Diode-Pumped Solid-State 473-nm Blue Laser System

85 BCA Series

Melles Griot 85 BCA-series diode-pumped, solid-state, blue lasers provide up to 15 mW of output at 473 nm, with rock-solid stability over a wide operating temperature range. Their wavelength and beam diameter are closely matched to that of blue argon-ion lasers, making them highly reliable drop-in replacements. The excellent beam quality, narrow linewidth, and low optical noise of 85 BCA-series lasers are ideal for scanning, metrology, spectroscopy, and interferometry applications. The small size, low power consumption, minimal heat-sinking requirements, and RS-232 control and monitoring interface are particularly suitable for compact, self-contained systems and OEM applications.

- Up to 15 mW at 473 nm
- <0.5% rms noise (20 Hz to 10 MHz)
  <2.0% peak-to-peak noise (20 Hz to 10 MHz)
- Stable output from 10°C to 40°C
- All solid-state for reliability
- Low power consumption
- Excellent beam quality (M^2 <1.2)
- 0.67-mm circular beam for easy retrofit from ion lasers
- RS-232 computer interface
- Lightweight and compact

MELLES GRIOT

Specifications:

Beam Characteristics

Output Power (cw):
85 BCA 005: >5 mW
85 BCA 010: >10 mW
85 BCA 015: >15 mW

Amplitude Noise (20 Hz to 10 MHz):
<2% peak-to-peak specified
<1% peak-to-peak typical
<0.5% rms

Wavelength: 473 ± 0.5 nm

Wavelength Stability: <0.2 nm

Longitudinal Mode: Single

Transverse Mode: TEM_{00}

Beam Quality: M^2 <1.2

Beam Diameter ($1/e^2$, at waist):
0.67 mm ± .05 mm

Beam Divergence (full angle, $1/e^2$): <1.2 mrad

Beam Waist Assymetry: <1.1:1

Polarization: >100:1, Vertical

Power Drift over 24 hours (22° ± 2°C):
±2.5%

Pointing Stability (22° ± 2°C): <20 μrad

Electrical Characteristics

Input Voltage: 100–240 Vac ±10%

Input Current: 3 A

Frequency: 47–63 Hz, single phase

Computer Interface: RS-232

Environmental Specifications

Warm-up Time: 3 minutes

Heat Dissipation: <10 W

Base Plate Temperature: 10°C to 40°C

Storage Temperature: −10°C to +60°C

Relative Humidity, Operating:
0 to 95% noncondensing

Weight

Laser Head: 0.51 kg (1.2 lb)

Laser Controller (with cable): 0.9 kg (1.9 lb)

dc Power Supply: 0.5 kg (1.2 lb)

Options

- OEM laser and electronics formats
- Mounting and heat-sink options
- Custom beam delivery

This Melles Griot laser is designed, tested, and manufactured for compliance with applicable international electrical and laser safety standards.

Application Note

Fluorescence Spectroscopy

Inducing fluorescence in biological samples is a major application for 85 BCA-series lasers. Fluorescence spectroscopy is potentially a very useful biosensor for many medical and environmental applications. By observing the relative intensity and wavelength distribution of the fluorescence spectra, the effect that changes in the environment or the introduction of toxins and pollutants have on cell function can be easily observed. Current research is focused on developing new tools for identifying environmental toxins as well as identifying telltale markers of disease.

Although biological samples can fluoresce naturally, samples are typically treated with a fluorochrome (fluorescent dye) that attaches itself preferentially to the feature being observed. 85 BCA-series lasers are particularly useful for exciting fluorochromes with peak absorption in the 450 to 490 nm range (e.g., Fluo 3, FITC, EGFP).

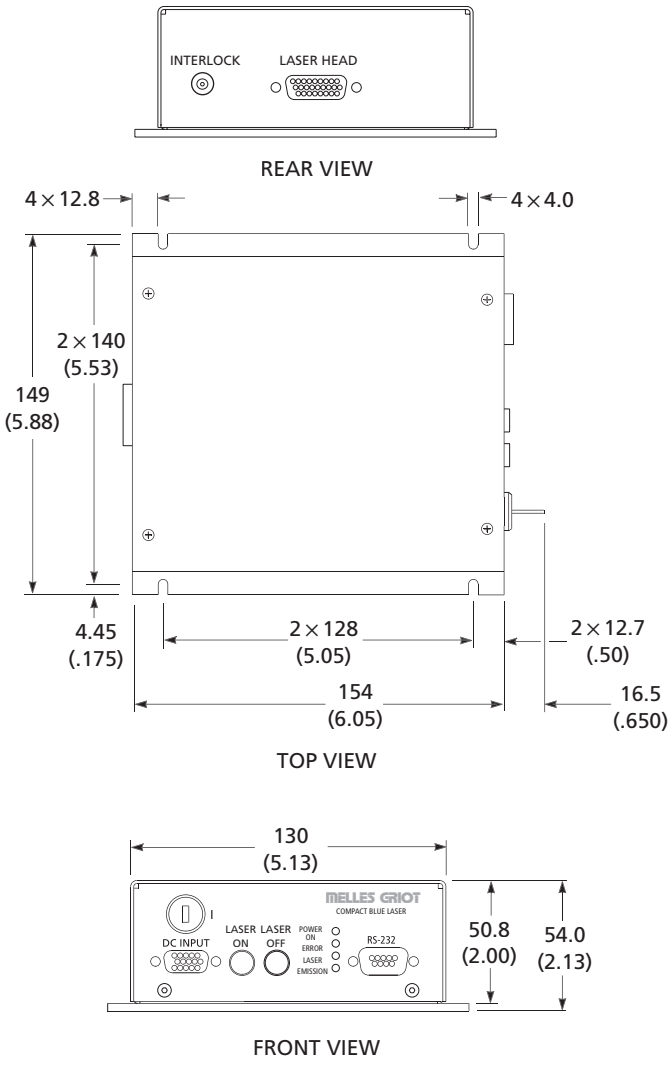
Characteristics of Fluorescence Spectroscopy

Fluorescence spectroscopy is often preferred to other spectroscopic techniques because it is extremely sensitive, relatively noninvasive, and yields virtually instantaneous results.

Fluorescence spectroscopic techniques can measure changes in fluorochrome concentration that are one million times smaller than those observed using absorption spectroscopy. Trace concentrations less than an attomole (10^{-18} mole) can be detected, and concentrations of as little as a femtomole (10^{-15} mole) can be accurately measured.

The fluorescence signal lags the excitation signal by a few nanoseconds or less. Consequently, one can monitor very rapid changes in concentration by observing the changes in fluorescent intensity.

Used properly, fluorescence spectroscopy does not interfere with or damage the sample; living tissue can be investigated with no adverse effects on its natural behavior.

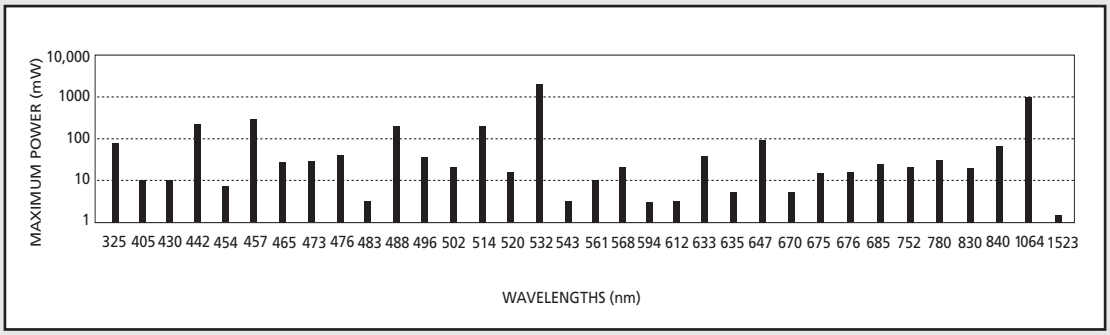


dimensions: millimeters (inches)

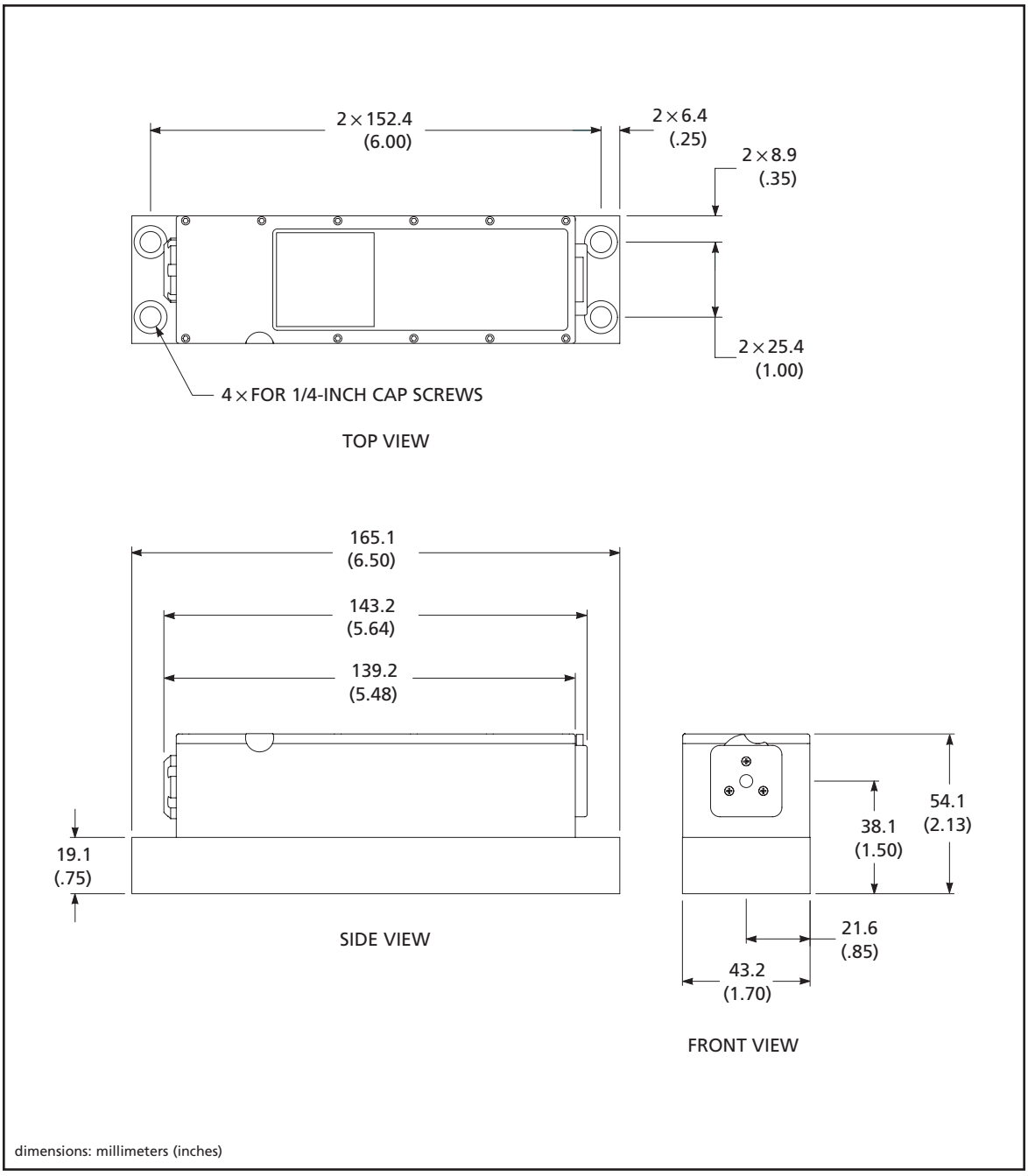
85 BCA-series laser controller

Select from more than 34 wavelengths

Melles Griot manufactures a comprehensive line of lasers and laser systems for laboratory and OEM applications. Standard products include helium neon and helium cadmium lasers, diode-pumped solid-state lasers, argon, krypton, and mixed gas ion lasers, and semiconductor laser assemblies. Available wavelengths range from 325 nm in the ultraviolet to 1.52 μm in the near infrared, with powers from a few milliwatts to several watts, as shown in the chart below.



Spectral output available from Melles Griot lasers



85 BCA-series laser head

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www.mellesgriot.com

Laser Group 2051 Palomar Airport Road, 200 • Carlsbad, CA 92009 • 1-800-645-2737 • (760) 438-2131 • FAX (760) 438-5208 • E-mail: sales@carlsbad.mellesgriot.com

Canada (613) 226-5880 **France** (01) 3012-0680 **Germany** (06251) 84060 **Japan** (03) 3407-3614
Netherlands (0316) 333041 **Singapore** 392-5368 **Sweden** 8 544 449 00 **United Kingdom** (01353) 654500

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