



# Sapphire FP

## Fiber Pigtailed Lasers from Deep Blue to Orange

Sapphire FP is a series of true fiber-pigtailed lasers based on Coherent's unique OPSSL (Optically Pumped Semiconductor Laser) technology. OPSSL 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 FP lasers are manufactured in cleanrooms using Coherent's patented PermAlign™ technology for optimal aligning and solder-bonding the optics. The fiber is an integral part of the resonator, completely independent of the outer housing. A Coherent proprietary fiber design allows the operation at short wavelengths and/or high powers without fiber degradation or damage.

As a result, Sapphire FP lasers deliver excellent output stability, lowest noise, and superior polarization (PER) over a broad ambient temperature operating range (10°C to 40°C).

Sapphire FP lasers come with a flexible interface concept: Analog, RS-232, or USB – it is up to the user to select the appropriate communication channel.



### FEATURES & BENEFITS

- Wavelength versatility
  - 458 nm to 594 nm
- Powers: up to 300 mW
- Outstanding power stability
- Low noise
- Broad ambient temperature range:
  - operational and non-operational
- PermAlign and fiber-pigtail technology
  - Permanent optimal alignment
  - Unsurpassed robust and stable
- Flexible interface concept
  - Analog, RS-232 & USB
- Unsurpassed reliability and lifetime

### APPLICATIONS

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

SPECIFICATIONS	Sapphire 458 FP	Sapphire 488 FP
Wavelength <sup>1</sup> (nm)	458 ±2	488 ±2
Output Power at Fiber Exit <sup>2</sup> (mW)	40	40, 80, 120, 200
Fiber Type	SM-PM <sup>3</sup>	
Fiber Length (m)	1	
Fiber Output	FC/APC; 8° angled <sup>4</sup>	
Spatial Mode	TEM <sub>00</sub> , M <sup>2</sup> <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		
Laser Safety Classification	3b	
Operating Voltage <sup>5</sup> (VDC)	+12.0 to 13.2	
Power Consumption (W)	<60	
Max. Laser Head Baseplate Temperature <sup>6</sup>	+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-Operating Condition	-20 to 60°C (-4 to 140°F)	
Humidity		
Operating Condition	0 to 95%, non-condensing	
Non-Operating Condition	0 to 100%, non-condensing	
Shock Tolerance (6 ms)	15g laterally, 15g vertically	
Dimensions (L x W x H)		
Laser Head <sup>7</sup>	125 x 70 x 34 mm (4.9 x 2.8 x 1.3 in.)	
Controller	118 x 76 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 2.0 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	2m (6.56 ft.) and options	
Weights		
Laser Head <sup>7</sup>	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.)	
Cable — Laser Head to Controller	0.3 kg (0.66 lbs.)	

1 Laser-to-laser tolerance.

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

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

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

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 Dimensions respectively weight without fiber-pigtail part.

SPECIFICATIONS	Sapphire 514 FP	Sapphire 532 FP	Sapphire 552 FP
Wavelength <sup>1</sup> (nm)	514 ±2	532 ±2	552 ±2
Output Power at Fiber Exit <sup>2</sup> (mW)	40, 80, 120	40, 80, 120, 200, 300	40, 80, 120
Fiber Type	SM-PM <sup>3</sup>		
Fiber Length (m)	1		
Fiber Output	FC/APC; 8° angled <sup>4</sup>		
Spatial Mode	TEM <sub>00</sub> , M <sup>2</sup> <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			
Laser Safety Classification	3b		
Operating Voltage <sup>5</sup> (VDC)	+12.0 to 13.2		
Power Consumption (W)	<60		
Max. Laser Head Baseplate Temperature <sup>6</sup>	+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-Operating Condition	-20 to 60°C (-4 to 140°F)		
Humidity			
Operating Condition	0 to 95%, non-condensing		
Non-Operating Condition	0 to 100%, non-condensing		
Shock Tolerance (6 ms)	15g laterally, 15g vertically		
Dimensions (L x W x H)			
Laser Head <sup>7</sup>	125 x 70 x 34 mm (4.9 x 2.8 x 1.3 in.)		
Controller	118 x 76 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 2.0 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	2m (6.56 ft.) and options		
Weights			
Laser Head <sup>7</sup>	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.)		
Cable — Laser Head to Controller	0.3 kg (0.66 lbs.)		

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7 Dimensions respectively weight without fiber-pigtail part.

SPECIFICATIONS	Sapphire 561 FP	Sapphire 588 FP	Sapphire 594 FP
Wavelength <sup>1</sup> (nm)	561 ±2	588 ±2	594 ±2
Output Power at Fiber Exit <sup>2</sup> (mW)	40, 80, 120, 200	40	40
Fiber Type	SM-PM <sup>3</sup>		
Fiber Length (m)	1		
Fiber Output	FC/APC; 8° angled <sup>4</sup>		
Spatial Mode	TEM <sub>00</sub> , M <sup>2</sup> <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			
Laser Safety Classification	3b		
Operating Voltage <sup>5</sup> (VDC)	+12.0 to 13.2		
Power Consumption (W)	<60		
Max. Laser Head Baseplate Temperature <sup>6</sup>	+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-Operating Condition	-20 to 60°C (-4 to 140°F)		
Humidity			
Operating Condition	0 to 95%, non-condensing		
Non-Operating Condition	0 to 100%, non-condensing		
Shock Tolerance (6 ms)	15g laterally, 15g vertically		
Dimensions (L x W x H)			
Laser Head <sup>7</sup>	125 x 70 x 34 mm (4.9 x 2.8 x 1.3 in.)		
Controller	118 x 76 x 30 mm (4.6 x 3.0 x 1.2 in.)		
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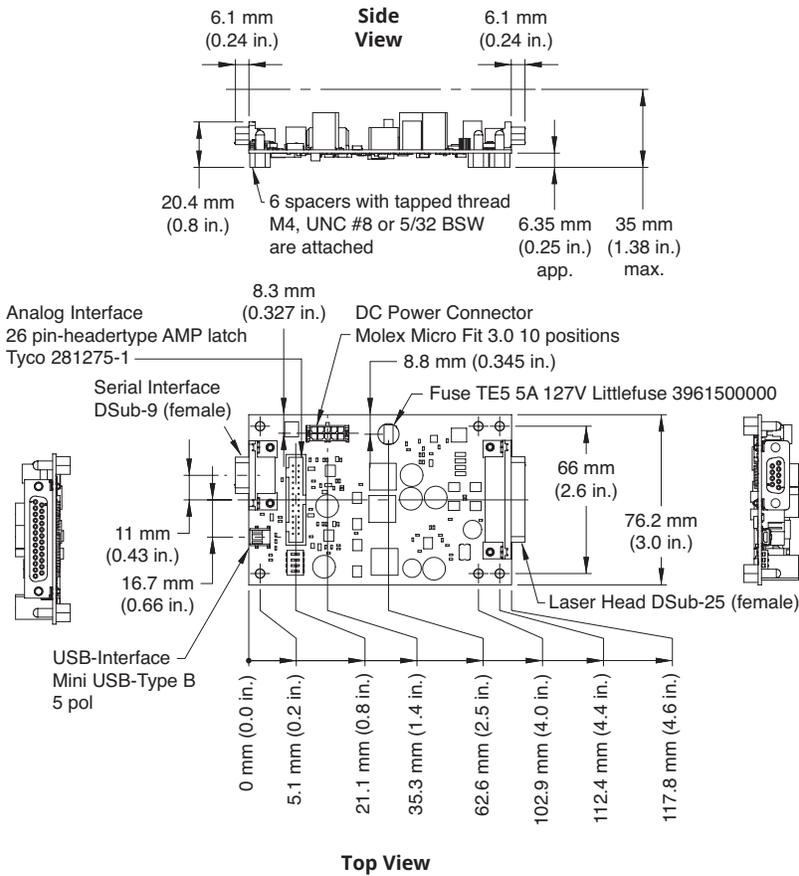
6 With factory-provided or other adequate heat sink.

7 Dimensions respectively weight without fiber-pigtail part.

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

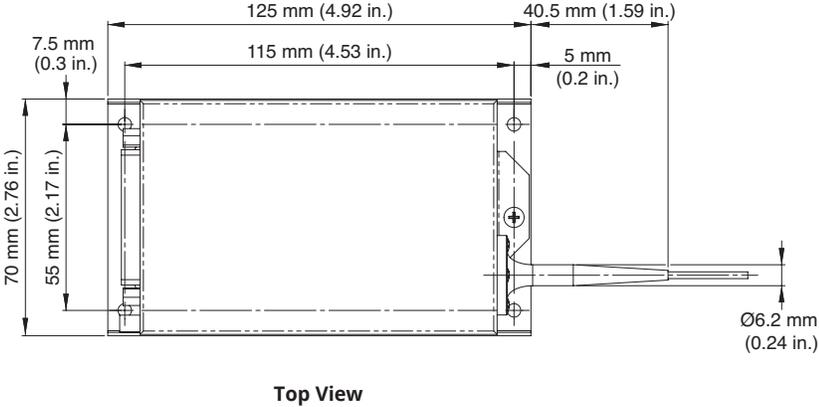
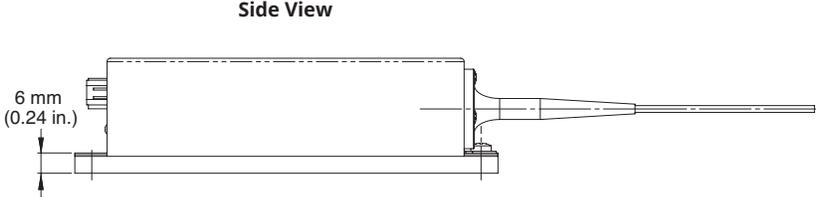
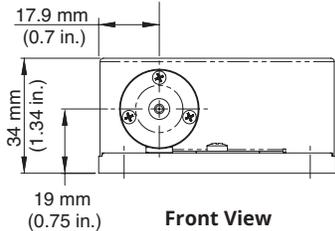
**MECHANICAL SPECIFICATIONS**

**Controller**



MECHANICAL SPECIFICATIONS

Sapphire FP



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VISIBLE AND INVISIBLE LASER RADIATION.  
 AVOID EYE OR SKIN EXPOSURE TO  
 DIRECT OR SCATTERED RADIATION.  
 CLASS IV LASER PRODUCT.

$\lambda$	Max. Power
0.50 to 0.55 $\mu\text{m}$	1300 mW
0.70 to 0.82 $\mu\text{m}$	20 mW
1.00 to 1.10 $\mu\text{m}$	200 mW

VISIBLE AND INVISIBLE LASER RADIATION.  
 AVOID EYE OR SKIN EXPOSURE TO  
 DIRECT OR SCATTERED RADIATION.  
 CLASS IIIb LASER PRODUCT.

$\lambda$	Max. Power
0.45 to 0.50 $\mu\text{m}$	400 mW
0.70 to 0.82 $\mu\text{m}$	20 mW
0.90 to 1.00 $\mu\text{m}$	50 mW

VISIBLE AND INVISIBLE LASER RADIATION.  
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 DIRECT OR SCATTERED RADIATION.  
 CLASS III LASER PRODUCT.

$\lambda$	Max. Power
0.54 to 0.57 $\mu\text{m}$	450 mW
0.70 to 0.82 $\mu\text{m}$	20 mW
1.00 to 1.14 $\mu\text{m}$	50 mW

VISIBLE AND INVISIBLE LASER RADIATION.  
 AVOID EYE OR SKIN EXPOSURE TO  
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 CLASS IIIb LASER PRODUCT.

$\lambda$	Max. Power
0.50 to 0.55 $\mu\text{m}$	400 mW
0.70 to 0.82 $\mu\text{m}$	20 mW
1.00 to 1.10 $\mu\text{m}$	50 mW

VISIBLE AND INVISIBLE LASER RADIATION.  
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 CLASS III LASER PRODUCT.

$\lambda$	Max. Power
0.55 to 0.58 $\mu\text{m}$	850 mW
0.70 to 0.82 $\mu\text{m}$	20 mW
1.10 to 1.20 $\mu\text{m}$	50 mW

VISIBLE AND INVISIBLE LASER RADIATION.  
 AVOID EYE OR SKIN EXPOSURE TO  
 DIRECT OR SCATTERED RADIATION.  
 CLASS IIIb LASER PRODUCT.

$\lambda$	Max. Power
0.50 to 0.60 $\mu\text{m}$	450 mW
0.70 to 0.82 $\mu\text{m}$	20 mW
1.10 to 1.20 $\mu\text{m}$	50 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](http://www.coherent.com) or contact your local Sales or Service Representative.  
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