing.
- Process wide range of materials from acrylics, cardboard, ceramics, glass, polymer films, leather, paper, textiles, wood, and PCBs.
# SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>Cx-10LDE+ 10.6 µm</th>
<th>Cx-10LDE+ 10.2 µm</th>
<th>Cx-10LDE+ 9.6 µm</th>
<th>Cx-10LDE+ 9.3 µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength (µm)</td>
<td>10.6 ± 0.03</td>
<td>10.2 ± 0.05</td>
<td>9.6 ± 0.05</td>
<td>9.3 ± 0.05</td>
</tr>
<tr>
<td>Laser Power at 50% Duty Cycle(^1,(^2) (W)</td>
<td>≥45</td>
<td>≥40</td>
<td>≥30</td>
<td>≥30</td>
</tr>
<tr>
<td>Typical Peak Output Power (W)</td>
<td>&gt;120</td>
<td>&gt;120</td>
<td>≥85</td>
<td>≥85</td>
</tr>
<tr>
<td>Power Stability(^1,(^2) (%)</td>
<td>±3 (±0.1 °C coolant stability after 10 minute warm-up)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse Rise and Fall Time (µsec)</td>
<td>≤1 (10% to 90%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Quality (M(^2))</td>
<td>≤1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Output Diameter (mm) (nominal)</td>
<td>5.5 ±1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Waist Diameter (mm) (nominal)</td>
<td>3.4 ±0.3</td>
<td>3.4 ±0.3</td>
<td>2.7 ±0.3</td>
<td>2.7 ±0.3</td>
</tr>
<tr>
<td>Beam Divergence (mrad) (full angle)</td>
<td></td>
<td>≤5.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beam Ellipticity(^3)</td>
<td>≥0.83, ≤1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pointing Stability(^4) (% divergence/actual µrad)</td>
<td>≤750 µrad</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polarization(^5)</td>
<td>Vertical ≥100:1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Frequency and Duty Cycle(^6)</td>
<td>0 to 200 kHz, 1% to 100% DC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# CONFIGURATION AND FACILITY REQUIREMENTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>23.0 kg (50.5 lbs)</td>
</tr>
<tr>
<td>Dimensions (L x W x H)</td>
<td>670.8 x 176.5 x 186.9 mm (26.41 x 6.95 x 7.36 in.)</td>
</tr>
<tr>
<td>Input Power</td>
<td>48 VDC, 45A</td>
</tr>
<tr>
<td>Heat Dissipation (W)</td>
<td>≤2300</td>
</tr>
<tr>
<td>Maximum Case Temperature</td>
<td>&lt;60°C (140°F)</td>
</tr>
<tr>
<td>Clean Dry Air Purge(^7)</td>
<td>&gt; 5 slph (0.177 scfh)</td>
</tr>
<tr>
<td>Operating Environment</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>5°C to 45°C (41 to 113 °F)</td>
</tr>
<tr>
<td>Altitude</td>
<td>≤2000 m (6500 ft)</td>
</tr>
<tr>
<td>Humidity</td>
<td>Non-condensing ≤95%</td>
</tr>
<tr>
<td>Shipping/Storage Environment</td>
<td>-10°C to +60°C (14 to 140°F), Non-condensing</td>
</tr>
<tr>
<td>Coolant</td>
<td></td>
</tr>
<tr>
<td>Coolant Flow Rate</td>
<td>Distilled water with 25% to 35% Dow Frost(^*)</td>
</tr>
<tr>
<td>Maximum Coolant Pressure</td>
<td>≥5.7 l/min (1.5 gpm)</td>
</tr>
<tr>
<td>Max. Pressure Differential (at 1.5 gpm)</td>
<td>700 kPa (101 psig)</td>
</tr>
<tr>
<td>Coolant Temperature</td>
<td>&lt;400 kPa (58 psig)</td>
</tr>
<tr>
<td></td>
<td>20°C ± 1°C</td>
</tr>
</tbody>
</table>

\(^1\) All measurements, such as power made at 20°C ±0.5°C coolant temperature, AOM PRF 25 kHz.

\(^2\) Power Stability based on \(\frac{P_{max} - P_{min}}{2P_{max}}\) average power measurement under the following conditions: AOM PRF 25 kHz; AOM duty cycle 50%; Cx-10 laser duty cycle 100%; and after 10 minute warm up period with 10 minute measurement duration.

\(^3\) Ratio based on far field divergence measurement, defined as the ratio of vertical to horizontal divergence.

\(^4\) Measured as the steady state angular beam centroid change between a 5% AOM duty cycle and a 95% AOM duty cycle. Steady state is defined as the angular beam centroid location after 1 minute of operation at the specific AOM duty cycle and with a 100% Cx-10 duty cycle after a 10 minute Cx-10 warm up period.

\(^5\) Refer to Mechanical Specifications for beam polarization orientation.

\(^6\) Operation at pulse repetition frequencies above 200 kHz may result in substantial side lobe power and reduced beam quality.

\(^7\) Dry Nitrogen is also acceptable as a purge gas.

\(^*\) Dow Frost is a trademark of the Dow Chemical Company.
MECHANICAL SPECIFICATIONS

Diamond Cx-10LDE+

Top View

Front View

Side View

Bottom View

Rear View

Beam Polarization

Beam Output

User Interface

RFPM Control

AO Driver DC Input

4X M3x0.5-6H 8.9 mm (0.35 in.)
EQ SP On Ø25.4 mm (1.0 in.) BC

Not Used

176.5 mm (6.95 in.)
11.3 mm (0.44 in.)
77.4 mm (3.05 in.)
455.0 mm (17.92 in.)
593.4 mm (23.36 in.)

670.8 mm (26.41 in.)

15.5 mm (0.61 in.)

128.9 mm (5.08 in.)

135.1 mm (5.32 in.)

542.0 mm (21.34 in.)

542.0 mm (21.34 in.)

6.6 mm (0.26 in.)

12.0 mm (0.47 in.)

95.0 mm (3.74 in.)

0.6 mm (0.026 in.) Thru

5X Ø6.7 mm (0.266 in.) Thru

Coolant Inlet

Control Connector RJ45

Laser DC Input

Coolant Inlet Ø10 mm (0.394 in.)

Coolant Inlet Ø10 mm (0.394 in.)

Purge Connection Ø6.0 mm (0.236 in.)

Purge Connection Ø6.0 mm (0.236 in.)

186.9 mm (7.36 in.)

30.2 mm (1.19 in.)

7.0 mm (0.28 in.)

17.8 mm (0.70 in.)

117.1 mm (4.61 in.)

23.8 mm (0.94 in.)

163.3 mm (6.40 in.)

23.8 mm (0.94 in.)

555.0 mm (21.85 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

23.8 mm (0.94 in.)

30.2 mm (1.19 in.)

17.8 mm (0.70 in.)

117.1 mm (4.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)

15.5 mm (0.61 in.)

23.8 mm (0.94 in.)