

# Cobolt 04-01 Series

Powerful | Single Frequency | CW Diode pumped lasers



## Applications

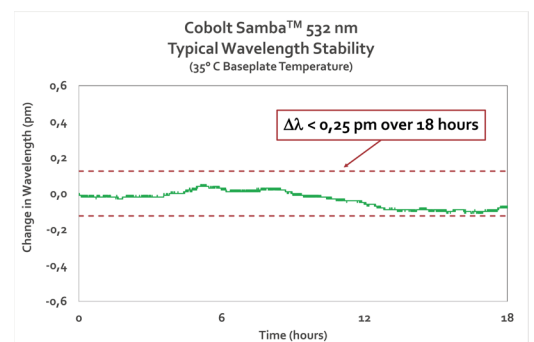
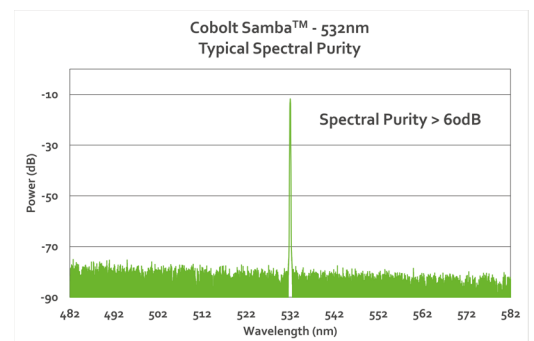
Raman Spectroscopy  
Interferometry  
DNA Sequencing  
Flow Cytometry  
Fluorescence Microscopy  
Particle Analysis

- CW power up to 400 mW in a perfect beam
- Ultra-robust, hermetically sealed packages
- True fiber pigtailed option
- Integrated AOM option
- Low noise <0.25 % rms
- 457 nm, 473 nm, 491 nm, 515 nm, 532 nm, 561 nm, 594 nm, 660 nm, and 1064 nm
- 24 months warranty, unlimited hours

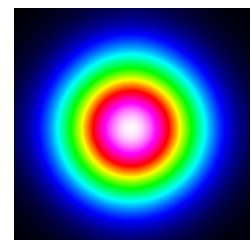
The Cobolt 04-01 Series lasers are continuous-wave diode-pumped laser (DPL) devices operating at a fixed wavelength between 457 nm and 1064 nm. The lasers are built using proprietary HTCure™ manufacturing technology for ultra-robustness in a compact hermetically sealed package which has been shown to withstand 60G mechanical shocks in operation as well as extreme storage temperature shocks (-30 to > 100 °C) without any sign of degraded performance.

The lasers emit a very high quality laser beam with stable characteristics over a wide range of operating conditions. Single frequency operation provides a narrow spectral bandwidth and long coherence length. The lasers are designed and manufactured to ensure a high level of reliability.

The Cobolt 04-01 Series lasers are intended for stand-alone use in laboratory environments or for integration as an OEM component in instruments for applications including fluorescence microscopy, flow cytometry, DNA sequencing, Raman spectroscopy, interferometry, holography and particle analysis.



Cobolt Samba™ - 532 nm  
Typical Beam Profile -  $M^2 < 1.1$



HÜBNER Photonics | Coherence Matters.



# Cobolt 04-01 Series

## Performance Specifications

	Twist™	Blues™	Calypso™ *	Fandango™	Samba™	Jive™
Wavelength (nm)	457.0 ± 0.3	473.0 ± 0.3	491.5 ± 0.3	514.4 ± 0.3	532.1 ± 0.3	561.2 ± 0.3
Available Power Levels (mW)	25 50	25 50	25 50 75 100	25 50 100 150	25 50 100 150 200 300** 400**	25 50 100 150 200**
Noise, 20 Hz - 20 MHz (pk-pk)	< 2%, typical < 1.5%		< 3%	< 2%, typical < 1.5%		
Noise, 20 Hz - 20 MHz (rms)	< 0.25%, typical < 0.15%		< 0.3%	< 0.25%, typical < 0.15%		
Long-term power stability (8 hrs ± 3°C)	< 2%		< 3%	< 2%		
Beam divergence (full angle, mrad)	< 1.2					
Spatial mode (TEM <sub>00</sub> )	M <sup>2</sup> < 1.1					
Beam diameter at aperture (µm)	700 ± 50					
Spectral linewidth (FWHM)	< 1 MHz					
Wavelength stability (after warm-up)	< 1 pm over ± 2 °C and 8 hrs***					
Beam symmetry at aperture	>0.95 : 1					
Beam pointing stability (over 10-40°C)	< 10 µrad / °C , typical 5 µrad / °C					
Polarization ratio (linear, vertical)	> 100:1					
Warranty	24 months, unlimited hours		24 months, 5000 hrs	24 months, unlimited hours		

	Mambo™	Flamenco™	Rumba™
Wavelength (nm)	593.6 ± 0.3	659.6 ± 0.3	1064.2 ± 0.6
Available Power Levels (mW)	25 50 100	100**	400**
Noise, 20 Hz - 20 MHz (pk-pk)	< 3%	< 1 %	
Noise, 20 Hz - 20 MHz (rms)	< 0.3%	< 0.1%	
Long-term power stability (8 hrs ± 3°C)	< 3%	< 2%	
Beam divergence (full angle, mrad)	< 1.3	< 1.5	< 1.6
Spatial mode (TEM <sub>00</sub> )	M <sup>2</sup> < 1.1		M <sup>2</sup> < 1.2
Beam diameter at aperture (μm)	700 ± 50		1000 ± 50
Spectral linewidth (FWHM)	< 1 MHz		
Wavelength stability (after warm-up)	< 1 pm over ± 2 °C and 8 hrs***		
Beam symmetry at aperture	>0.95 : 1		
Beam pointing stability (over 10-40°C)	< 10 μrad / °C, typical 5 μrad / °C		
Polarization ratio (linear, vertical)	> 100:1		
Warranty	24 months, unlimited hours		

\* Cobolt Calypso™ is only available with the 04-02 option and Gen 4 controllers.

\*\* Wavelength and power level only available as model 04-51.

\*\*\* Cobolt 04-02 option available for all Cobolt 04-01 series laser up to 594 nm. The 04-02 option delivers enhanced wavelength stability under varying operating conditions, < 2 pm over the entire operating temperature range of 20° - 50°C.

\*\*\*\* Integrated Raman filter option (-x30) for ensured spectral purity of > 80 dB at ± > 0.3 nm from the main peak available for select wavelengths including Cobolt Twist™, Blues™, Fandango™, Samba™, Jive™ and Rumba™.

## Model Number

WWWW-04-XX-PPPP-CCC	Wavelength	Power	Configuration:
01	Free beam		300 = Gen 4 Controller, RS-232, CE / CDRH
02	Free beam (Enhanced WL stability)***		400 = Gen 4 Controller, RS-232, OEM
03	Fiber pigtailed		500 = Gen 5b Controller, RS-232, CE / CDRH
05	Integrated AOM		600 = Gen 5b Controller, RS-232, OEM
51	Free beam (ring laser)**		700 = Gen 5b Controller, USB, CE / CDRH
			800 = Gen 5b Controller, USB, OEM
			x30 = Integrated Raman filter****
			xxx = OEM customization



Cobolt 04-03  
Fiber pigtailed option



Cobolt 04-05  
Integrated AOM option



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



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



Wvl (nm)	Max.Pwr (mW)
457	400
473	400
491	400
515	400
532	499
561	400
594	400
660	400
1064	499



# Cobolt 04-01 Series

## True fiber pigtailed option for 04-01 Series diode pumped lasers

The fiber pigtailed option for the Cobolt 04-01 Series is delivered with the fiber permanently aligned and fixed inside the hermetically sealed package using Cobolt's proprietary HTCure™ Technology, providing stable output over a large temperature range and insensitive to transport conditions.



Cobolt 04-03  
Fiber pigtailed option

## Cobolt 04-03 : Fiber pigtailed option - Specifications

	Blues™	Calypso™	Fandango™	Samba™	Jive™	Mambo™
Available Power (mW) - Out of fiber	35	100	100	150	100	75
Power stability (8 hrs ± 3°C)	< 3%					
Nominal Numerical Aperture (NA)	0.095					
Fiber Output	FC/APC, 8°, non-collimated					
Fiber Type	SM/PM					
Fiber end cap	Yes		No			
Polarization	PER > 100:1, ± 2°					
Standard Fiber Length	1 m					
Jacketing	Ø 3mm, Stainless Steel					
Warranty	Laser warranty and 12 months on fiber and workmanship					

## Cobolt 04-01 Series diode pumped lasers with integrated AOM

The integrated Acousto Optic Modulator (AOM) option for Cobolt 04-01 Series delivers high speed modulation capabilities for diode pumped lasers (DPL) in a single package without the need for time consuming external alignment. The system includes the Laser head, laser controller, AOM driver, power supply and cables.



Cobolt 04-05  
Integrated AOM option

## Cobolt 04-05 : Integrated AOM option - Specifications

	Twist™	Blues™	Calypso™	Fandango™	Samba™	Jive™	Mambo™	Flamenco™
Available Power Levels (mW)	40	40	80	120	260	160	80	80
Rise/Fall Time(ns)	< 200							
Modulation Frequency	DC- 3 MHz							
Extinction Ratio (free space)	> 30 dB @ DC							
Warranty	24 months on laser, 12 months on workmanship							

## Operational Environment : Cobolt 04-01 Series

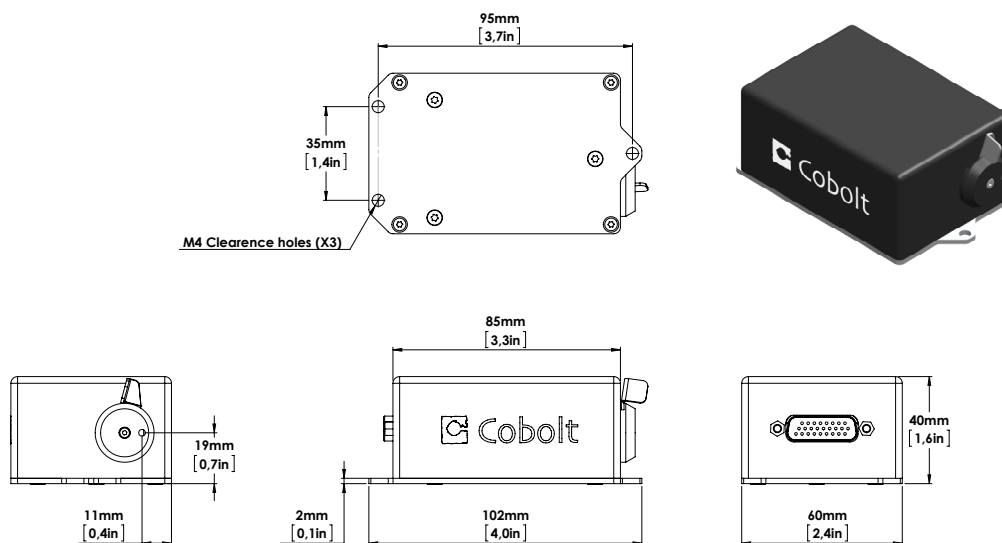
Power supply requirements	12 VDC, 5 A
Maximum laser head baseplate temperature	50 °C
Ambient temperature, operation	10 - 40°C
Ambient temperature, storage	-10 -> +60°C
Humidity	0-90% RH non-condensing
Ambient Air pressure	950-1050 mbar
Laser Head heat sink thermal impedance at 40°C ambient	0.6 K/W or 0.4 K/W *
Maximum heat dissipation of Laser Head	< 35 W, typical < 15 W

\* For Calypso™ 100 mW, Samba™ 300 mW and 400 mW, Jive™ 200 mW, and Mambo™ 100 mW

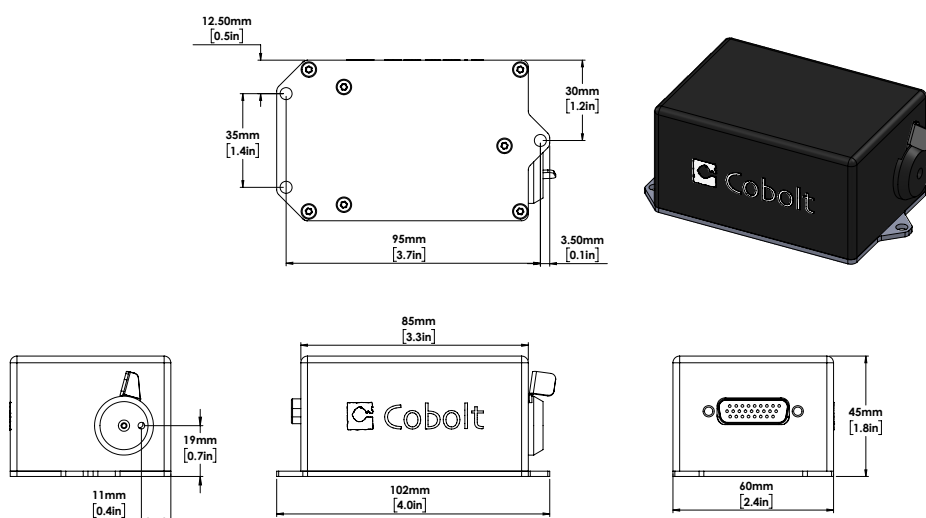
# Cobolt 04-01 Series

## Mechanical Specifications

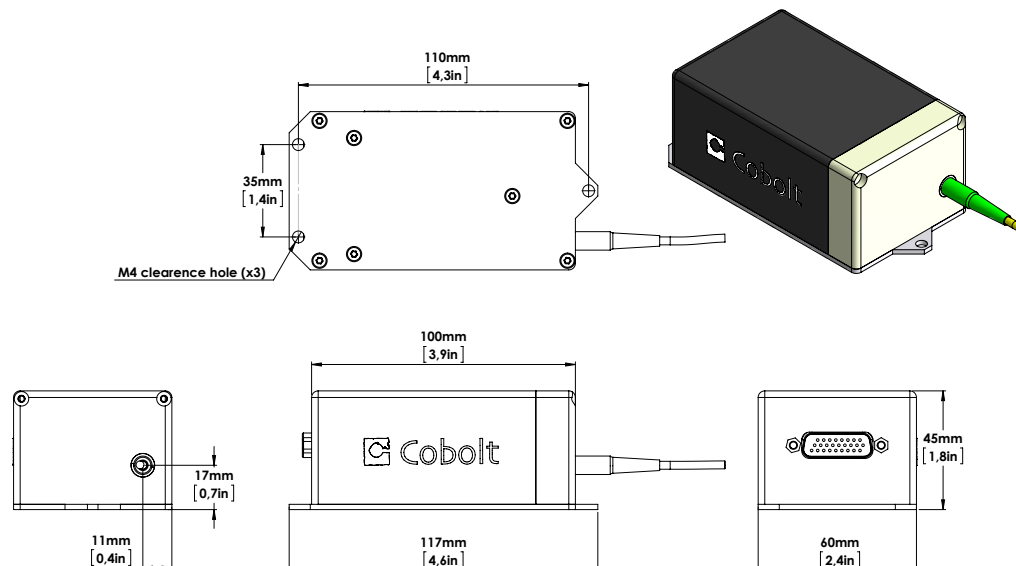
### Laser Head dimensions : 04-01



### Laser Head dimensions : 04-02



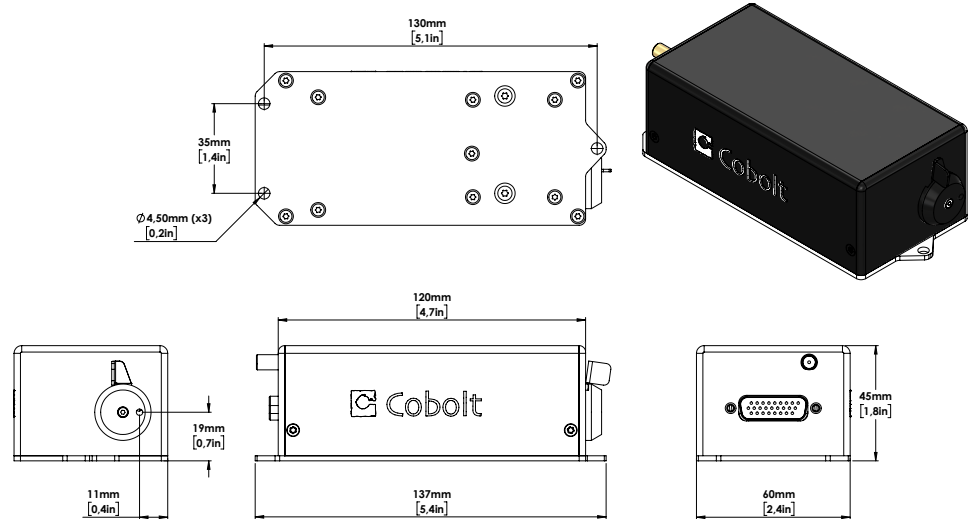
### Laser head with fiber pigtail : 04-03



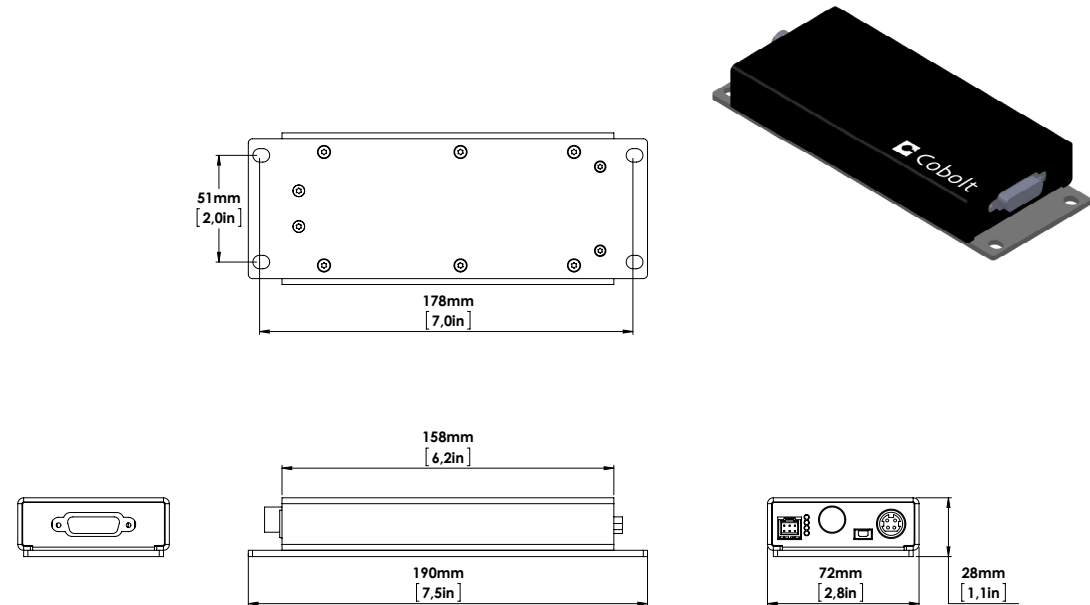
# Cobolt o4-01 Series

## Mechanical Specifications (cont.)

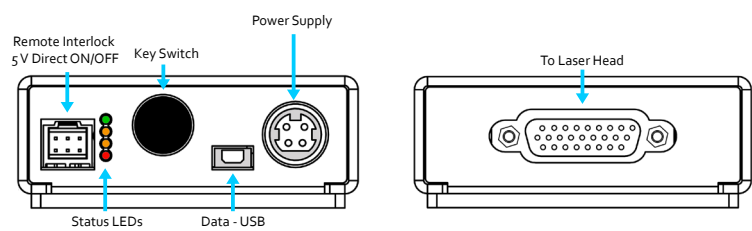
Laser head with integrated AOM dimensions : o4-05



## Laser Controller



## Electrical Interfaces



### Molex 6 pin - Controller I/O

Pin	Function
1	Remote interlock
2	0 V – Ground
3	Direct On/Off (+5 V Input)
4	--
5	LED 1 (LASER ON)
6	LED 2 (ERROR)

## Communication Interface

Communication	USB or RS-232
Standard Baudrate	115200

# Cobolt o4-01 Series

## Options and Accessories

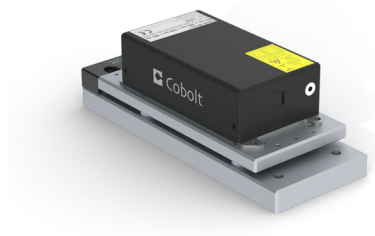
- C-FLEX Laser combiner
- Laser head heatsink HS-03
- TEC Plate for active baseplate temperature control
- 2 - to 1 Laser combiner for optogenetics



C-FLEX Laser Combiner



Heatsink HS-03



TEC-Plate for active baseplate temperature control



2-to1- Combiner for optogenetics

## Headquarters

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