

Sapphire LP

CW Visible Lasers
from Deep Blue to Orange

Sapphire LP is a series of compact CW visible lasers based on Coherent's unique OPSL (Optically Pumped Semiconductor Laser) technology. OPSL technology not only provides established legacy wavelengths of ion and diode-pumped solid-state lasers, but their scalability also allows for customized wavelengths to be developed and tailored to a specific application.

Sapphire LP lasers are manufactured in cleanrooms using Coherent's patented PermAlign™ technology for optimal aligning and solderbonding the optics. This patented technology results in the best beam quality and power stability as well as the lowest noise over the complete lifetime of the laser.

Sapphire LP 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 LP lasers feature superior performance, proven reliability and low cost of ownership making them the ideal laser solution for a variety of applications e.g. in life sciences, environmental protection, semiconductor inspection, and metrology.

Features and Benefits

- Wavelength versatility
 - 458 nm to 594 nm
- Broad spectrum of output power
 - 10 mW up to 300 mW
- Outstanding power stability and low noise
- Superior beam quality
- Flexible interface concept
 - Analog, RS-232 & USB
- PermAlign technology
 - Permanent optimal alignment
 - Unsurpassed robust and stable
- Proven reliability
 - More than 50,000 installations
- OEM and end-user versions

Applications

- Flow Cytometry
- Confocal Microscopy
- Genomics & Proteomics
- High Throughput Drug Screening
- Medical Diagnostics
- Micro Array Scanning
- Semiconductor Inspection
- Metrology



SPECIFICATIONS

	Sapphire 458 LP	Sapphire 488 LP
Wavelength ¹ (nm)	458 ±2	488 ±2
Output Power ² (mW)	20, 50, 75	10, 20, 30, 50, 75, 100, 150, 200, 300
Spatial Mode	TEM ₀₀ , M ² <1.1	
Beam Asymmetry	0.9 to 1.1	
Beam Diameter at 1/e ²	0.70 ±0.05 mm	
Beam Divergence (mrad)	<1.2	
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 ³		
Beam Position (mm)	±0.25	
Beam Angle (mrad)	±2.5	
Beam Waist Position with respect to Exit Window	±200 ⁴	

UTILITY AND ENVIRONMENTAL REQUIREMENTS

Operating Voltage ⁵ (VDC)		
Maximum Rated	+10.8 to 15.0	
Nominal	+12.0 to 13.2	
Power Consumption (W)	<60	
Max. Laser Head Baseplate Temperature ⁶	+50°C (122°F)	+55°C (131°F), +50°C (122°F) ⁷
Max. Heat Dissipation of Head (W)	25 (baseplate at 50°C)	25 (baseplate at 55°C/50°C) ⁷
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	117.8 x 76.2 x 30 mm (4.6 x 3.0 x 1.2 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.), optional 5 m (16.4 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 Laser-to-laser tolerance. With residual IR emission less than 0.1 mW.

² 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.

³ Static alignment tolerances are relative to the right bottom edge (in beam direction).

⁴ 200 mm is ~30% of Raleigh Range at 514/532/561/568 nm; 200 mm is ~25% of Raleigh Range at 458/488 nm.

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

⁶ With factory-provided or other adequate heat sink.

⁷ Sapphire 488-10/20/25/30 has a maximum baseplate temperature of +55°C (+131°F). Sapphire 488-40/50/75/100/150/200 and 300 mW models are limited to a maximum baseplate temperature of +50°C (+122°F).

SPECIFICATIONS

	Sapphire 514 LP	Sapphire 532 LP	Sapphire 552 LP
Wavelength ¹ (nm)	514 ±2	532 ±2	552 ±2
Output Power ² (mW)	20, 50, 100, 150	20, 50, 100, 150, 200, 300	50, 100, 200
Spatial Mode	TEM ₀₀ , M ² <1.1		
Beam Asymmetry	0.9 to 1.1		
Beam Diameter at 1/e ²	0.70 ±0.05 mm		
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 ³			
Beam Position (mm)	±0.25		
Beam Angle (mrad)	±2.5		
Beam Waist Position with respect to Exit Window	±200 ⁴		

UTILITY AND ENVIRONMENTAL REQUIREMENTS

Operating Voltage ⁵ (VDC)			
Maximum Rated		+10.8 to 15.0	
Nominal		+12.0 to 13.2	
Power Consumption (W)		<60	
Max. Laser Head Baseplate Temperature ⁶		+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		117.8 x 76.2 x 30 mm (4.6 x 3.0 x 1.2 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.), optional 5 m (16.4 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 Laser-to-laser tolerance. With residual IR emission less than 0.1 mW.

² 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.

³ Static alignment tolerances are relative to the right bottom edge (in beam direction).

⁴ 200 mm is ~30% of Raleigh Range at 514/532/561/568 nm; 200 mm is ~25% of Raleigh Range at 458/488 nm.

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

⁶ With factory-provided or other adequate heat sink.

SPECIFICATIONS

	Sapphire 561 LP	Sapphire 568 LP	Sapphire 588 LP	Sapphire 594 LP
Wavelength ¹ (nm)	561 ±2	568 ±2	588 ±2	594 ±2
Output Power ² (mW)	20, 50, 75, 100, 150, 200, 300	50, 100, 150, 200	20, 100	75
Spatial Mode	TEM ₀₀ , M ² <1.1			
Beam Asymmetry	0.9 to 1.1			
Beam Diameter at 1/e ²	0.70 ±0.05 mm			
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 ³				
Beam Position (mm)	±0.25			
Beam Angle (mrad)	±2.5			
Beam Waist Position with respect to Exit Window	±200 ⁴			

UTILITY AND ENVIRONMENTAL REQUIREMENTS

Operating Voltage ⁵ (VDC)	
Maximum Rated	+10.8 to 15.0
Nominal	+12.0 to 13.2
Power Consumption (W)	<60
Max. Laser Head Baseplate Temperature ⁶	+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	117.8 x 76.2 x 30 mm (4.6 x 3.0 x 1.2 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.), optional 5 m (16.4 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 Laser to laser tolerance. With residual IR emission less than 0.1 mW.

2 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.

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

4 200 mm is ~30% of Raleigh Range at 514/532/561/568 nm; 200 mm is ~25% of Raleigh Range at 458/488 nm.

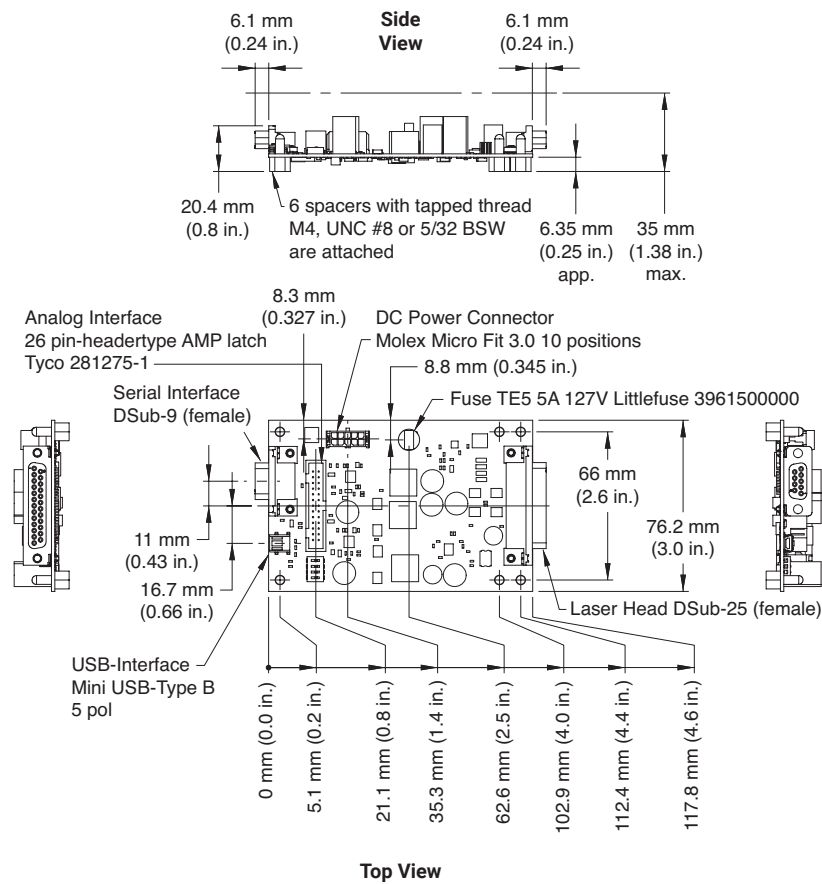
5 If user-supplied, the DC power supply has to meet the following requirements: Power >60W; ripple <5% peak-to-peak; line regulation <0.5%.

6 With factory-provided or other adequate heat sink.

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

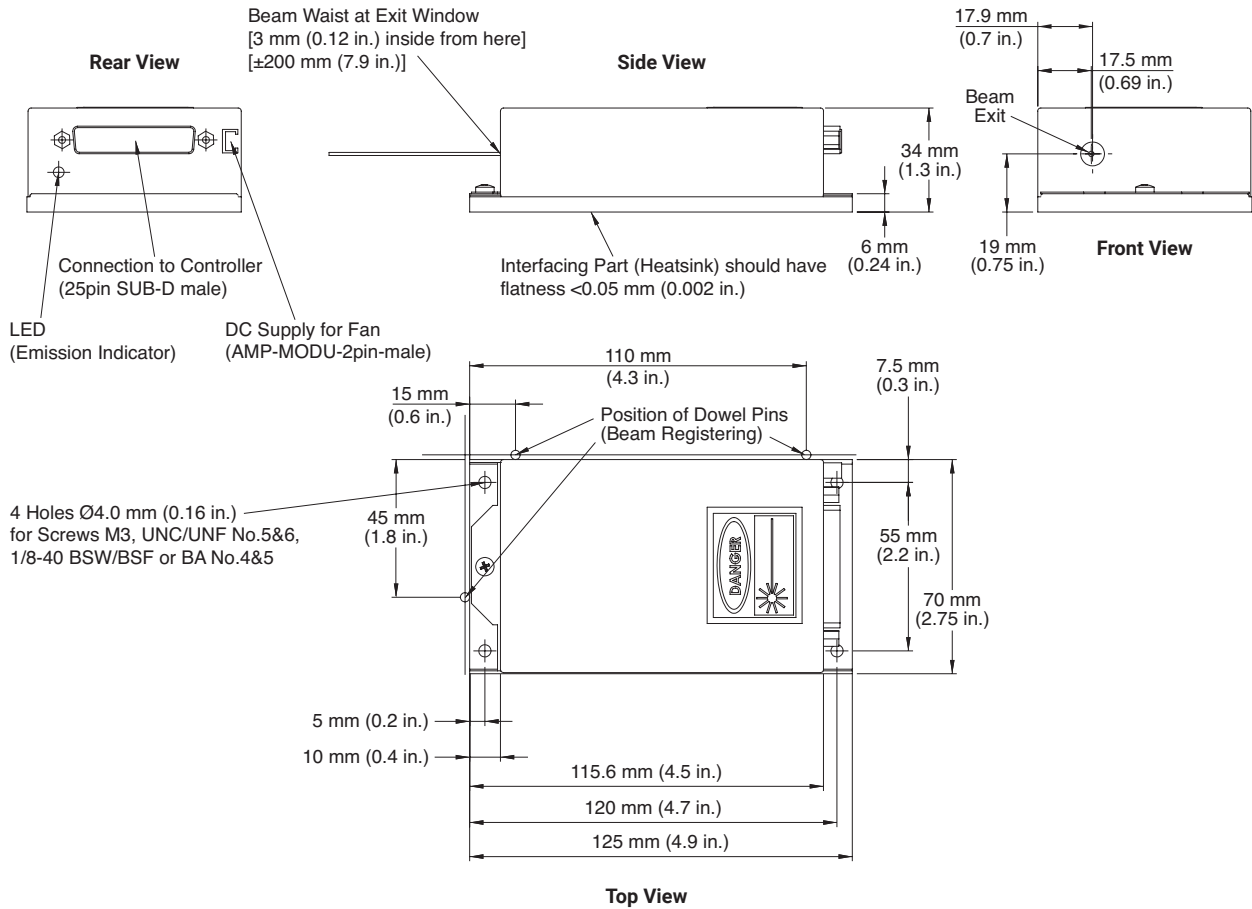
MECHANICAL SPECIFICATIONS

Controller



MECHANICAL SPECIFICATIONS

Sapphire LP



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 VISIBLE AND INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS IIIb LASER PRODUCT. λ 0.45 to 0.50 μm Max. Power 150 mW 0.50 to 0.62 μm 20 mW 0.62 to 1.00 μm 20 mW	 VISIBLE AND INVISIBLE LASER RADIATION. AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS IIIb LASER PRODUCT. λ 0.45 to 0.50 μm Max. Power 400 mW 0.50 to 0.62 μm 20 mW 0.62 to 1.00 μm 20 mW	 VISIBLE AND INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS IIIb LASER PRODUCT. λ 0.54 to 0.57 μm Max. Power 400 mW 0.70 to 0.82 μm 20 mW 1.10 to 1.20 μm 20 mW
 VISIBLE AND INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS IIIb LASER PRODUCT. λ 0.45 to 0.50 μm Max. Power 200 mW 0.50 to 0.62 μm 20 mW 0.62 to 1.00 μm 20 mW	 VISIBLE AND INVISIBLE LASER RADIATION. AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS IIIb LASER PRODUCT. λ 0.50 to 0.62 μm Max. Power 400 mW 0.70 to 0.82 μm 20 mW 1.00 to 1.10 μm 20 mW	 VISIBLE AND INVISIBLE LASER RADIATION. AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS IIIb LASER PRODUCT. λ 0.55 to 0.58 μm Max. Power 400 mW 0.70 to 0.82 μm 20 mW 1.10 to 1.20 μm 20 mW
 VISIBLE AND INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS IIIb LASER PRODUCT. λ 0.50 to 0.60 μm Max. Power 400 mW 0.70 to 0.82 μm 20 mW 1.10 to 1.20 μm 20 mW	 VISIBLE AND INVISIBLE LASER RADIATION. AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS IIIb LASER PRODUCT. λ 0.50 to 0.60 μm Max. Power 400 mW 0.70 to 0.82 μm 20 mW 1.10 to 1.20 μm 20 mW	

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.
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