

Cobolt 04-01 Series

Powerful | Single Frequency | CW Diode pumped lasers



Applications

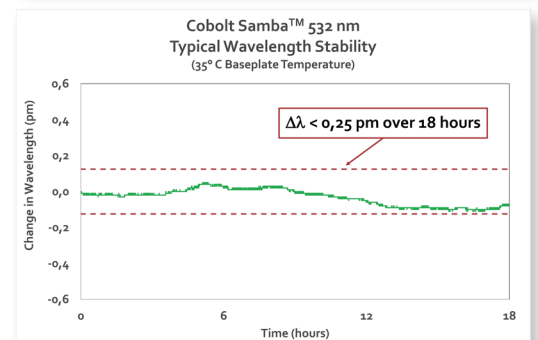
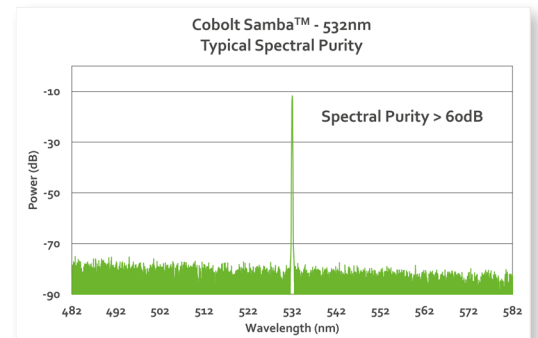
- Raman Spectroscopy
- Interferometry
- DNA Sequencing
- Flow Cytometry
- Fluorescence Microscopy
- Particle Analysis

- CW power up to 400 mW in a perfect beam
- Stable single frequency operation over wide temperature range
- Ultra-robust, hermetically sealed packages
- True fiber pigtailed option
- Integrated AOM option
- Low intensity 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

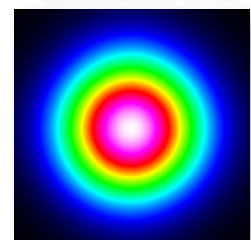
The Cobolt 04-01 Series lasers are continuous-wave diode-pumped laser (DPL) devices operating at a fixed wavelength between 457 nm and 1064 nm. The lasers are built using proprietary HTCure™ manufacturing technology for ultra-robustness in a compact hermetically sealed package which has been shown to 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

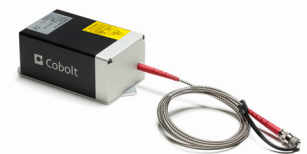


Cobolt 04-01 Series

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 | 50 75 | 50 100 150 | 50 100 150 200 300** 400** | 50 75 100 150** 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 ₀₀) | M ² < 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) | 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 ₀₀) | M ² < 1.1 | | M ² < 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 | | |

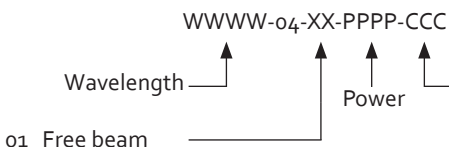


Cobolt 04-03
Fiber pigtailed option



Cobolt 04-05
Integrated AOM option

Model Number



- 01 Free beam
- 02 Free beam (Enhanced WL stability)***
- 03 Fiber pigtailed
- 05 Integrated AOM
- 51 Free beam (ring laser)**
- 53 Fiber pigtailed (ring laser)**
- 11 Integrated optical isolator - OEM only

- Configuration:
- 300 = Gen 4 Controller, RS-232, CE / CDRH
 - 400 = Gen 4 Controller, RS-232, OEM
 - 500 = Gen 5b Controller, RS-232, CE / CDRH
 - 600 = Gen 5b Controller, RS-232, OEM
 - 700 = Gen 5b Controller, USB, CE / CDRH
 - 800 = Gen 5b Controller, USB, OEM
 - x30 = Integrated Raman filter****
 - xxx = OEM customization

* 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 baseplate temperature range of 20° - 50°C.

**** Integrated Raman filter option (-x30) for ensured spectral purity of > 80 dB at ± > 0.5 nm from the main peak available for select wavelengths including Cobolt Twist™, Blues™, Fandango™, Samba™, Jive™ and Rumba™.



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



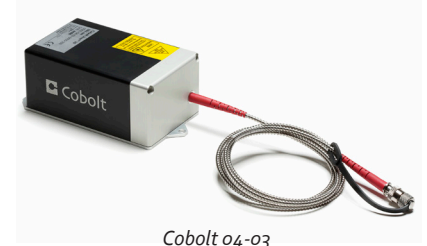
| Wvl (nm) | Max.Pwr (mW) |
|----------|--------------|
| 457 | 400 |
| 473 | 400 |
| 491 | 400 |
| 515 | 400 |
| 532 | 499 |
| 561 | 400 |
| 594 | 400 |
| 660 | 400 |
| 1064 | 499 |



Cobolt 04-01 Series

True fiber pigtailed option for 04-01 Series 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

| | Twist™ | Blues™ | Fandango™ | Samba™ | Jive™ | Mambo™ | Flamenco™ | Rumba™ | |
|--|---|----------|-----------------|-----------------|-----------------|----------------------|----------------|---------------|-----------|
| Available Power (mW) (Out of fiber) | 25 | 25 35 | 25 50 100 | 25 50 100 | 150 ** 200** | 25, 50 75, 100 ** | 25 50 75 | 50** 200** | |
| Fiber end cap | Yes | | No | | Yes | No | | | |
| Power stability (8 hrs ± 3°C) | < 3% | | | | | | | | |
| Mode Field Diameter (µm) | 3.5 ± 0.5 | | | 4.0 ± 0.5 | | | | 4.5 ± 0.5 | 6.6 ± 0.5 |
| Fiber Output | FC/APC, 8°, non-collimated | | | | | | | | |
| Fiber Type | SM/PM | | | | | | | | |
| Polarization | PER > 100:1, ± 3° | | | | | | | | |
| Standard Fiber Length | 1 m | | | | | | | | |
| Jacketing | Ø 3mm, Stainless Steel | | | | | | | | |
| Available configuration | OEM or CE/CDRH | | | | | | | | |
| Warranty | Laser warranty and 12 months on fiber and workmanship | | | | | | | | |

** Wavelength and power level only available as model 04-53.

Cobolt 04-01 Series 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™ | Fandango™ | Samba™ | Jive™ | Mambo™ | Flamenco™ |
|-------------------------------|--|--------|-----------|--------|-------|--------|-----------|
| Available Power Levels (mW) | 40 | 40 | 120 | 320 | 160 | 80 | 80 |
| Rise/Fall Time(ns) | < 200 | | | | | | |
| Modulation Frequency | DC- 3 MHz | | | | | | |
| Extinction Ratio (free space) | > 30 dB @ DC | | | | | | |
| Available configuration | OEM or CE/CDRH | | | | | | |
| Warranty | 24 months on laser, 12 months on workmanship | | | | | | |

Cobolt 04-01 Series laser with integrated optical isolator

The integrated optical isolator for Cobolt 04-01 Series prevents unwanted disturbance from reflected light, making the laser performance immune to optical feedback. The optional optical isolator does not add to the footprint of the laser head and replaces the mechanical shutter, therefore the integrated optical isolator is available on lasers with OEM configurations only.



Cobolt 04-11
Integrated isolator - OEM Only

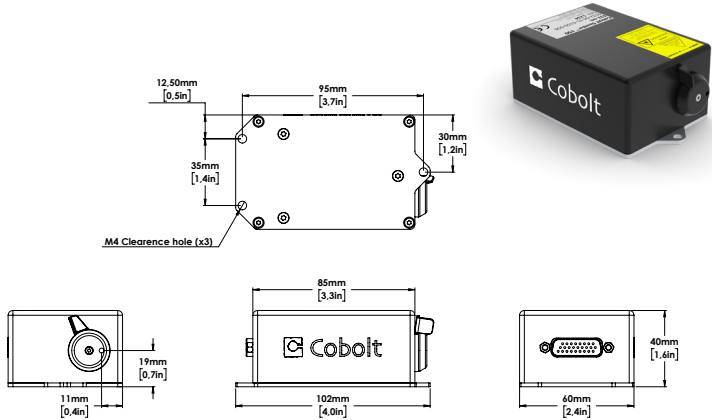
Cobolt 04-11 : Integrated optical isolator option - Specifications

| | Twist™ | Blues™ | Fandango™ | Samba™ | Jive™ | Mambo™ |
|-----------------------------|---|--------|-----------|--------|-------|--------|
| Available Power Levels (mW) | 40 | 40 | 120 | 320 | 160 | 75 |
| Maximum optical feedback | 100 % | | | | | |
| Available configuration | OEM Only | | | | | |
| Warranty | Laser warranty and 12 months on fiber and workmanship | | | | | |

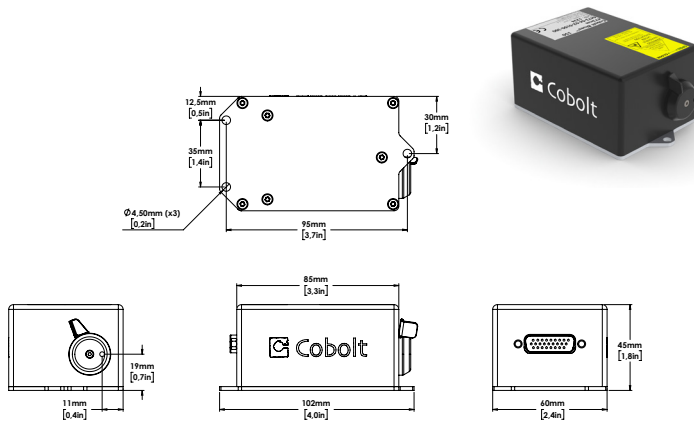
Cobolt 04-01 Series

Mechanical Specifications

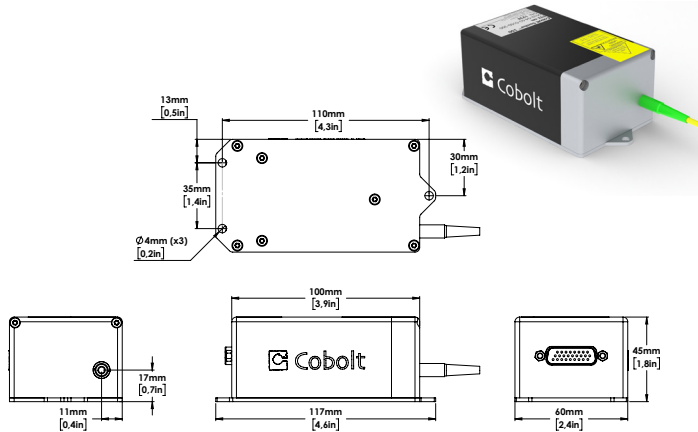
Laser Head dimensions : 04-01



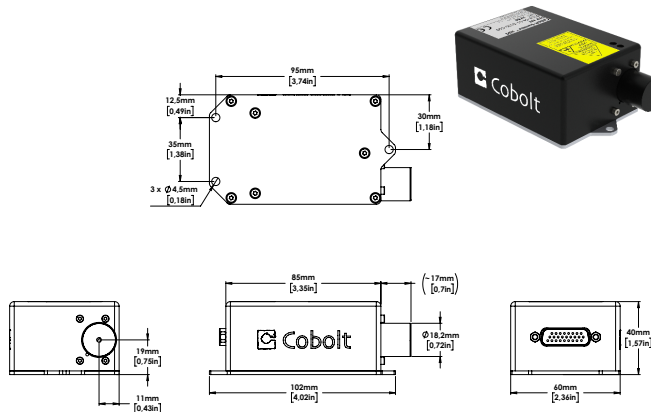
Laser Head dimensions : 04-02



Laser head with fiber pigtail : 04-03



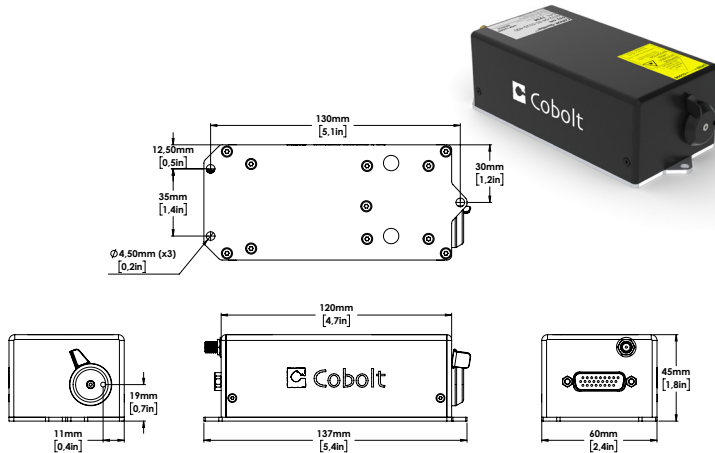
Laser head with integrated optical isolator : 04-11



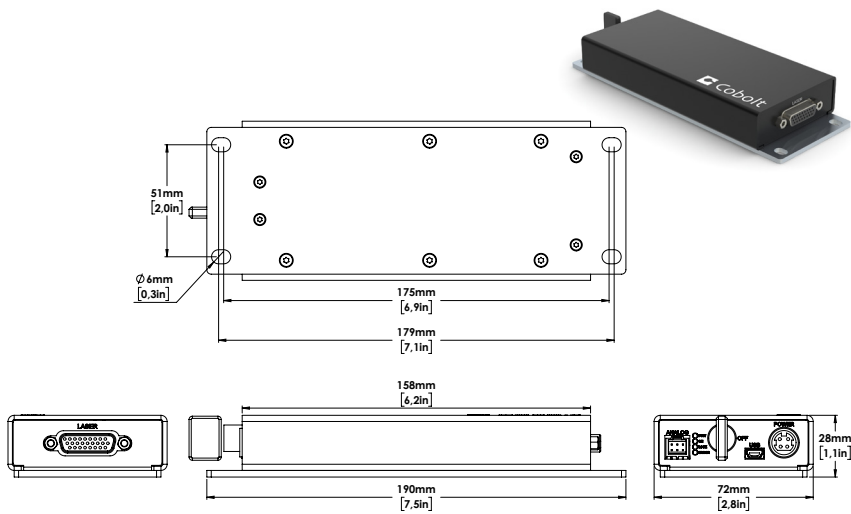
Cobolt 04-01 Series

Mechanical Specifications (cont.)

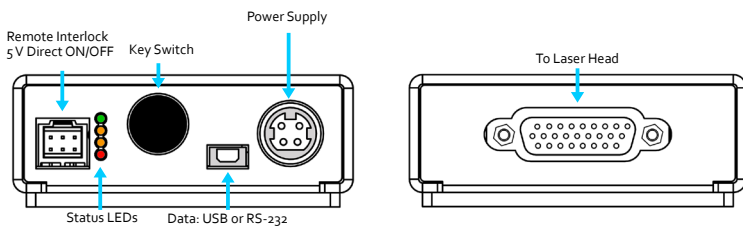
Laser head with integrated AOM dimensions : 04-05



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) |

Operational Environment

| | |
|--|-------------------------|
| 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

Communication Interface

| | |
|-------------------|---------------|
| Communication | USB or RS-232 |
| Standard Baudrate | 115200 |

Cobolt 04-01 Series

Options and Accessories

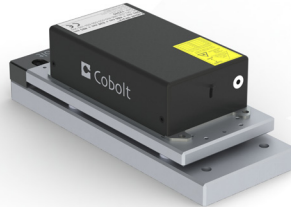
- C-FLEX Laser combiner
- Laser head heatsink HS-03
- TEC Plate for active baseplate temperature control
- 2 - to 1 Laser combiner for optogenetics



C-FLEX Laser Combiner



Heatsink HS-03



TEC-Plate for active baseplate temperature control



2-to1-Combiner for optogenetics

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