

# C-FLEX

## Compact and Flexible | Laser combiner



- Combines up to 4, 6 or 8 wavelengths
- Compatible with 37 different wavelengths from 375 nm to 1064 nm
- Flexible and field upgradeable
- High speed modulation capabilities
- Fiber coupling with single or dual outputs
- Electromechanical shutter options
- Optional laser output power monitors

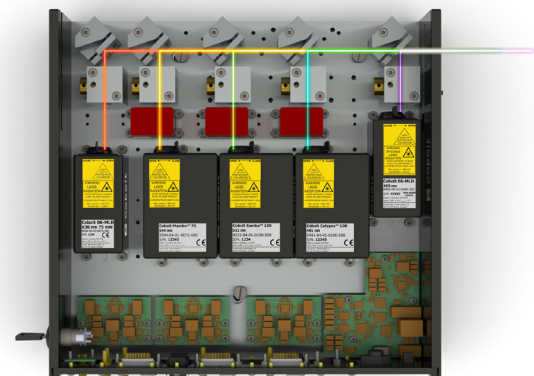
The highly-flexible, compact C-FLEX laser combiner allows you to combine up to 8 wavelengths of the 37 available wavelengths with modulation options for all wavelengths and configurations for single or dual outputs and optional fiber coupling.

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, 04-01 Series and 05-01 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.

### Applications

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



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# 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	300 mW	●
491 nm	200 mW	●
493 nm	100 mW	●
505 nm	80 mW	●
515 nm	300 mW	●
520 nm	80 mW	●
532 nm	1500 mW	●
553 nm	150 mW	●
561 nm	1000 mW	●
594 nm	150 mW	●
633 nm	80 mW	●
638 nm	180 mW	●
640 nm	1000 mW	●
642 nm	180 mW	●
647 nm	130 mW	●
660 nm	100 mW	●
675 nm	200 mW	●
685 nm	40 mW	●
690 nm	200 mW	●
705 nm	30 mW	●
730 nm	50 mW	●
785 nm	250 mW	●
808 nm	120 mW	●
830 nm	250 mW	●
850 nm	200 mW	●
915 nm	250 mW	●
940 nm	250 mW	●
975 nm	250 mW	●
1064 nm	2000 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	90953
Maximum number of Cobolt 06-01 or 08-01 lasers	4	6	8
Maximum number of Cobolt 04-01 lasers	2	3	4
Maximum number of Cobolt 05-01 lasers	1	2	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

	C4 and C6	C8
Power supply requirement	15 V / 7 A	12 V / 21 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	< 250 W
System warranty period**	24 months	12 months

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



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

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



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

Product	o6-MLD	o6-DPL
Nominal Wavelength	375 - 520 nm, 633 - 1064 nm	532 - 594 nm
Digital power modulation		
Modulation frequency	DC - 10 MHz	DC - 1 kHz
Rise/fall time	< 2.5 ns	< 100 μs
Extinction ratio	> 10 000 000 : 1 (>70 dB)	
Input signal - Low	0 - 0.8 V	
Input signal - High	2 - 5 V	
Input signal - Impedance	2 kW	
Analog power modulation		
Modulation frequency	DC - 10 Hz	DC - 1 kHz
Rise/fall time	< 10 ms	< 100 μs
Extinction ratio	> 10 000 000 : 1 (>70 dB)	
Input signal	0 - 1 V -or- 0 - 5 V	
Threshold voltage	37 ± 5 mV (0 - 1 V) 68 ± 5 mV (0 - 5 V)	< 0.1 V (0 - 1 V) < 0.5 V (0 - 5 V)
Input signal - Impedance	2 kΩ -or- 50 Ω	
Digital current modulation		
Max. modulation frequency	> 100 MHz	> 10 kHz
Rise/fall time	< 2.5 ns	< 30 μs
Input signal - Low	0 - 0.8 V	
Input signal - High	2 - 5 V	
Input signal - Impedance	2 kW	
Analog current modulation		
Max. modulation frequency	> 300 kHz	> 10 kHz
Rise/fall time	< 2 μs	< 30 μs
Input signal	0 - 1 V -or- 0 - 5 V	
Threshold voltage	37 ± 5 mV (0 - 1 V) 68 ± 5 mV (0 - 5 V)	
Input signal - Impedance	2 kΩ -or- 50 Ω	

Acousto-optic modulation specifications

Cobolt Laser Product (compatibility)	Cobolt 04-01, 05-01 and 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 kΩ
Analog modulation	
Voltage range	0 - 5 V
RF ON/OFF ratio	60 dB
Absolute maximum ratings	-0.5 V – +5.5 V
Impedance	1 kΩ

## Beam delivery and emission control options

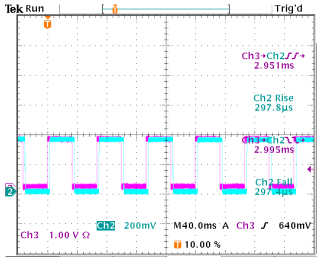
C-FLEX laser combiners feature a highly configurable beam delivery.

- Optional electromechanical shutter
- Single or dual aperture
- Free beam or fiber coupled
- Photonic crystal fiber available for high power broadband coupling
- Power attenuation - per line
- Power monitoring with analog output - per line
- Contact us for customized configurations



## Optomechanical shutter

	Bistable	Unistable
Maximum frequency (Hz)	15	50
Thermal load (W)	n/a	2
Rise / Fall time (ms)	< 0.5	
Input signal port	SMB	
Input signal	0 - 5 V, 1 kΩ	



## Dual aperture beam delivery

The C-FLEX laser combiner can be configured for one of two output ports. The power distribution between the two ports can be split on power or wavelength.

## Fiber coupling options

A wide range of fiber coupled options are available for the C-FLEX laser combiner. Fiber coupled connectors are FC/APC as standard, with FCP8 or collimated output upon request. Broadband high-power fiber coupled solutions are available to cover the wavelength range 400-1100 nm.

## Power attenuation

Power attenuators allow control the output power of individual lasers lines while preserving all performance parameters, with power settings available from 1 % to 100 % of the nominal laser power. Attenuation is available on laser wavelengths from 405 nm to 1064 nm.

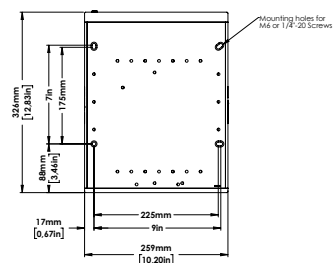
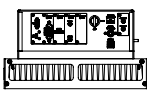
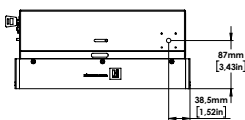
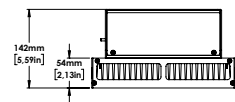
## Power monitors

Additional laser power monitors are available for each laser line, allowing for power monitoring of each integrated laser providing a 0-5 V analog output signal and additional LED indicators.

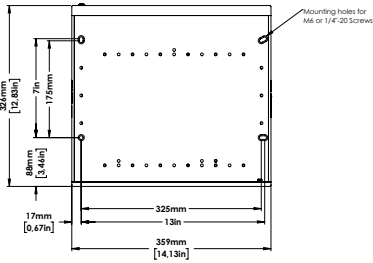
## Thermal Management

### Heatsink Specifications

C-FLEX Model	C4	C6	C8
Heat sink article number	13471	13533	13235
Heat sink dimensions (mm)	326 x 225 x 54	326 x 359 x 54	326 x 479 x 54



C-FLEX C4 Heatsink

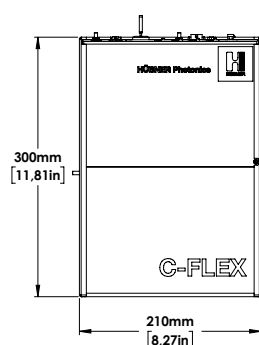
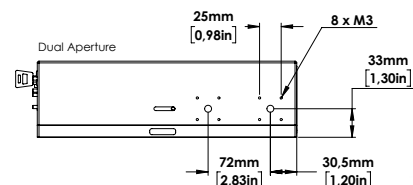
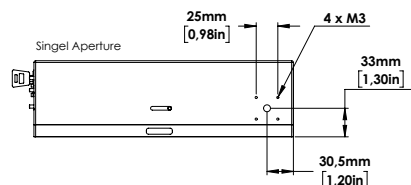
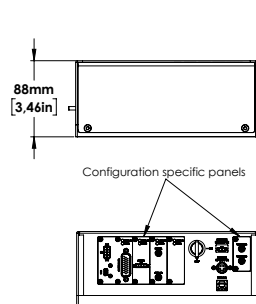


C-FLEX C6 Heatsink

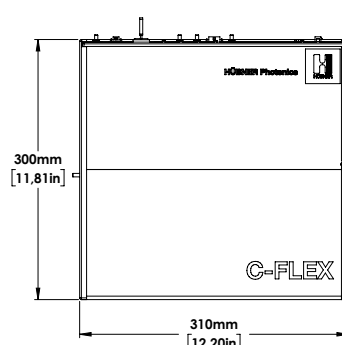


## Mechanical Specifications

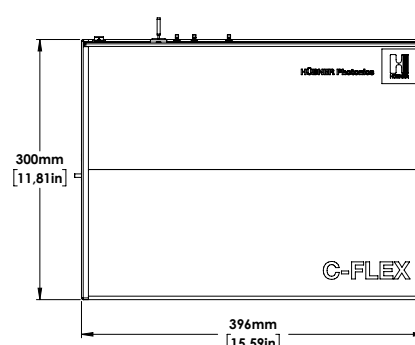
C-FLEX Model	C4	C6	C8
Laser combiner (mm)	300 x 210 x 88	300 x 310 x 88	300 x 396 x 88
Weight, combiner without lasers or heatsink	< 3 kg	< 5 kg	< 10 kg



C-FLEX C4



C-FLEX C6



C-FLEX C8

## 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 05-01 Series

Powerful, single frequency, CW diode pumped lasers:

355 nm – 1064 nm up to 2 W

<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/>

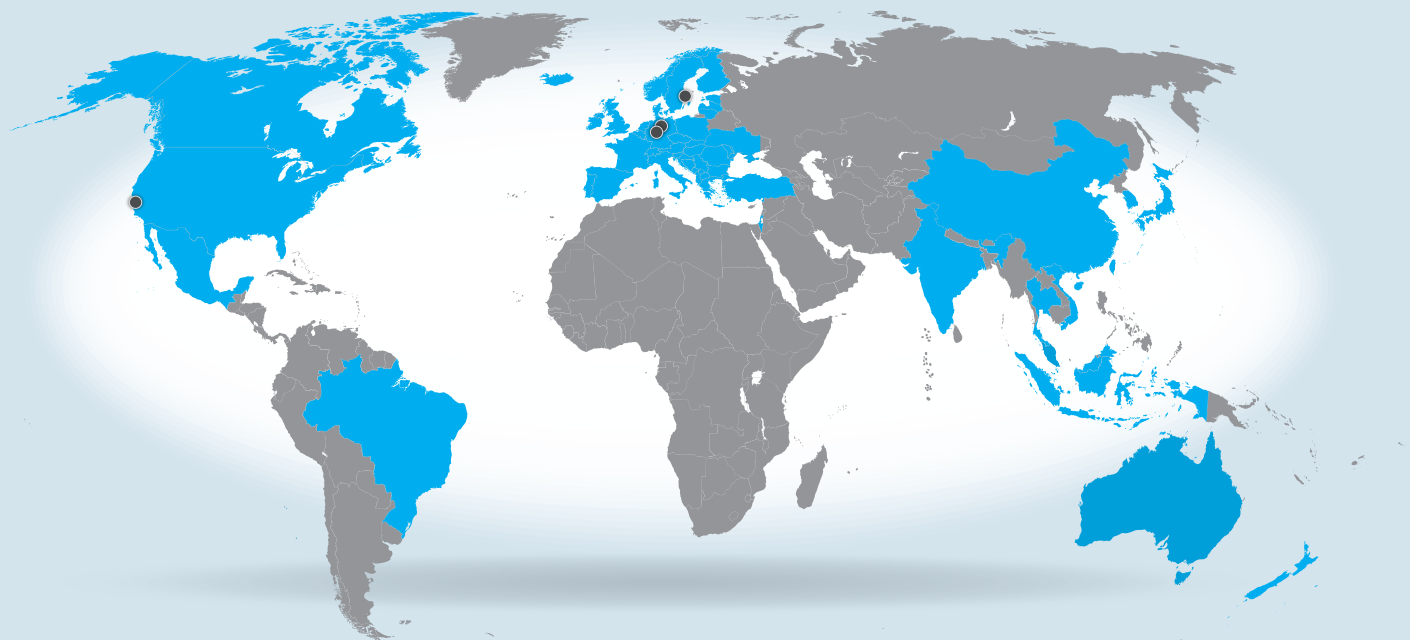
### Cobolt 08-01 Series

Compact narrow linewidth lasers:

405 nm – 1064 nm up to 400 mW

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





## Our Locations

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