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Diode-Pumped Solid-State OEM Compact Green Laser

85 GCJ Series



85 GCJ-series green diode-pumped solid-state lasers deliver diffraction-limited TEM_{00} output from a compact package. A separate controller includes drive and thermoelectric-cooling electronics. Automatic power control (APC) provides excellent power stability over a broad operating temperature range, and the highly efficient electronics require only 10 W of input power at 5 Vdc. These lasers are ideal for spectroscopy, laser-induced fluorescence, medical diagnostics, alignment, and a wide variety of testing applications. Systems are available in ultracompact OEM configurations with a variety of custom beam delivery systems.

Features

- Up to 20 mW at 532 nm
- Automatic power control
- <3% peak-to-peak noise (20 Hz to 2 MHz) <0.5% rms noise (20 Hz to 2 MHz)
- Stable output from 10ºC to 45ºC
- All solid state for reliability
- Excellent beam quality (M^2 <1.2)
- <10 W power input at 5 Vdc
- Interface for remote monitoring and operation
- Supplied with laser controller
- <5 W heat dissipation at 45ºC

MELLES GRIOT

Specifications

Output Power (cw):
85 GCJ 005: >5 mW
85 GCJ 010: >10 mW
85 GCJ 015: >15 mW
85 GCJ 020: >20 mW

Wavelength: 532 nm ± 1.0 nm

Wavelength Purity: >1000:1

Transverse Mode: TEM_{00}

Beam Quality: M^2 <1.2

Polarization
Vertical: ±5°
Extinction Ratio: >100:1

Warm-up Time:
<5 minutes

Bore Sight (both planes wrt. base plate):
<5 mrad

Beam Pointing Stability (constant temperature ±1°C, 8 hrs): <0.02 mrad

Beam Pointing Temperature Dependence:
≤12 μrad/°C

Power Stability (constant temperature ±2°C over 8 hours): ±2%

Amplitude Noise (20 Hz to 2 MHz):
<3% peak-to-peak
<0.5% rms

Beam Diameter ($1/e^2$ at waist): 0.32 mm ± 10%

Beam Divergence (full angle, $1/e^2$): <2.5 mrad

Beam Ellipticity: <1.1:1

Centration (with respect to exit aperture):
<1.0 mm

Electrical Specifications

Input: 5 ± 0.25 Vdc

Power: 10 W (maximum)

Environmental Specifications

Mounting Surface (Heatsink) Requirements:
Laser Head:
Surface Flatness: < 0.003 inch
Surface Roughness: < 63 microinch rms
Heat Dissipation at 45°C: >5 W
Controller:
Surface Flatness: < 0.010 inch
Surface Roughness: < 63 microinch rms
Heat Dissipation at 45°C: >5 W

Operating Temperature (base plate temperature): 10°C to 45°C

Storage Temperature: −10°C to +50°C

Relative Humidity, Operating:
0 to 95% noncondensing

Laser Head Weight: 0.21 kg (0.46 lb)

Laser Controller Weight: 0.41 kb (0.89 lb)

Options

Evaluation Kit: 58 ACG 009 (AC cord, DC supply, laser enable connector)

Application Note

Fluorescence Spectroscopy

Inducing fluorescence in biological samples is a major application for 85 GCJ-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 GCJ-series lasers are particularly useful for exciting fluorochromes with peak absorption in the 505 to 560 nm range.

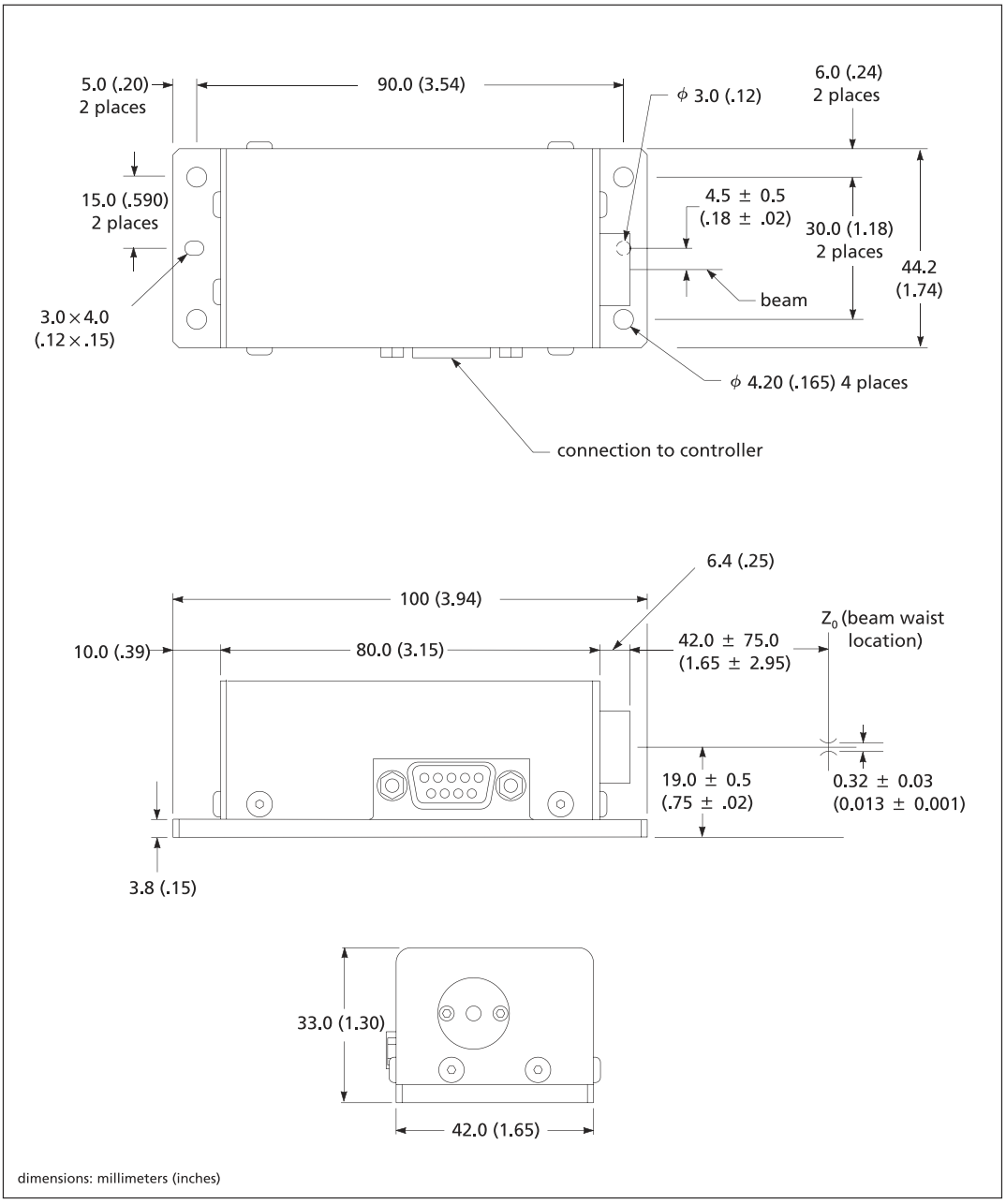
Characteristics of Fluorescence Spectroscopy

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.



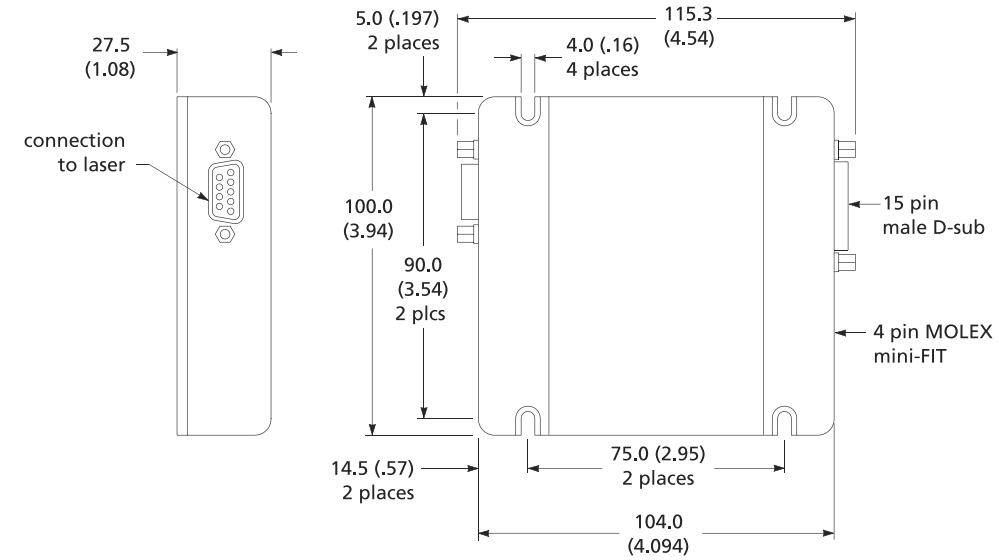
85 GCJ-series laser head

LASER LIGHT
AVOID EXPOSURE TO BEAM
<50 mW DPSS 532 nm

IEC safety class 3B and CDRH safety class 3b precautions are recommended when handling or using this laser.

Compliance with Regulatory Requirements

The 85 GCJ-series is an OEM diode-pumped solid-state laser. As such, it is intended only for integration into other equipment. The 85 GCJ-series laser does not comply with Center for Devices and Radiological Health (CDRH) standards. The customer is responsible for CDRH certification of any system that incorporates this laser system. This laser complies with CE Low Voltage Directive 73/23/EEC.

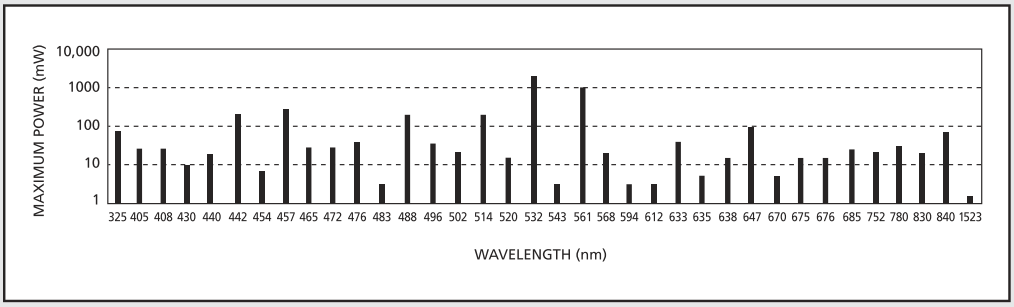


dimensions: millimeters (inches)

85 GCJ-series controller

Select from more than 36 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

MELLES GRIOT

www.mellesgriot.com

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