

# DIAMOND G-100i

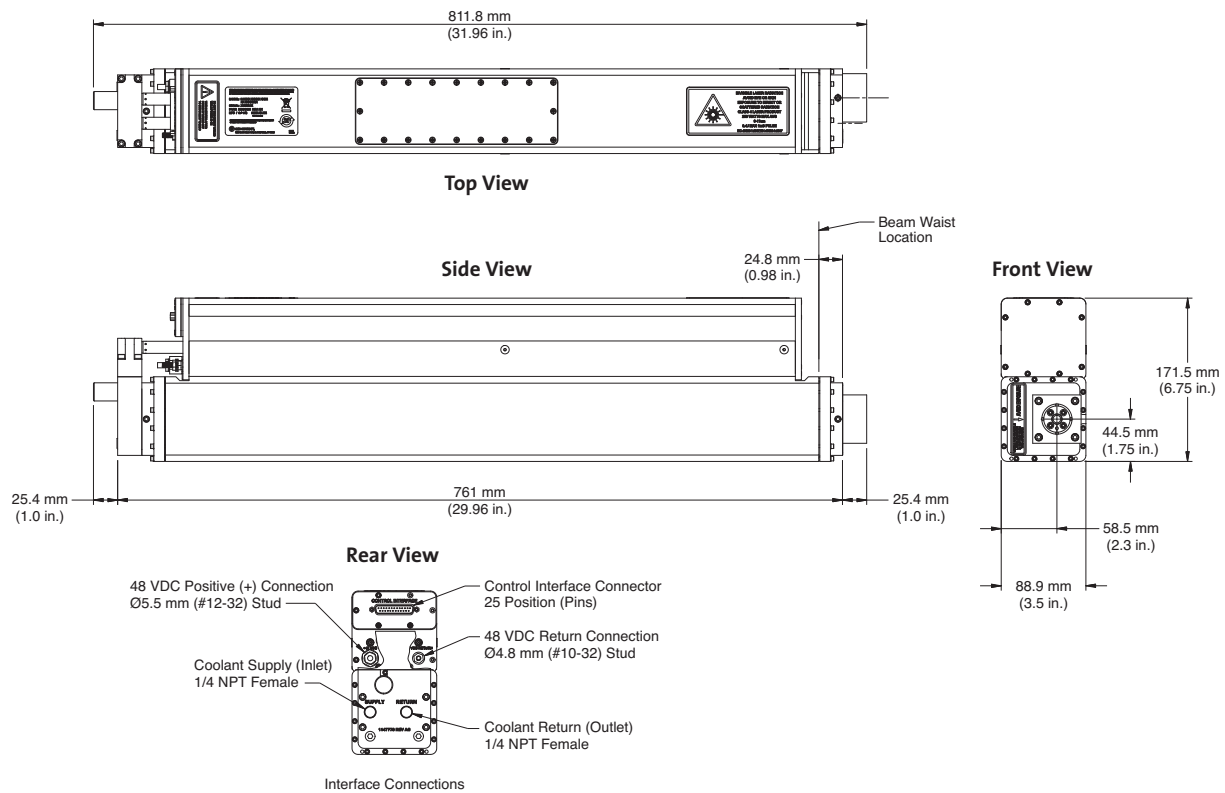
Liquid-Cooled, RF-Excited OEM Industrial CO<sub>2</sub> Laser

### Features

- High peak power
- Wide operating power range
- Pulse frequency from single-shot to 100 kHz
- Fast rise/fall time
- Low-cost OEM configuration
- Integrated RF power supply
- Compact design
- Stable operation at 9.4 μm



### Mechanical Specifications



**Superior Reliability & Performance**

# DIAMOND™ G-100i

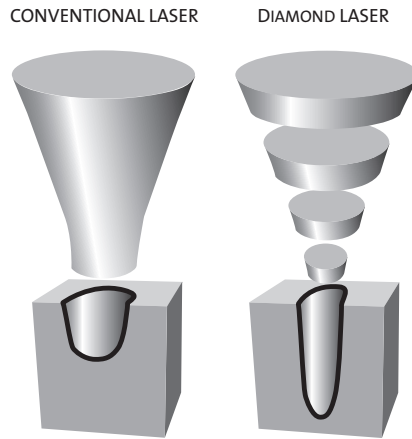
## Liquid-Cooled, RF-Excited OEM Industrial CO<sub>2</sub> Laser

**Figure 1:** The unique *Brilliance* of the G-100i combines a sharp spot size and intense high-frequency “square-wave” pulses to let you process:

- at higher feed rates
- thicker materials

and to do it:

- with a smaller tool
- with smaller HAZ
- at lower power
- in less time

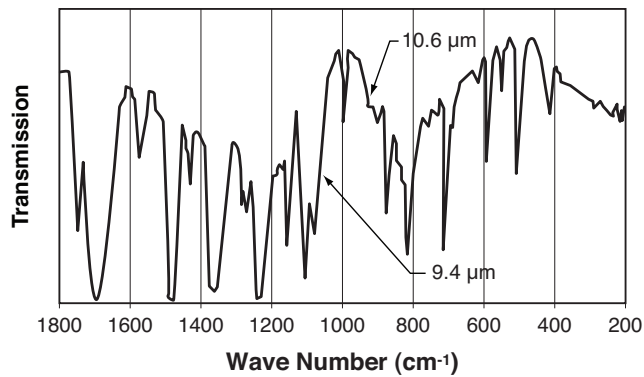


### Polyimide Processing

Figure 2 shows the transmission spectrum of Kapton™ over the far-infrared wavelengths, illustrating the increased absorption at 9.4 microns compared to 10.6 microns. This difference in the light-material interaction means better processing quality.

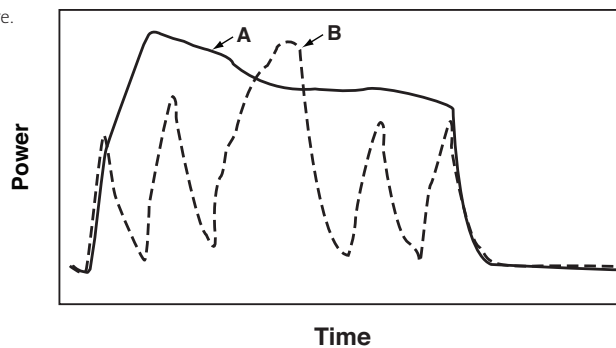
Overall, the G-100i lasers faster and more efficient processing leads to higher quality results. G-100i lasers also give you excellent mode quality, fast optical rise time, and high peak power. And now, with the DIAMOND G-100i, all these characteristics are available at 9.4 microns. Compared with any other laser in their class, the G-100i let you do more work with less energy.

**Figure 2:** Conventional infrared absorption spectrum of polyimide. Thickness—5.3 μm.



**Figure 3:** Pulse-tailoring, a *Brilliance-Plus* feature.

A represents a typical G-100i pulse, while B represents a unique “tailored” pulse.



# DIAMOND™ G-100i

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

### System Specifications

Wavelength (μm)	9.4 ±0.3
Output Power (W)	100 <sup>1</sup>
Power Range <sup>2</sup> (W)	10 to 100
Peak Effective Power <sup>3</sup> (W)	275W
Pulse Energy Range	10 to 200 mJ
Power Stability <sup>4</sup> (%)	<±8 <sup>2</sup>
Mode Quality (M <sup>2</sup> )	<1.5
Beam Waist Diameter <sup>5</sup> at 1/e <sup>2</sup> (mm)	X: 2.0 ±0.6 mm; Y: 1.2 ±0.6 mm <sup>3</sup>
Full-Angle Beam Divergence (mrad)	X:<9 mrad; Y: <14 mrad
Polarization (parallel to base)	Linear >100:1
Beam Ellipticity	<2:1 <sup>5</sup>
Pulse Frequency (kHz)	0 to 100
RF Excitation Pulse Width Range (μsec)	2 to 1000
Duty Cycle Limit (%)	70% <sup>9</sup>
Fall Time (μs)	<90
Weight	15.9 kg (35 lbs.)
Dimensions (L x W x H)	805.2 x 89 x 171.4 mm (31.7 x 3.5 x 6.75 in.)

### Electrical Power Requirements

DC Input Voltage (VDC)	48 ±1%
Continuous DC Current (A)	50A rms
Peak Current (A)	100
Electrical Input Requirements for DC Supply	240 VAC ±10% <sup>6</sup> 15A

### Coolant

Heat Load (kW)	2.5 kW <sup>7</sup>
Dynamic Coolant Flow Rate (l/min.)	5.7 l/min. (1.5 gal/min.)
Coolant Setpoint Temperature Range	10 to 35°C (50-86°F)
Coolant Differential Pressure (kPa)	170 kPa (25 psi) minimum
Coolant Maximum Static Pressure (kPa)	205 to 520 kPa (30 to 75 psi)
Water Hardness (equiv. CaCO <sub>3</sub> )	<250 mg/l
pH	5 to 9
Particle Size	<200 microns in diameter

### Environmental Conditions

Ambient Temperature	5 to 40°C (41 to 104°F)
Relative Humidity <sup>8</sup> (%)	<95% non-condensing <sup>8</sup>
Altitude	<2000 m (<6600 ft.)

- <sup>1</sup> Guaranteed at 700 ns pulse width at 70% duty cycle at inlet cooling water temperature of 25°C. Allow a 1%/°C of power de-rating for inlet cooling water to a maximum temperature of 35°C.
- <sup>2</sup> At a constant coolant temperature. Stability defined as  $\pm(P_{max}-P_{min})/2P_{min}$  from cold start at 25°C.
- <sup>3</sup> Located approximately at the interface of the header and housing as shown on illustration.
- <sup>4</sup> Full angle with a  $\pm 5^\circ\text{C}$  water temperature change.
- <sup>5</sup> Without beam correction, at laser output.
- <sup>6</sup> Optional DC power supply requires single-phase input power at 50 to 60 Hz.
- <sup>7</sup> At maximum duty cycle including DC supply dissipator.
- <sup>8</sup> Do not operate at or below dew point.
- <sup>9</sup> Maximum duty cycle on some older systems is 60%.

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 G-100i 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 G-100i 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.



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