

Sapphire SF

CW Free Space and Fiber Pigtailed Single-Frequency Lasers

Sapphire SF is a series of compact CW visible single-frequency lasers based on Coherent's unique OPSL (Optically Pumped Semiconductor Laser) technology. Sapphire SF lasers come with an ultra-narrow linewidth of <math><1.5\text{ MHz}</math>, a high quality diffraction-limited beam with excellent pointing stability, high power stability and low noise.

Sapphire lasers are manufactured in cleanrooms using Coherent's patented PermAlign™ technology for optimal aligning and solder-bonding the optics. Sapphire SF lasers come with a flexible interface concept: Analog, RS-232 or USB – it is up to the user to select the appropriate communication channel.

Sapphire SF lasers are intended for applications that need narrow and ultra-narrow linewidth light such as Raman spectroscopy, interferometry, holography, metrology, and inspection.

FEATURES & BENEFITS

- Ultra-narrow linewidth
- Outstanding power and wavelength stability
- Output power
 - Up to 150 mW at 488 nm / 100 mW fiber pigtailed
 - Up to 200 mW at 532 nm / 150 mW fiber pigtailed
- Ultra-low noise
- Superior beam quality
- PermAlign technology
 - Permanent optimal alignment
 - Unsurpassed robust and stable
- OEM and end-user versions
- Proven Sapphire reliability

APPLICATIONS

- Raman Spectroscopy
- Interferometry
- Holography
- Metrology
- Inspection



SPECIFICATIONS	Sapphire 488 SF	Sapphire 532 SF
Wavelength ¹ (nm)	488.0	532.0
Wavelength Accuracy ² (nm)	0.1	
Single-longitudinal Mode, Linewidth (MHz)	<1.5	
Output Power ³ (mW)	20, 50, 75, 100, 150	20, 50, 75, 100, 150, 200
Spatial Mode	TEM ₀₀ , M ² <1.1	
Beam Asymmetry	0.9 to 1.1	
Beam Diameter at 1/e ² (mm)	0.70 ±0.05	
Beam Divergence (mrad)	<1.3	
Pointing Stability (μrad) (over 2 hours after warm-up and ±3°C)	<30	
Noise (%)		
20 Hz to 2 MHz, rms	<0.25	
20 Hz to 20 kHz, peak-to-peak	<1	
Long-term Power Stability (%) (2 hours, ±3°C)	<2	
Warm-up Time (minutes)	<5	
Polarization Ratio	>100:1, vertical	
Static Alignment Tolerances ⁴		
Beam Position (mm)	±0.25	
Beam Angle (mrad)	±2.5	
Beam Waist Position with respect to Exit Window	±200 ⁵	
UTILITY AND ENVIRONMENTAL REQUIREMENTS		
Interfacing	Analog, RS-232, USB	
Operating Voltage ⁶ (VDC)	+12.0 to 13.2	
Power Consumption (W)	<60	
Max. Laser Head Baseplate Temperature ⁷	+50°C (122°F)	
Max. Heat Dissipation of Head (W)	25 (baseplate at 50°C)	
Ambient Temperature		
Operating Condition	10 to 40°C (50 to 104°F) non-condensing	
Non-Operating Condition	-30 to 60°C (-22 to 140°F)	
Shock Tolerance (6 ms)	7 g laterally, 15 g vertically	
Dimensions (L x W x H)		
Laser Head	125 x 70 x 34 mm (4.9 x 2.8 x 1.3 in.)	
Controller	123.3 x 76.2 x 38.1 mm (4.9 x 3.0 x 1.5 in.)	
Heat Sink (optional)	200 x 80 x 50 mm (7.9 x 3.2 x 2 in.)	
DC Power Supply (optional)	171 x 104 x 55 mm (6.7 x 4.1 x 2.2 in.)	
Cable — Laser Head to Controller	2 m (6.56 ft.)	
Weights		
Laser Head	0.35 kg (0.77 lbs.)	
Controller	0.25 kg (0.55 lbs.)	
Heat Sink (optional)	0.75 kg (1.65 lbs.)	
DC Power Supply (optional)	0.95 kg (incl. line cable) (2.1 lbs.)	
Packaged System (head+controller+cable>manual)	1.7 kg (3.7 lbs.)	
Cable — Laser Head to Controller	0.3 kg (0.66 lbs.)	

¹ Measured in air.

² Laser-to-laser tolerance and wavelength tolerance over guaranteed lifetime.

³ Output power is adjustable via analog or digital interface from 10% to 110%. Specifications are valid for 100% power.

⁴ Static alignment tolerances are relative to the right bottom edge (in beam direction).

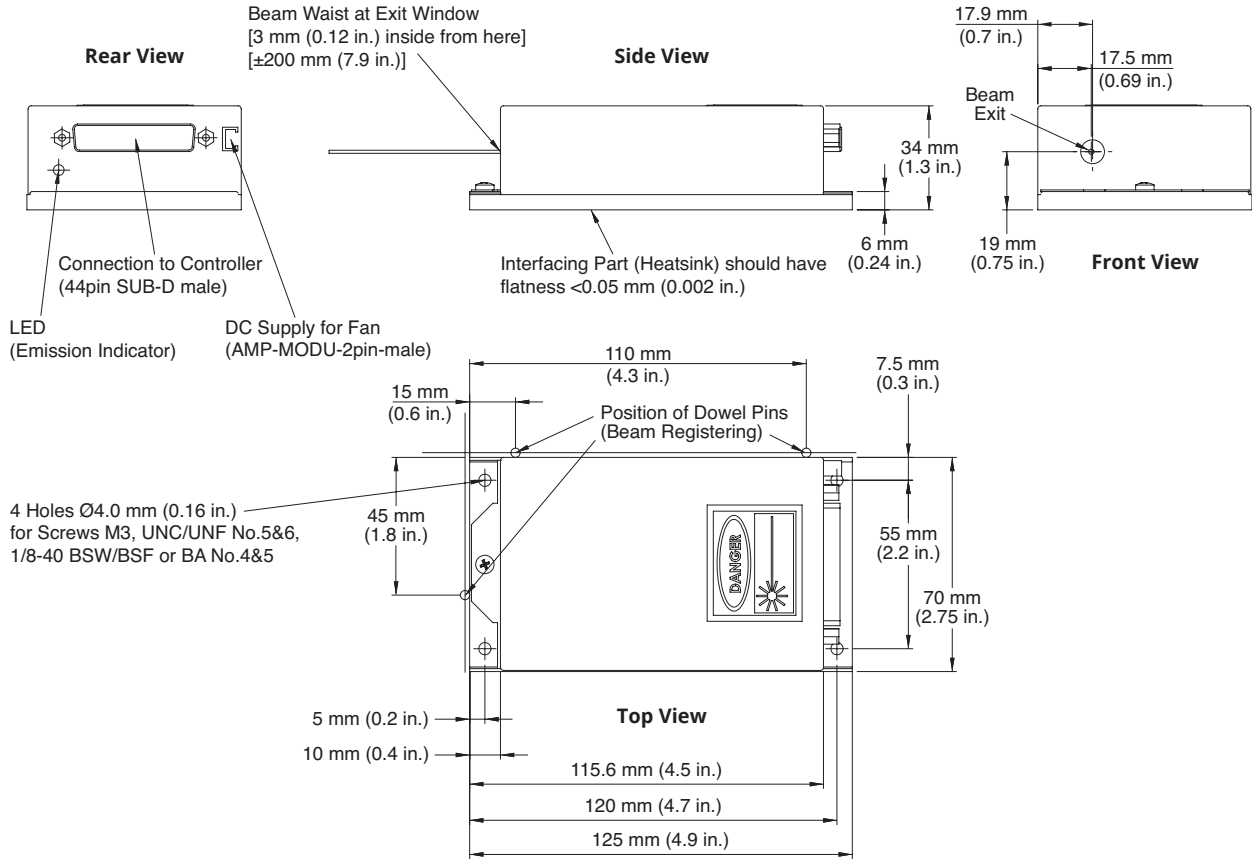
⁵ 200 mm is ~25% of Rayleigh Range at 488 nm and ~30% of Rayleigh Range at 532 nm.

⁶ If user-supplied, the DC power supply has to meet the following requirements: Power >60W; ripple <5% peak-to-peak; line regulation <0.5%.

⁷ With factory-provided or other adequate heat sink.

MECHANICAL SPECIFICATIONS

Sapphire SF



SPECIFICATIONS	Sapphire 488 SF FP	Sapphire 532 SF FP
Wavelength ¹ (nm)	488.0	532.0
Wavelength Accuracy ² (nm)	0.1	
Single-longitudinal Mode, Linewidth (MHz)	<1.5	
Output Power at Fiber Exit ³ (mW)	20, 50, 100	20, 50, 100, 150
Fiber Type	SM-PM ⁴	
Fiber Length (m)	1	
Fiber Numerical Aperture (NA) (1/e ²)	0.06	
Fiber Output	FC/APC; 8° angled ⁵	
Spatial Mode	TEM ₀₀ , M ² <1.1	
Beam Asymmetry	<1:1.1	
Noise (%)		
20 Hz to 2 MHz, rms	<0.25	
20 Hz to 20 kHz, peak-to-peak	<1	
Long-term Power Stability (%) (2 hours, ±3°C)	<2	
Warm-up Time (minutes)	<5	
Polarization Ratio	>100:1, linear, vertical	
UTILITY AND ENVIRONMENTAL REQUIREMENTS		
Interfacing	Analog, RS-232, USB	
Operating Voltage ⁶ (VDC)	+12.0 to 13.2	
Power Consumption (W)	<60	
Max. Laser Head Baseplate Temperature ⁷	+50°C (122°F)	
Max. Heat Dissipation of Head (W)	25 (baseplate at 50°C)	
Ambient Temperature		
Operating Condition	10 to 40°C (50 to 104°F) non-condensing	
Non-Operating Condition	-30 to 60°C (-22 to 140°F)	
Shock Tolerance (6 ms)	7 g laterally, 15 g vertically	
Dimensions (L x W x H)		
Laser Head ⁸	125 x 70 x 34 mm (4.9 x 2.8 x 1.3 in.)	
Controller	123.3 x 76.2 x 38.1 mm (4.9 x 3.0 x 1.5 in.)	
Heat Sink (optional)	200 x 80 x 50 mm (7.9 x 3.2 x 2 in.)	
DC Power Supply (optional)	171 x 104 x 55 mm (6.7 x 4.1 x 2.2 in.)	
Cable — Laser Head to Controller	2 m (6.56 ft.)	
Weights		
Laser Head ⁸	0.35 kg (0.77 lbs.)	
Controller	0.25 kg (0.55 lbs.)	
Heat Sink (optional)	0.75 kg (1.65 lbs.)	
DC Power Supply (optional)	0.95 kg (incl. line cable) (2.1 lbs.)	
Packaged System (head+controller+cable>manual)	1.7 kg (3.7 lbs.)	
Cable — Laser Head to Controller	0.3 kg (0.66 lbs.)	

¹ Measured in air.

² Laser-to-laser tolerance and wavelength tolerance over guaranteed lifetime.

³ Output power is adjustable via analog or digital interface from 10% to 110%. Specifications are valid for 100% power.

⁴ Single-mode, polarization maintaining fiber, bending radius min. 50 mm.

⁵ Fiber FC/APC connector output not compatible for patchcord-to-patchcord connection.

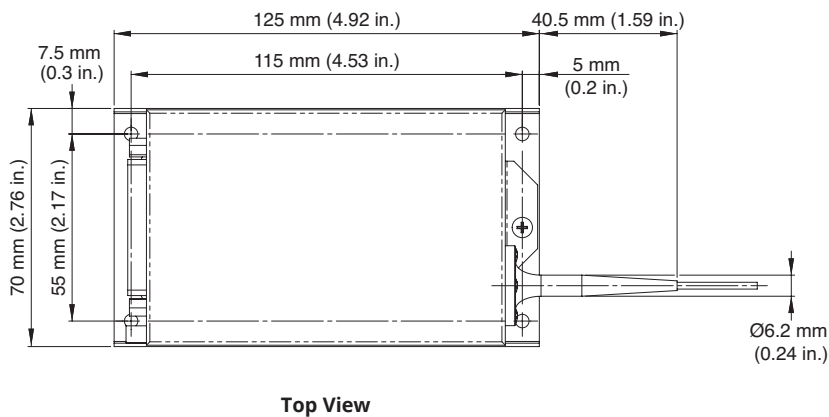
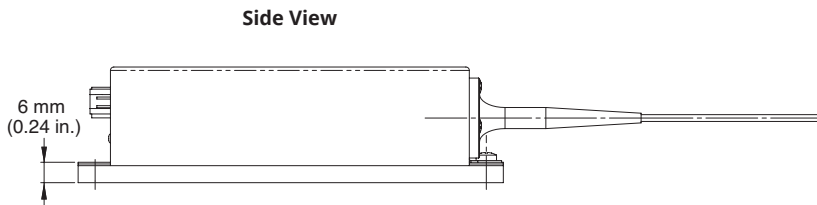
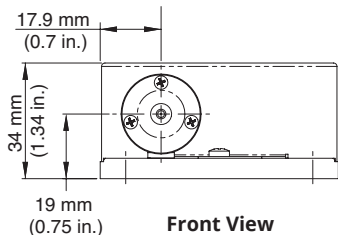
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⁷ With factory-provided or other adequate heat sink.

⁸ Dimensions respectively weight without fiber pigtail part.

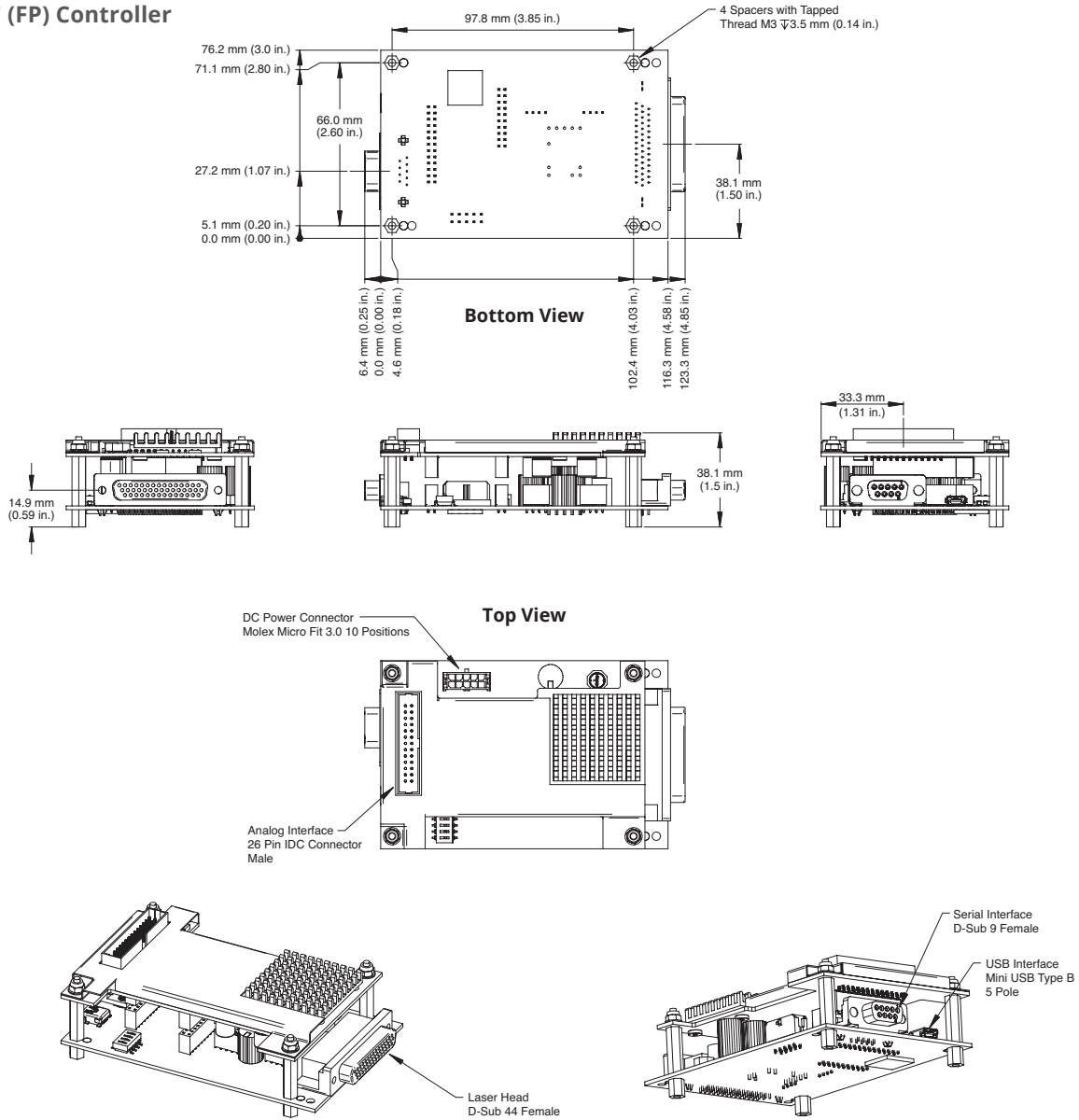
MECHANICAL SPECIFICATIONS

Sapphire SF FP



MECHANICAL SPECIFICATIONS

Sapphire SF (FP) Controller



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Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice. Coherent's scientific and industrial lasers are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by the Center for Devices and Radiological Health on all systems ordered for shipment after August 2, 1976.

Coherent offers a limited warranty for all Sapphire Lasers. For full details of this warranty coverage, please refer to the Service section at www.coherent.com or contact your local Sales or Service Representative. MC-018-11-0M0719Rev.1 Copyright ©2019 Coherent, Inc.

