



DIAMOND™ G-Series

CO₂ Laser Technology

FEATURES

- **Compact “no maintenance” design**
- **Single-tube/RF design**
- **Integrated optical rail**
- **Vertical or horizontal mounting**
- **DIAMOND slab technology**
- **Average power >150 watts**
- **Peak power >375 watts**

KEY APPLICATIONS

- **Cutting**
- **Converting**
- **Drilling**
- **Engraving**
- **Marking**
- **Scribing**
- **Welding**

		G-100	G-150
Guaranteed Performance	Output Power ¹	100W	150W
	M ²	<1.5 (K >0.67)	<1.5 (K >0.67)
	Power Range	10-100W	10-150W
	Pulse Frequency	0-100 kHz	0-100 kHz
Typical Performance	Peak Effective Power	250W	375W
	Pulse Energy Range	5-200 mJ	5-300 mJ
	Pulse Rise & Fall Time	<90 μsec	<70 μsec
	Power Stability ²	±10%	±10%
	Beam-Pointing Stability ³	<200 μrad	<200 μrad
	Beam Ellipticity	<1.5:1 ⁴	<1.2:1 ⁷
	Beam Diameter (1/e ²)	2.3 mm ±0.4 mm ⁴	2.2 mm ±0.6 mm ⁷
	Beam Divergence (Full Angle)	<11.0 mrad ⁴	<9.0 mrad ⁷
	Wavelength ⁵	10.2-10.7 μm	10.2-10.7 μm
	Polarization (Parallel to Narrow)	Linear >100:1	Linear >100:1
Electrical Requirements	DC Input Voltage	48 VDC ±1%	48 VDC ±1%
	Max. DC Current	50A rms, 100A peak	50A rms, 100A peak
	Electrical input requirements for DC supply		
	Single Phase Voltage Current	200-240 V 15A 50-60 Hz Power-factor corrected	200-240 V 15A 50-60 Hz Power-factor corrected
Water	Cooling Water Flow Rate	1.5 gal/min 5.7 l/min	1.5 gal/min 5.7 l/min
	Cooling Water Temperature Range	50-95°F 10-35°C	50-95°F 10-35°C
	Water Hardness (equiv. CaCO ₃)	<250 mg/l	<250 mg/l
	Water Pressure	30-75 psi 205-520 kPa	30-75 psi 205-520 kPa
Environmental Conditions	Ambient Temperature	41-104°F 5-40°C	41-104°F 5-40°C
	Relative Humidity	<95% non-condensing ⁶	<95% non-condensing ⁶
	Altitude	<6600 ft <2000 m	<6600 ft <2000 m
Weight	Laser	35 lb (15.9 kg)	37.5 lb (17 kg)

¹ Guaranteed at 600 μs pulse width at 60% duty cycle at inlet water temperature of 25°C. Allow a 1%/°C power derating for inlet cooling-water temperatures up to 35°C.

² Measured as $\pm(P_{\max} - P_{\min})/2P_{\max}$ from cold start at 25°C.

³ Full angle with a ±5°C water temperature change.

⁴ Without beam correction, at laser output.

⁵ Call about special isotope versions.

⁶ Do not operate at or below dew point.

⁷ With standard beam shaper assembly Optional beam expander assembly available.

DIAMOND G-Series

Coherent's DIAMOND G-Series CO₂ industrial lasers deliver the same excellent field-proven performance and reliability as the higher-powered DIAMOND series in a unique, integrated OEM package.

G-Series lasers feature a compact, solid-state RF amplifier integrated with an all metal 100W or 150W DIAMOND tube.



CONVENTIONAL LASER



DIAMOND LASER

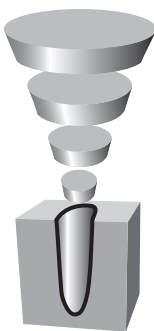


Figure 1.

The unique *Brilliance* of the DIAMOND combines a sharp spot size and intense high-frequency "square-wave" pulses to let you process:

- at higher feed rates
- thicker materials
- with smaller HAZ

and to do it with:

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

Easy to Integrate

DIAMOND G-Series lasers are designed for easy integration. They feature both universal mounting orientation and a built-in optical rail (component mounting structure) that let you mount beam delivery assemblies and electro-optic accessories directly to the laser. This provides the system designer with the flexibility to build an efficient and compact system.

G-Series lasers are also designed to accept optical accessories, scanners, acousto-optic modulators, deflectors and shutters from qualified suppliers.

Our goal is to not only offer a high-quality state-of-the-art laser, but also package it in such a way so as to make system integration simple, efficient and economical.

Brilliance™

DIAMOND lasers deliver a high-quality beam featuring a set of unique characteristics called *Brilliance*. *Brilliance* allows the G-Series lasers to perform the same tasks that typically require lasers with two to three times more cw output power.

This significantly higher performance is possible because all DIAMOND lasers produce a high-quality mode that focuses to a smaller and sharper spot. DIAMOND lasers also generate high-frequency "square-wave" pulses producing fast rise-and-fall times, which result in more working energy, and less energy wasted heating your work. (Figure 1)

Furthermore, the unique design of the DIAMOND allows for intricate pulse-tailoring. This opens more possibilities that have so far not been available to materials processing with lasers. Due to the unique design of the RF amplifier, it is possible to precisely control the distribution of energy within a single pulse or a series of pulses at repetition rates as high as 100 kHz! This is demonstrated in Figure 2. This feature has several advantages. For instance, by segmenting a pulse into a series of pulses with varying energies it is possible to drill holes in dielectric or polymer materials up to a controlled depth without causing any damage to the underlying material. This unique feature is another reason why DIAMOND lasers are widely used in the converting industry for applications such as kiss-cutting and perforations.

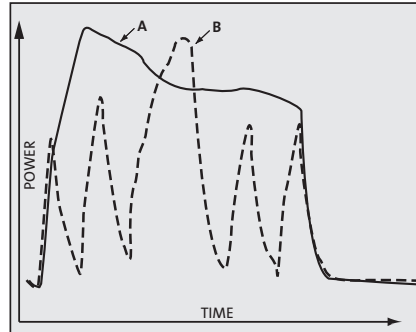


Figure 2.
Pulse-tailoring, a Brilliance-Plus feature.
A represents a typical DIAMOND pulse, while
B represents a unique "tailored" pulse.

Overall, the DIAMOND's small focused spot size, square-waved pulses, and high peak power combine to process materials more efficiently, with a smaller heat-affected-zone (HAZ) than other lasers.

OEM Package

Coherent designs DIAMOND OEM packages to address the needs of laser system manufacturers. This OEM unit provides the greatest flexibility and the best cost compatibility for the OEM environment. Consisting of an integrated head and RF amplifier, simply add a DC supply (not included) and you are ready for integration.

All DIAMOND OEM lasers feature a common control interface and provide easy access to RF diagnostics and pulse control. G-Series RF amplifiers also provide a self-test mode, which allows the system supplier to test the laser from an internal clock.

OEM Integration

Ask about our beam shaping optics, cut edge enhancers, isolators and other accessories to aid in your integration efforts.

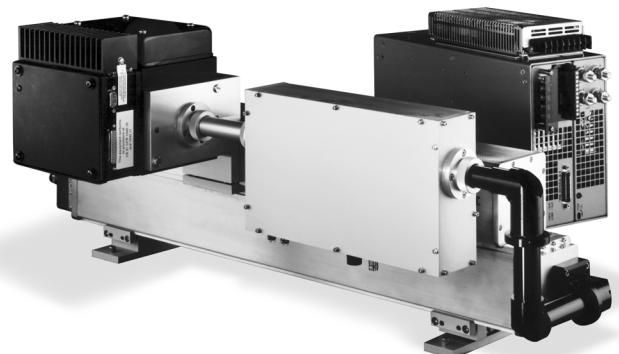
Many applications will use the high quality uncorrected beam from the G-Series (see specifications). However, if your application requires enhanced beam parameters our Applications Engineers can assist you.

Applications Lab

Our highly qualified Applications Team can assist in laser and parameter selection, as well as do first order material processing work.



DIAMOND G-Series Laser

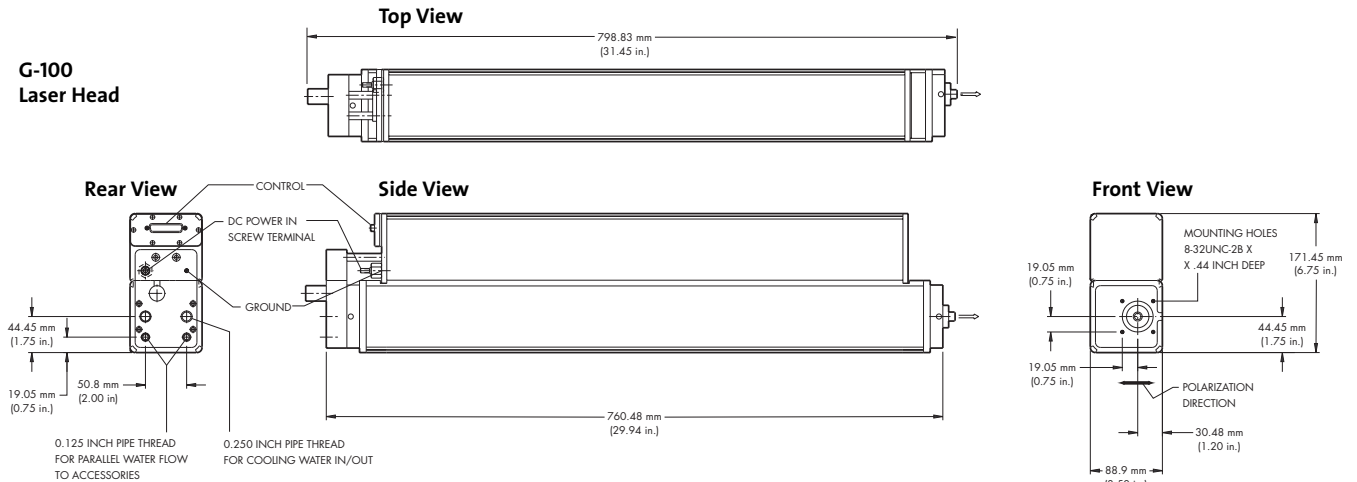


G-Series with aftermarket products directly coupled for stability to Coherent's integrated optical rail.

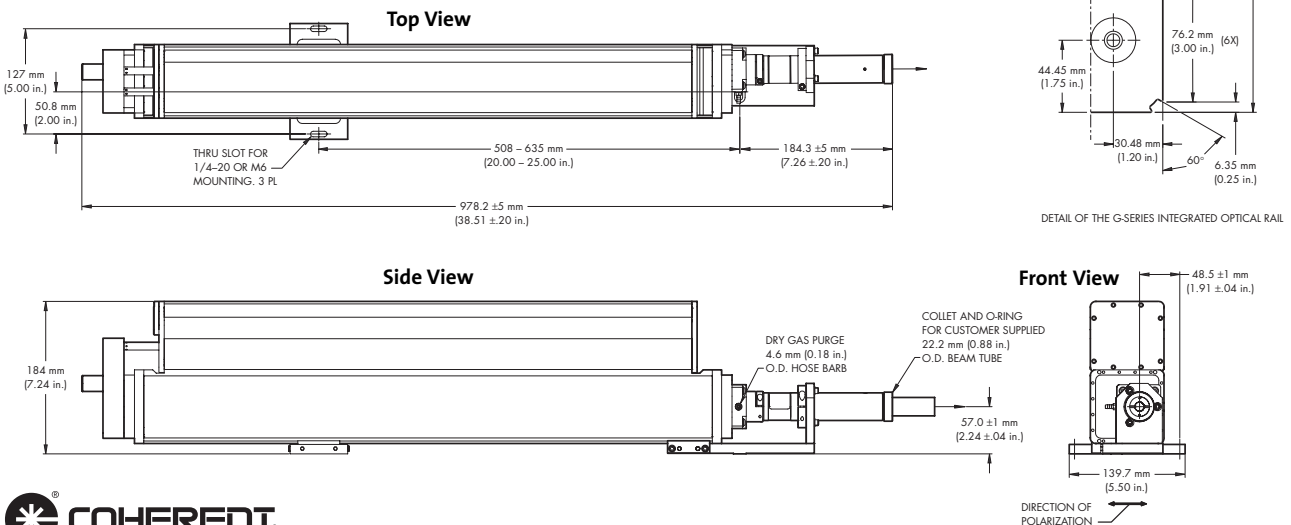
DIAMOND G-Series

CO₂ Laser Technology

G-100 Laser Head



G-150 Laser Head with Shaper



Power Supply



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Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice.

Coherent offers a limited warranty that covers parts and labor for the entire Innova 300 system. For full details on warranty coverage, please refer to the Service and Support section at www.CoherentInc.com, or contact your local Sales or Service Representative.

