

C-FLEX

Compact and Flexible | Laser combiner



Applications

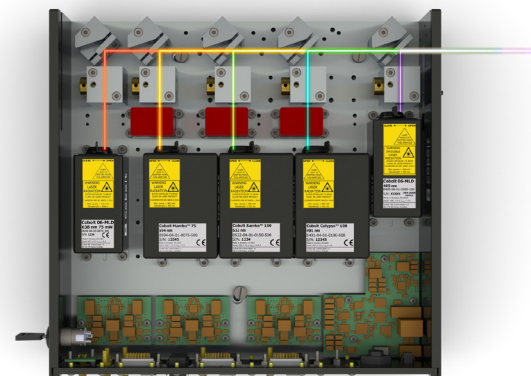
Fluorescence Microscopy
Raman Spectroscopy
Holography
Flow Cytometry
Optogenetics
Argon-Ion Replacement
Multi-Disciplinary Applications
Custom Solutions

- Combines up to 4 or up to 6 wavelengths
- Compatible with 32 different wavelengths from 375 nm to 1064 nm
- Flexible and field upgradeable
- High speed modulation capabilities
- Fiber coupling with single or dual outputs
- Electromechanical aperture shutter(s)

The highly-flexible, compact C-FLEX laser combiner allows you to combine up to 6 wavelengths of the 32 available wavelengths with modulation options for all wavelengths and configurations for single or dual outputs and optional fiber coupling.

The C-FLEX laser combiner harnesses the quality and reliability of the Cobolt high performance lasers. It is field upgradeable and ready to mount lasers from the Cobolt 06-01 Series, 08-01 Series, and 04-01 Series. The C-FLEX design allows for full flexibility in the choice of laser technology, ranging from plug and play diode lasers to high power, single frequency diode pumped lasers.

The robust design of the C-FLEX laser combiner provides excellent long-term stability in output power and beam overlap, as well as outstanding flexibility in terms of laser wavelength and type, which makes it ideally suited for use over a wide range of applications. C-FLEX can be fully customized, or is available as application-specific configurations which are tailored to deliver the optimum performance and features for applications in optogenetics, fluorescence microscopy, raman spectroscopy, or holography.



HÜBNER Photonics



C-FLEX

Available Wavelengths

375 nm	70 mW	●
395 nm	120 mW	●
405 nm	365 mW	●
415 nm	120 mW	●
425 nm	120 mW	●
445 nm	400 mW	●
457 nm	400 mW	●
473 nm	300 mW	●
488 nm	200 mW	●
491 nm	100 mW	●
505 nm	80 mW	●
515 nm	150 mW	●
520 nm	80 mW	●
532 nm	400 mW	●
553 nm	50 mW	●
561 nm	200 mW	●
594 nm	100 mW	●
633 nm	80 mW	●
638 nm	180 mW	●
647 nm	130 mW	●
660 nm	100 mW	●
685 nm	40 mW	●
705 nm	30 mW	●
730 nm	50 mW	●
760 nm	25 mW	●
785 nm	250 mW	●
808 nm	120 mW	●
830 nm	100 mW	●
915 nm	250 mW	●
940 nm	250 mW	●
975 nm	250 mW	●
1064 nm	400 mW	●

Combiner Optical Specifications

Output power losses per beam diverter	< 10 %
Fiber coupled power stability (8 hrs, ± 3 °C, SM/PM fiber)	± 2 %
Achievable fiber coupling efficiency (SM/PM fiber)	> 50 %
Temperature dependant pointing stability per laser (10-40 °C)	< 20 µrad / °C
Static beam pointing stability per laser (8 hrs, ± 3 °C)	< 50 µrad
Achievable beam position overlap at exit	< 50 µm
Achievable beam-to-beam angle deviation	< 150 µrad

Configuration

C-FLEX Model	C4	C6	C8
Article number	90417	90616	90626
Maximum number of Cobolt 06-01 or 08-01 lasers	4	6	8
Maximum number of Cobolt 04-01 lasers	2	3	3
Maximum number of AOMs	2	3	3
Minimum wavelength separation between laser lines	20 nm		
Standard wavelength ranges*	375 nm, 395 nm or 405 nm - 1064 nm		

*Custom solutions available

Operational Environment

Power supply requirement	15 V / 7 A
Communication protocol	USB
Maximum baseplate temperature	50 °C
Warm-up time to system thermal stability	< 15 min
Laser warm up time	< 3 min
Intended use environment	Laboratory
Storage temperature	10 - 40 °C
Humidity (non-condensing)	0-90% RH
Ambient air pressure	950-1050 mbar
Heat sink thermal impedance at 30 °C	< 0.2 K/W
Power consumption	< 100 W
System warranty period**	24 months

** 12 month limited warranty on combining optics for < 405 nm

Configurable Beam Delivery

C-FLEX laser combiners feature a highly configurable beam delivery.

- Single or dual aperture
- Free beam or fiber coupled
- Photonic crystal fiber available for high power broadband coupling
- Optional electromechanical shutter
- Contact us for customized configurations



This device contains components that may be sensitive to Electrostatic Discharge (ESD). ESD protection can be achieved with proper electrical grounding.

WARNING/DANGER VISIBLE AND INVISIBLE LASER RADIATION
Classified per IEC 60825-1:2014

Avoid eye or skin exposure to direct or scattered radiation.
Class 4 Laser Product

Avoid exposure to beam.
Class 3B Laser Product



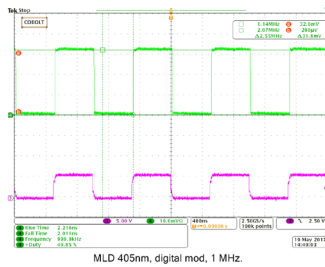
Modulation Options

Emission control and power modulation options are available from 375 nm to 1064 nm. The Cobolt 06-01 Series lasers feature integrated modulation capabilities within the laser head. Acousto-optic modulators (AOM) are available for high speed modulation of Cobolt 04-01 and 08-01 Series lasers. Modulation controls are fully integrated into the C-FLEX.

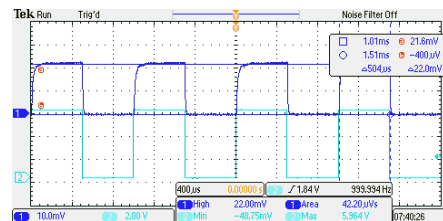
Cobolt 06-01 Series modulation specifications

Cobolt Laser Product	06-MLD		06-DPL		
Nominal Wavelength	375 - 515 nm, 633 - 1064 nm		532	553	561
Digital modulation					
Bandwidth	DC - 150 MHz	DC-50 kHz	DC-5 kHz	DC-10 kHz	
Extinction ratio @ 10 MHz	>10 000 000 : 1 (>70dB)	--	--	--	
Rise/fall time	< 2.5 ns	< 6 μ s	< 60 μ s	< 30 μ s	
Input signal	0 - 5 V, TTL				
Impedance	50 Ω	10 k Ω			
Analog modulation					
Bandwidth	DC - 2 MHz	DC-50 kHz	DC-5 kHz	DC-10 kHz	
Extinction ratio @ 250 kHz	>10 000 000 : 1 (>70dB)	--	--	--	
Rise/fall time	< 300 ns	< 6 μ s	< 60 μ s	< 30 μ s	
Input signal	0 - 1 V, Arbitrary				
Impedance	1 k Ω	1 k Ω			
ON-OFF modulation					
Bandwidth	DC - 500 kHz	N/A			
Extinction ratio	inf : 1				
Rise/fall time	< 300 ns				
Input signal	0 - 5 V, TTL				
Impedance	High				

Cobolt o6-MLD
Typical Digital Modulation at 1 MHz



Cobolt o6- DPL
Typical Digital Modulation at 1 kHz



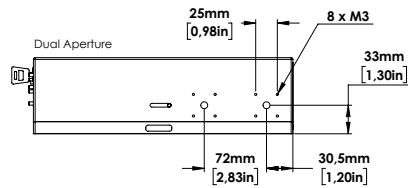
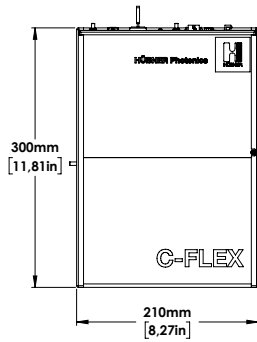
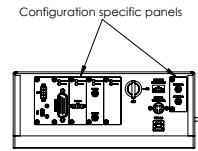
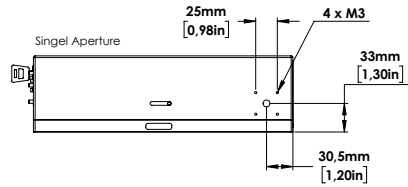
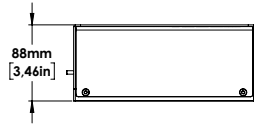
Acousto-optic modulation specifications

Cobolt Laser Product (compatibility)	Cobolt 04-01 Series and Cobolt 08-01 series
Nominal Wavelength	457 - 1064 nm
Expected AOM throughput	> 80 %
Output impedance - RF output connector	50 Ω (nom.)
Modulation frequency	DC- 3 MHz
Digital Modulation	
Extinction ratio @ 3 MHz	> 30 dB @ DC
Rise/fall time	< 200 ns
RF ON/OFF ratio	70 dB
Input signal	0 - 5 V
Impedance	1 k Ω
Analog modulation	
Voltage range	0 - 5 V
RF ON/OFF ratio	60 dB
Absolute maximum ratings	-0.5 V - +5.5 V
Impedance	1 k Ω

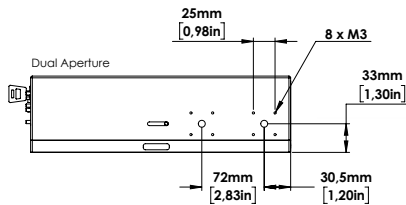
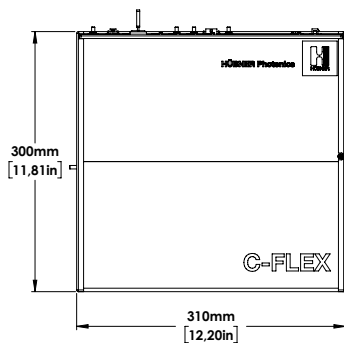
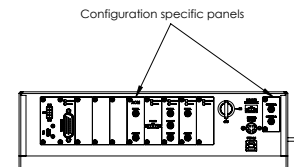
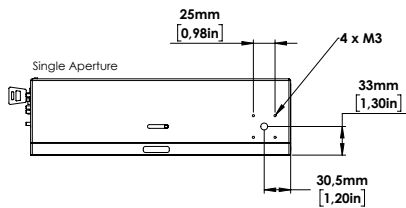
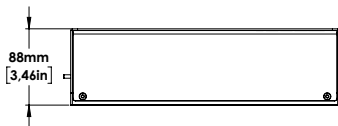
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Mechanical Specifications

C-FLEX Model	C4	C6
Laser combiner (mm)	300 x 210 x 88	300 x 310 x 88
Weight, combiner without lasers or heatsinks	< 3 kg	< 5 kg



C-FLEX C4 Laser Combiner



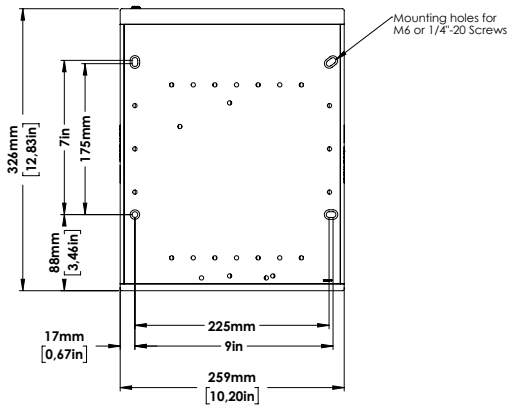
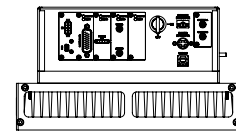
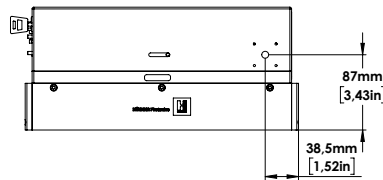
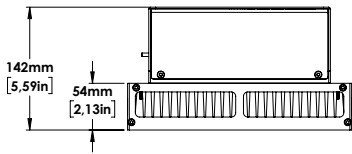
C-FLEX C6 Laser Combiner

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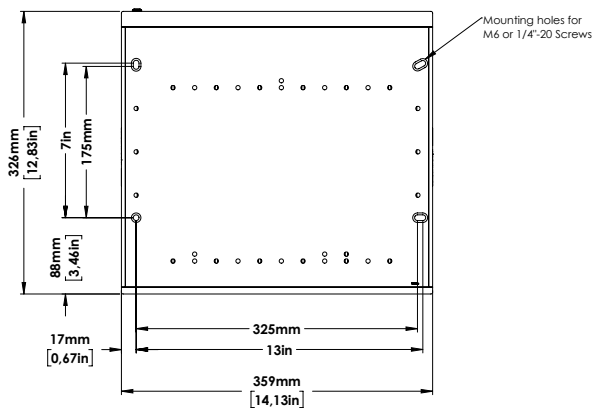
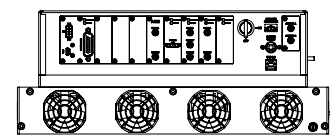
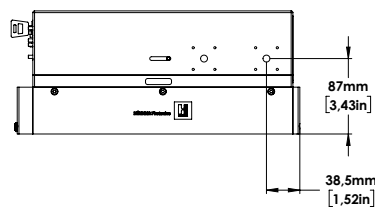
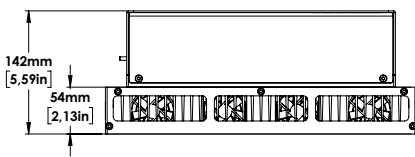
Thermal Management

Heatsink Specifications

C-FLEX Model	C4	C6
Heat sink article number	13471	13533
Heat sink dimensions (mm)	326 x 225 x 54	326 x 359 x 54



C-FLEX C4 Heatsink



C-FLEX C6 Heat sink

C-FLEX

Compatible Laser Products

Cobolt 04-01 Series

Powerful, single frequency, CW diode pumped lasers:

457 nm – 1064 nm up to 400 mW

<https://hubner-photonics.com/products/lasers/single-frequency-lasers/04-01-series/>



Cobolt 06-01 Series

Plug & play modulatable lasers:

375 nm – 1064 nm up to 400 mW

<https://hubner-photonics.com/products/lasers/diode-lasers/06-01-series/>



Cobolt 08-01 Series

Compact narrow linewidth lasers:

405 nm – 1064 nm up to 400 mW

<https://hubner-photonics.com/products/lasers/narrow-linewidth-lasers/08-01-series/>



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