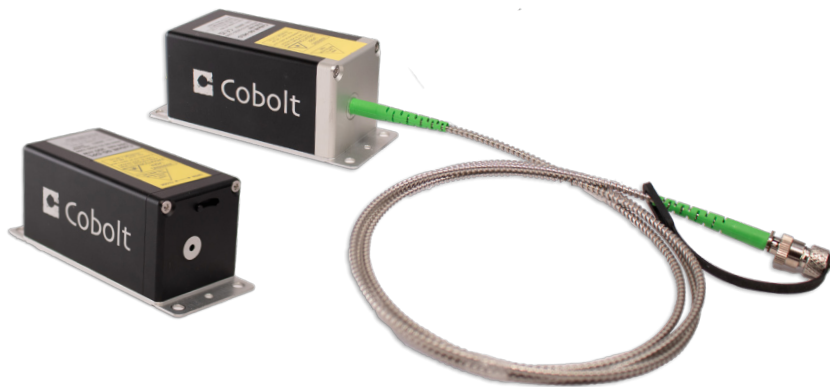


Cobolt o6-o1 Series

Plug & Play | Modulatable | Continuous Wave lasers



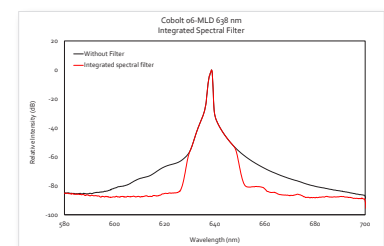
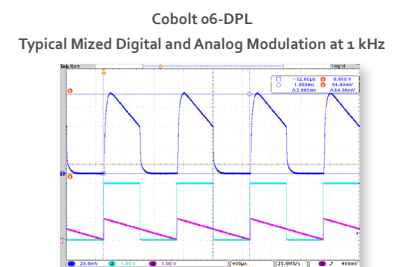
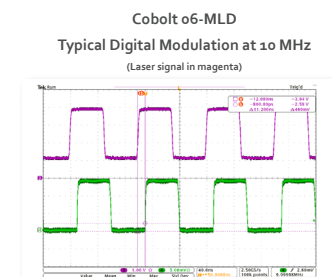
- Easy-to-integrate compact and powerful laser modules
- Output power up to 400 mW
- Fast and deep intensity modulation to a complete dark state on all lines
- Linear response to analog power control signals
- Full duty cycle flexibility and ensured stability within a pulse through active power control
- Versatile modulation controls
- Free space and fiber pigtailed beam delivery
- Integrated clean-up filter on all diode lasers
- Wavelengths from 375 nm to 1064 nm, including 532 nm, 561 nm and 594 nm
- Ultra-robust design

The Cobolt o6-o1 Series lasers offer a compact form factor and a wide wavelength span in an industry standard plug and play format, utilizing the most ideal laser technology to achieve each wavelength while maintaining the same footprint. The Cobolt o6-o1 Series consists of high performance fixed wavelength diode laser modules (MLD) and diode-pumped solid-state lasers (DPL) and offer direct intensity modulation capability, allowing fast and deep modulation from versatile input signals between 375 nm and 1064 nm.

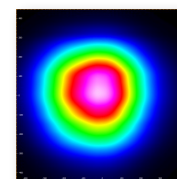
The lasers are manufactured using Cobolt's unique HTCure™ Technology to ensure world-class quality and reliability, as well as unmatched robustness. The Cobolt o6-o1 Series lasers are intended for stand-alone use in laboratory environment, or for integration into laser combiners (C-FLEX) or analytical instrumentation and are ideally suited for demanding fluorescence analysis applications such as confocal microscopy and flow cytometry.

Applications

Fluorescence microscopy and imaging
Super resolution microscopy
Flow cytometry
Optogenetics
Quantum research

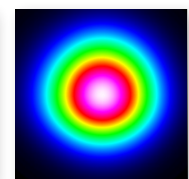


Typical Beam Profile



Cobolt o6-MLD
 $M^2 < 1.2$

Typical Beam Profile



Cobolt o6-DPL
 $M^2 < 1.1$

HÜBNER Photonics



Cobolt o6-o1 Series

Optical Performance Specifications

	375	395	405	415	425	445	457	473	488	505	515	520
Platform	o6-MLD											
Center Wavelength (nm)	375 ± 5	395 ± 5	405 ± 5	415 ± 5	425 ± 5	445 ± 5	457 ± 5	473 ± 5	488 ± 3	505 ± 3	515 ± 3	520 ± 5
Spectral bandwidth (FWHM)	< 1.2 nm								< 1.5 nm			
Output power (mW)	70	120	150 365	120	120	100 400	100 400	100 300	60 100 150 200 300*	80	80 150	80
Power stability over 8 hrs (%)	< 1.0											
Noise, 20 Hz – 2 MHz (RMS, %)	< 0.2											
Beam diameter at aperture (µm)	700 ± 100											
Beam symmetry	> 0.90:1											
Beam divergence (full angle, mrad)	< 1.1			< 1.2				< 1.3				
Polarization extinction ratio	> 100:1, vertical											
Warranty	12 mo., 5000 hrs		24 months, unlimited hours									

* o6-MLD 488 nm 300 mW wavelength specification : 488 ± 5 / - 8 nm

	532	553	561	594	633	638	647	660	685	690
Platform	o6-DPL				o6-MLD					
Center Wavelength (nm)	532.1 ± 0.3	552.8 ± 0.3	561.2 ± 0.3	594.0 ± 0.3	633 ± 3	638 ± 5	647 -1/+4	660 ± 5	685 ± 5	690 ± 5
Spectral bandwidth (FWHM)	< 1 MHz				< 1.2 nm					
Output power (mW)	25 50 100 200 400	25 50	25 50 100 200	100	80	180	130	100	40	200
Power stability over 8 hrs (%)	< 2.0				< 1.0				< 2.0	
Noise, 20 Hz – 2 MHz (RMS, %)	< 0.3	< 0.25			< 0.2				< 0.5	< 0.2
Beam diameter at aperture (μm)	700 ± 70				700 ± 100					
Beam symmetry	> 0.95:1				> 0.90:1					
Beam divergence (full angle, mrad)	< 1.2			< 1.4	< 1.6				< 1.75	
Spatial mode (TEM ₀₀)	M ² < 1.1				M ² < 1.2					
Polarization extinction ratio	> 100:1, vertical									
Warranty	24 months, unlimited hours			12 mo.	24 months, 5000 hours					

	705	730	760	785	808	830	852	915	940	975	1064
Platform	o6-MLD										
Center Wavelength (nm)	705 ± 10	730 ± 5	760 ± 15	785 ± 5	808 ± 5	830 ± 5	852 ± 5	915 ± 10	940 ± 10	975 ± 5	1064 ± 10
Spectral bandwidth (FWHM)	< 2 nm										
Output Power (mW)	30	50	25	250	120	250	50	250	250	250	200
Power stability over 8 hrs (%)	< 2										
Noise, 20 Hz – 2 MHz (RMS, %)	< 0.2 %								< 0.5		
Beam diameter at aperture (μm)	700 ± 100										
Beam symmetry	> 0.90:1										
Beam divergence (full angle, mrad)	< 1.9			< 2.0	< 2.6	< 2.3		< 2.6			< 3.0
Spatial mode (TEM ₀₀)	M ² < 1.2				M ² < 1.3				M ² < 1.4		
Polarization extinction ratio	> 100:1, vertical										
Warranty	24 month, 5000 hours										





WARNING
VISIBLE OR INVISIBLE
LASER RADIATION
Avoid Exposure to beam
Class 3B Laser Product
Classified per
IEC 60825-1:2014

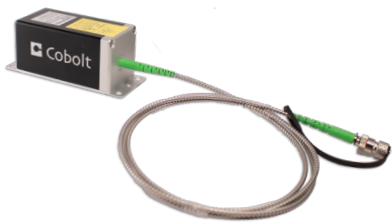
This device is
sensitive to
Electrostatic
Discharge
(ESD).

Wvl (nm)	Max.Pwr (mW)	Wvl (nm)	Max.Pwr (mW)	Wvl (nm)	Max.Pwr (mW)	Wvl (nm)	Max.Pwr (mW)
375	200	505	120	638	200	785	499
395	200	515	200	647	200	808	200
405	450	520	200	660	150	830	200
415	200	532	499	685	100	852	100
425	200	553	400	690	300	915	450
445	499	561	400	705	100	940	400
457	499	594	499	730	100	975	400
473	450	633	120	760	100	1064	400
488	499						

Cobolt o6-o1 Series

Fiber pigtailing option for the o6-o1 Series

The fiber pigtailed option for the Cobolt o6-o1 Series lasers are delivered with the fiber permanently aligned and fixed inside the sealed package using Cobolt's proprietary HTCure™ Technology, providing stable output over a large temperature range and insensitive to transport conditions.



Fiber pigtailed option Specifications

Center Wavelength (nm)	375	395	405	415	425	445	457	473	488	505	515	520	532	553	561	633
Power (mW)	25	25	75 150	60	60	50 150	50 150	50 150	30 100*	40	40 75	40	25 50 100 200*	25	25 50 100	40
Power stability over 8 hrs (%)	< 3.0															
Noise, 20 Hz – 2 MHz (RMS, %)	< 0.3															
Exit ferrule	End-cap (red boot)									No end-cap (green boot)						
Fiber Output	FC/APC, Narrow key															
Fiber Type	SM/PM															
Polarization	PER > 100:1, ± 3° w.r.t. key															
MFD (µm)	3.5 ± 0.5									4.0 ± 0.5						4.5
Standard Fiber Length	1 m															
Jacketing	Ø 3mm, stainless steel															
Warranty	Laser warranty including 12 months on fiber and workmanship															

* With end-cap in standard configuration

Center Wavelength (nm)	638	647	660	685	690	705	730	760	785	808	830	852	915	940	975	1064
Power (mW)	80	60	50	20	75	15	20	15	100	50	100	20	100	75	50	75
Power stability over 8 hrs (%)	< 3.0															
Noise, 20 Hz – 2 MHz (RMS, %)	< 0.3															
Exit ferrule	No end-cap (green boot)															
Fiber Output	FC/APC, Narrow key															
Fiber Type	SM/PM															
Polarization	PER > 100:1, ± 3° relative to key															
MFD (µm)	4.5 ± 0.5									5.5 ± 0.5					6.6 ± 0.5	
Standard Fiber Length (m)	1.0															
Jacketing	Ø 3mm, stainless steel															
Warranty	Laser warranty including 12 months on fiber and workmanship															

Model Number

WWWW-o6-XX-PPPP-CCCC

Wavelength

Power

Configuration:

01 Free beam, MLD

51 Free beam, DPL (high power)

91 Free beam, DPL

03 Fiber pigtailed, MLD

53 Fiber pigtailed, DPL (high power)

93 Fiber pigtailed, DPL

1100 = CE / CDRH Compliant

1200 = OEM Laser product

1XXX = Custom OEM laser product

Communication Interface

Communication	USB and RS-232
Standard Baudrate	115200

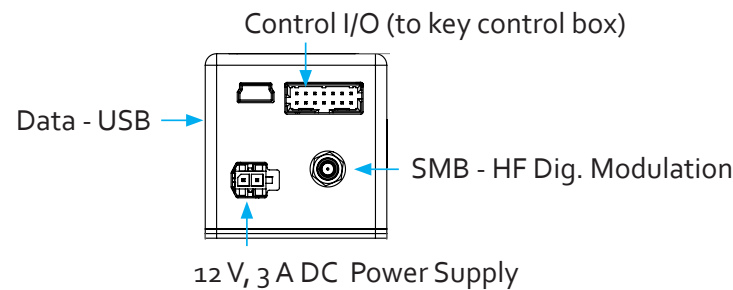
Cobolt o6-o1 Series

Modulation Specificaitons

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 (>70dB)	
Input signal - Low	0 - 0.8 V	
Input signal - High	2 - 5 V	
Input signal - Impedance	2 kΩ	
Analog power modulation		
Modulation frequency	DC - 10 Hz	DC - 1 kHz
Rise/fall time	< 10 ms	< 100 μs
Extinction ratio	> 10 000 000 : 1 (>70dB)	
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 kΩ	
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	

Electrical Interfaces

Laser Head



Molex 14 pin - Control I/O (to key control box)

Pin	Function
1	Remote Interlock
2	GND
3	GND
4	RS-232 TX
5	RS-232 RX
6	LED 1B (Laser ON)
7	LED 1A (Laser ON)
8	LED 2 (Error)
9	Digital modulation input (limited to 500 kHz)
10	GND
11	Key switch
12	Remote ON/OFF
13	GND
14	Analog modulation input

Molex 2 pin - To Key control box

Pin	Function
1	+ 12 V DC, max 3 A
2	GND

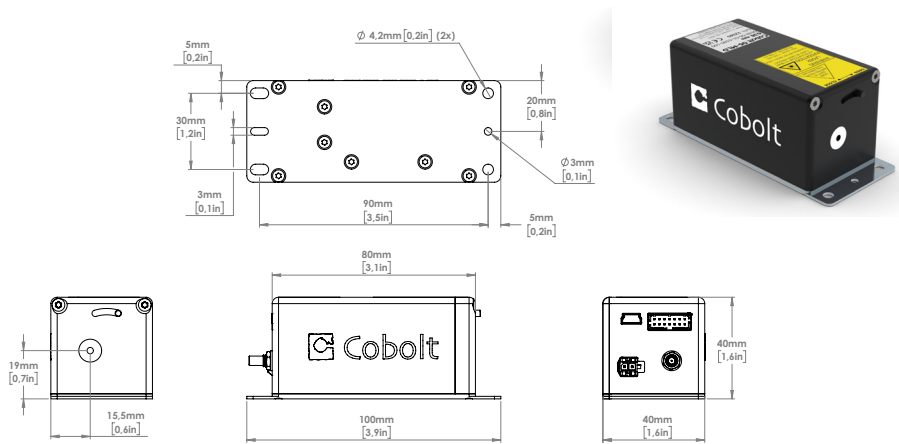
Cobolt o6-o1 Series

Operational Environment

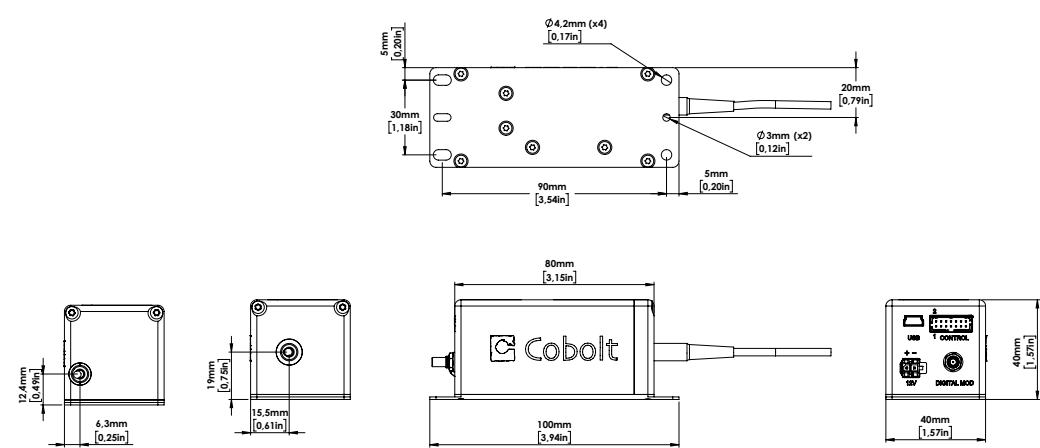
Product	o6-MLD	o6-DPL
Power supply requirements	12 VDC, 3 A	
Intended use environment	Laboratory (indoor)	
Maximum baseplate temperature	50 °C	
Ambient temperature, operation	10 to 40°C	
Ambient temperature, storage	-10 to +60°C	
Humidity	0-90% RH non-condensing	
Ambient Air pressure	950-1050 mbar	
Laser Head heat sink thermal impedance (at 40°C ambient)	< 0.4 K/W	< 0.8 K/W
Maximum heat dissipation of Laser Head	< 25 W	

Mechanical Specifications

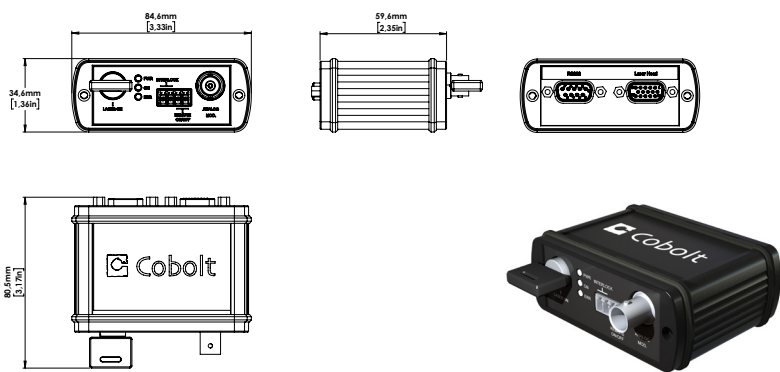
Laser head dimensions



Fiber pigtailed laser head dimensions : o6-o3 (right : o6-DPL, left : o6-MLD)



Key control box dimensions



Cobolt o6-o1 Series

Options and Accessories

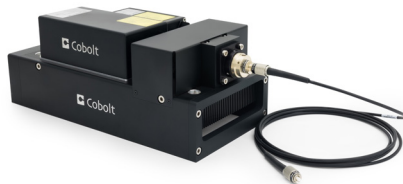
- C-FLEX Laser Combiner
- Laser head heatsink HS-03
- Fiber coupled mounting plate FIC-05
- 2 - to 1 Laser combiner for optogenetics



C-FLEX Laser Combiner



Heatsink HS-03



*2-to-1 Laser combiner for optogenetics
Cobolt o6-o1 Series with Cobolt o4-o1 series*



*2-to-1 Laser combiner for optogenetics
Two Cobolt o6-o1 Series*

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