Sapphire SF

CW Blue and Green 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 <1.5 MHz, 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 the user to select the appropriate communication channel.

Sapphire SF 488 overcomes the disadvantages of ion lasers (size, power consumption, background light, cost of ownership) and diode lasers (beam quality, wave-length precision).

Sapphire SF 532 is the alternative to Nd:YAG or Nd:YVO4 based lasers eliminating their thermal lensing and green noise effects, a phenomenon causing power instability due to intracavity frequency-doubling mechanisms.

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

- Ultra-narrow linewidth
- High single-frequency power
  - Up to 100 mW at 488 nm
  - Up to 150 mW at 532 nm
- Outstanding power stability
- Ultra-low noise, esp. no discharge background or green noise (cf. ion, diode, DPSS lasers)
- Superior beam quality
- Flexible interface concept
  - Analog, RS-232 & USB
- PermAlign technology
  - Permanent optimal alignment
  - Unsurpassed robust and stable
- OEM and end-user versions
- Proven Sapphire reliability

APPLICATIONS

- Raman Spectroscopy
- Holography
- Metrology
- Inspection

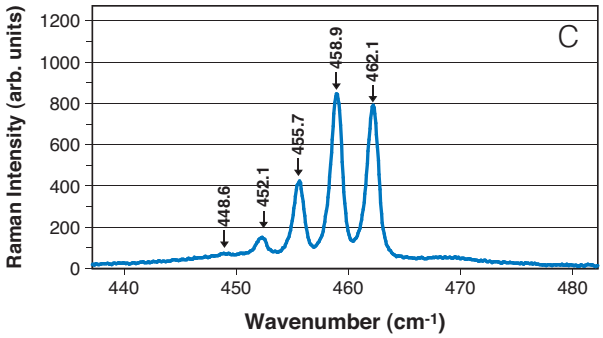
COHERENT®
Superior Reliability & Performance

SPECIFICATIONS	Sapphire 488 SF	Sapphire 532 SF
Wavelength (nm)	488	532
Wavelength Accuracy (nm)	0.1	
Single-longitudinal Mode, Linewidth (MHz)	<1.5	
Output Power[1] (mW)	20, 50, 100	20, 50, 100, 150
Spatial Mode	TEM_{00}, M^2 <1.1, single longitudinal mode	
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 20 Hz to 20 kHz, peak-to-peak	 <0.25 <1	
Long-term Power Stability (%) (2 hours, ±3°C)	<2	
Warm-up Time (minutes)	<5	
Polarization Ratio	>100:1, vertical	
Static Alignment Tolerances[2] Beam Position (mm) Beam Angle (mrad) Beam Waist Position with respect to Exit Window	 ±0.25 ±2.5 ±200[3]	
UTILITY AND ENVIRONMENTAL REQUIREMENTS		
Interfacing	Analog, RS-232, USB	
Operating Voltage[4] (VDC)	+12.0 to 13.2	
Power Consumption (W)	<60	
Max. Laser Head Baseplate Temp.[5]	+50°C (122°F)	
Max. Heat Dissipation of Head (W)	25 (baseplate at 50°C)	
Ambient Temperature Operating Conditions Non-Operating Condition	 10 to 40°C (50 to 104°F) non-condensing -30 to 60°C (-22 to 140°F)	
Shock Tolerance (6 ms)	7g laterally, 15g vertically	
Dimensions (L x W x H) Laser Head Controller Heat Sink (optional) DC Power Supply (optional) Cable — Laser Head to Controller	 125 x 70 x 34 mm (4.9 x 2.8 x 1.3 in.) 117.8 x 76.2 x 43.2 mm (4.6 x 3.0 x 1.7 in.) 200 x 80 x 50 mm (7.9 x 3.2 x 2 in.) 172 x 105 x 55 mm (6.8 x 4.1 x 2.2 in.) 2m (6.56 ft.), optional 5m (16.4 ft.)	
Weights Laser Head Controller Heat Sink (optional) DC Power Supply (optional) Packaged System (head+controller+cable+manual) Cable — Laser Head to Controller	 0.35 kg (0.77 lbs.) 0.25 kg (0.55 lbs.) 0.75 kg (1.65 lbs.) 0.95 kg (incl. line cable)(2.1 lbs.) 1.7 kg (3.7 lbs.) 0.3 kg (0.66 lbs.)	

1 Output power is adjustable via analog or digital interface from 10% to 110%. Specifications are valid for 100% power. Recommended power range is 70 to 110% power.
2 Static alignment tolerances are relative to the right bottom edge (in beam direction).
3 200mm is ~25% of Raleigh Range at 488 nm and ~30% of Raleigh Range at 532 nm.
4 If user-supplied, the DC power supply has to meet the following requirements: Power >60W; ripple <5% peak-to-peak; line regulation <0.5%.
5 With factory-provided or other adequate heat sink.

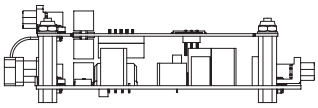
MEASUREMENT TOOLS		Part Number
Meter	FieldMax™II-TO	1098579
Sensor	PS10Q	1098400

High Resolution Raman Spectra

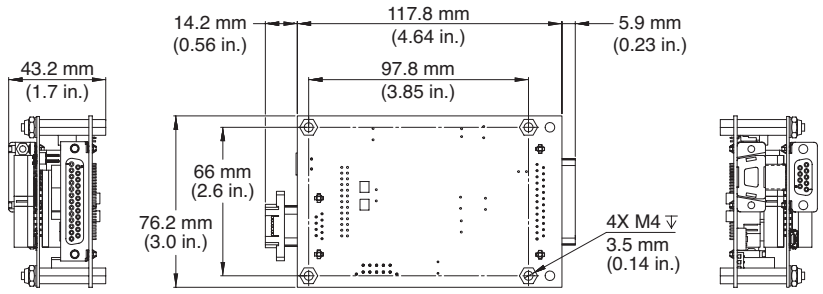


MECHANICAL SPECIFICATIONS

Controller



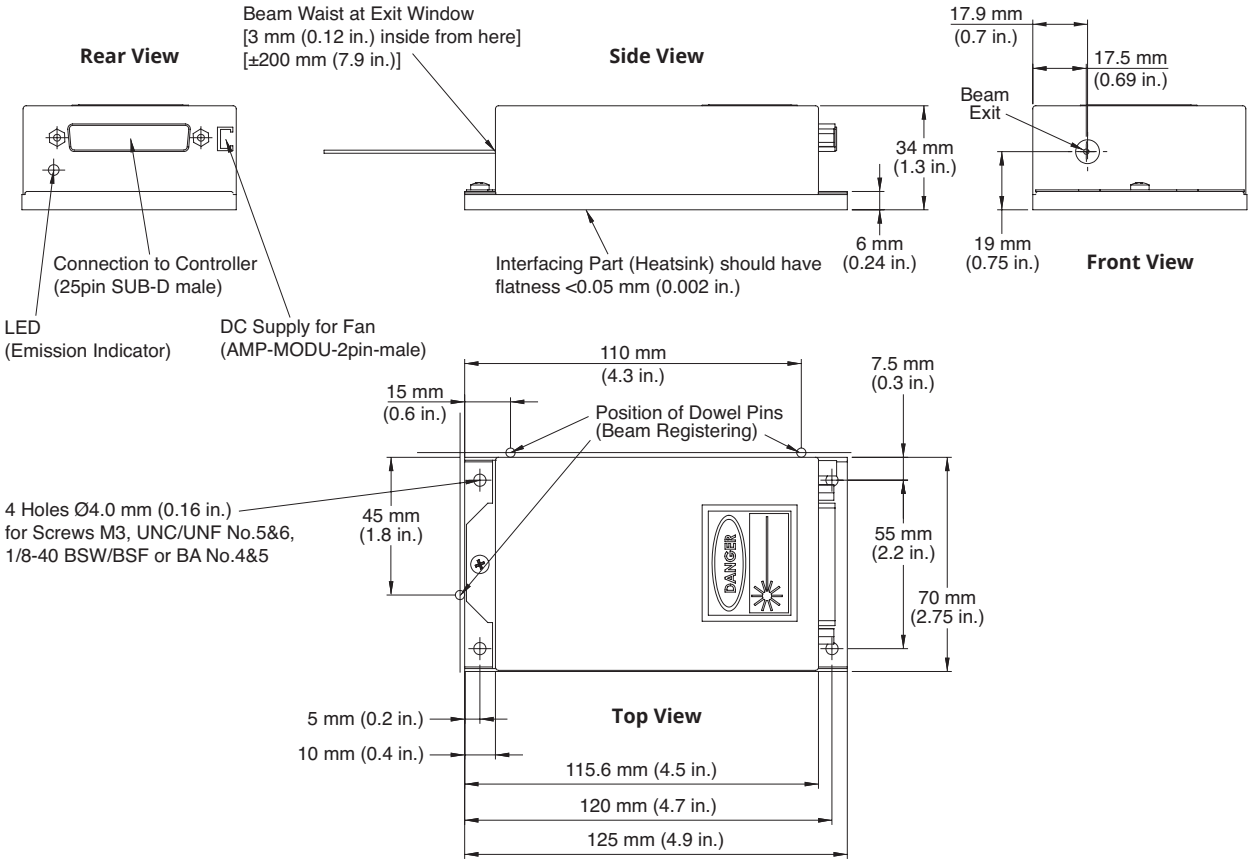
Side View



Top View

MECHANICAL SPECIFICATIONS

Laser Head



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