

<p>Dodavatel:</p> <p style="text-align: center;"><b>OptiXs</b></p> <p><b>OptiXs, s.r.o.</b>  Křivoklátská 37/3  19900 Praha  Česká republika  IČO: 02016770, DIČ: CZ02016770,  Telefon:  Fax:  Mobil:  E-mail:  WWW:</p>	<p>Odběratel - sídlo: <b>Technická univerzita v Liberci</b>  <b>Studentská 1402/2</b>  <b>46001 Liberec</b>  <b>Česká republika</b></p> <p>IČO: 46747885, DIČ: CZ46747885</p>
<p>Forma úhrady:  Způsob dopravy:</p> <p>Termín:  Vystaveno: 30.10.2023</p>	<p>Poštovní adresa:</p> <p style="text-align: center;"><b>Technická univerzita v Liberci</b>  <b>Studentská 1402/2</b>  <b>46001 Liberec</b>  <b>Česká republika</b></p> <p>Místo určení:</p> <p>Číslo poptávky:</p>

Označení dodávky	Množství MJ	Sleva [%]	Cena za MJ	Sazba DPH	Základ [Kč]	Celkem [Kč]
CW diode pumped laser, 04-03 series, 561 nm, 100 mW, fiber pigtailed	1,00 ks		222 495,00	21,00	222 495,00	269 218,95
0561-04-03-0100-500						
CW diode pumped laser, 04-03 series, 660 nm, 50 mW, fiber pigtailed	1,00 ks		237 165,00	21,00	237 165,00	286 969,65
0660-04-53-0050-500						

## Rekapitulace DPH v Kč

Základ 0%	0,00	DPH 0%	0,00
Základ 10%	0,00	DPH 10%	0,00
Základ 15%	0,00	DPH 15%	0,00
Základ 21%	459 660,00	DPH 21%	96 528,60
Celkem	459 660,00		96 528,60

Základ [Kč]	<b>459 660,00</b>
Celkem [Kč]	<b>556 188,60</b>

## Registrace:

Registrováno u Městský soud v Praze pod číslem C 212818 / Registered at City Court in Prague under n. 212818

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Razítko a podpis

## **Veřejná zakázka:120\_JZ\_OP JAK\_Koherentní laser (FM-004)**

### **Technický popis**

#### **Laser 1: Laser série 04-01 Jive s označením 0561-04-53-0100-500 od výrobce firmy Cobolt**

Konfigurace: fiber pigtailed laser

Vlnová délka:  $561,2 \pm 0,3\text{nm}$

Režim laseru: kontinuální (CW)

Výstup: optické PM vlákno s FC/APC konektorem

Optický výkon na výstupu z vlákna:  $>100\text{mW}$

Stabilita výkonu (alespoň 8 hodin)  $< 2\%$

Spektrální šířka čáry (FWHM: Plná šířka v polovině maxima)  $< 1\text{MHz}$

Polarizace: extinkční poměr (PER)  $> 100:1$

Obsahuje kontrolér a veškerou elektroniku k provozování laseru: ANO

#### **Laser 2: Laser série 04-01 Flamenco s označením 0660-04-53-0050-500 od výrobce firmy Cobolt**

Konfigurace: fiber pigtailed laser

Vlnová délka:  $659,6 \pm 0,3\text{nm}$

Režim laseru: kontinuální (CW)

Výstup: optické PM vlákno s FC/APC konektorem

Optický výkon na výstupu z vlákna:  $>50\text{mW}$

Stabilita výkonu (alespoň 8 hodin)  $< 2\%$

Spektrální šířka čáry (FWHM: Plná šířka v polovině maxima)  $< 1\text{MHz}$

Polarizace: extinkční poměr (PER)  $> 100:1$

Obsahuje kontrolér a veškerou elektroniku k provozování laseru: ANO

Podrobné specifikace obou laserů jsou v příloženém datovém listu výrobce.

# Cobolt 04-01 Series

Powerful | Single Frequency | CW Diode pumped lasers



## Applications

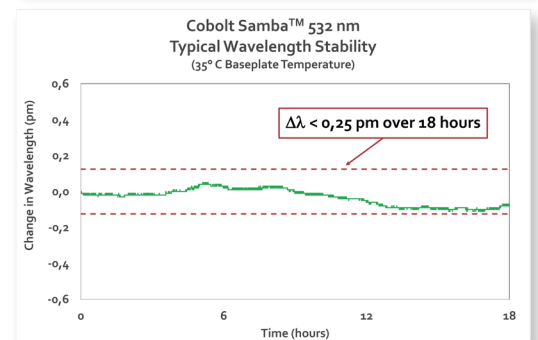
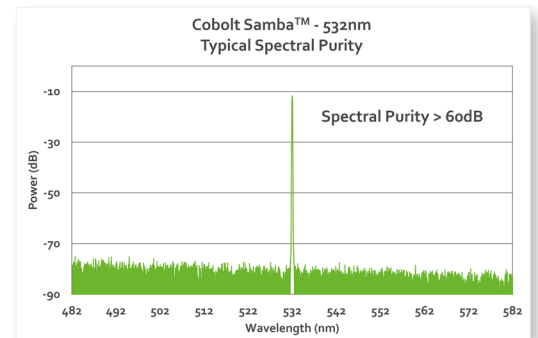
- Raman Spectroscopy
- Interferometry
- DNA Sequencing
- Flow Cytometry
- Fluorescence Microscopy
- Particle Analysis

- 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

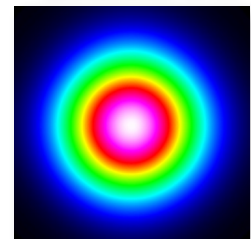
The Cobolt 04-01 Series lasers are continuous-wave diode-pumped laser (DPL) devices operating at a fixed wavelength between 457 nm and 1064 nm. The lasers are built using proprietary HTCure™ manufacturing technology for ultra-robustness in a compact hermetically sealed package which has been shown to 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 -  $M^2 < 1.1$



# 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 <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)	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		

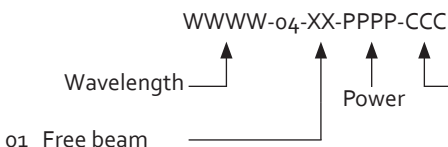


Cobolt 04-03  
Fiber pigtailed option



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 ± 0.3 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	260	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

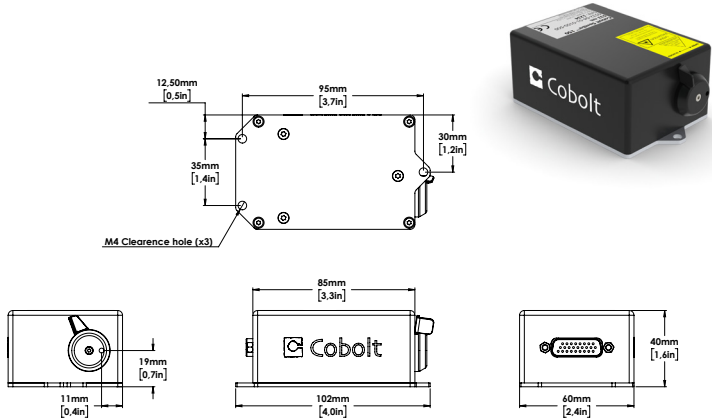
## Cobolt 04-11 : Integrated optical isolator option - Specifications

	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					

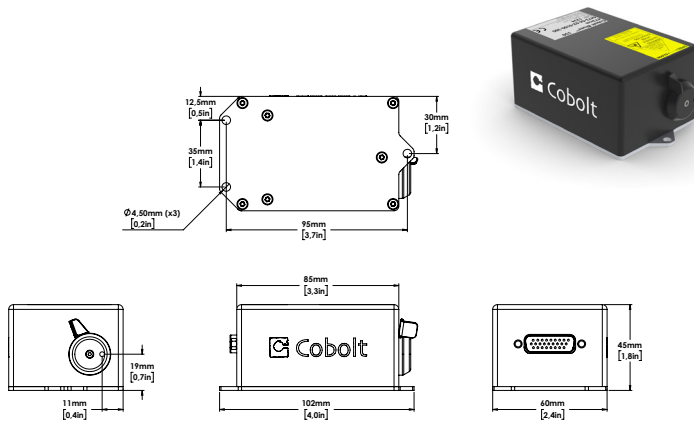
# Cobolt 04-01 Series

## Mechanical Specifications

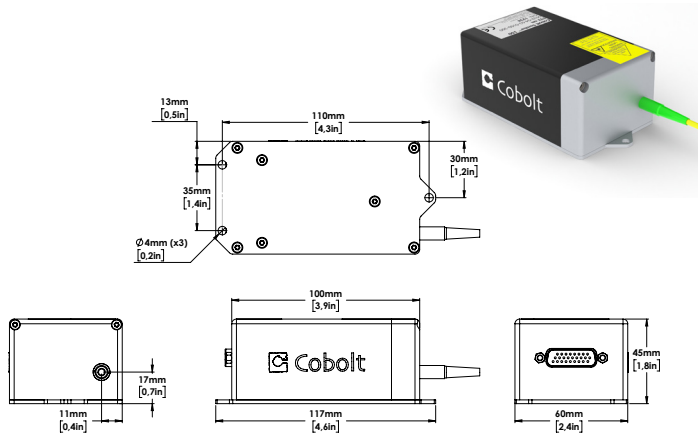
### Laser Head dimensions : 04-01



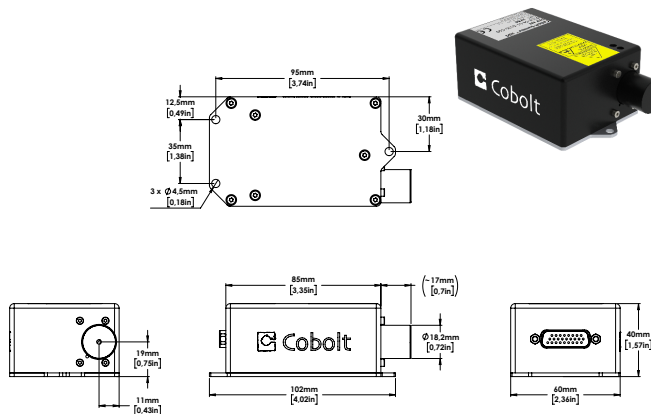
### Laser Head dimensions : 04-02



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



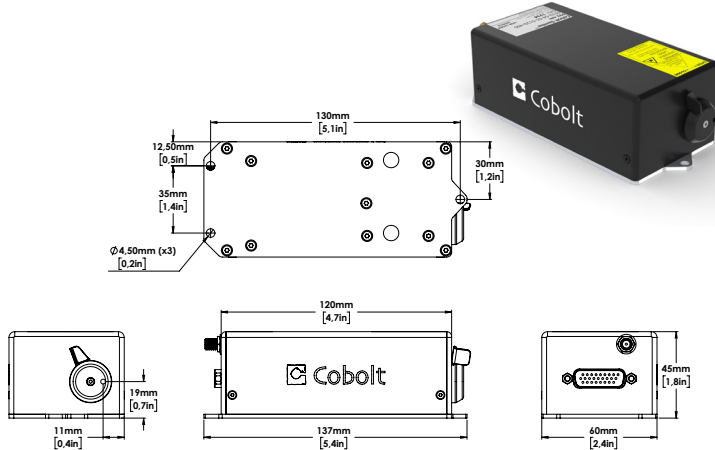
### Laser head with integrated optical isolator : 04-11



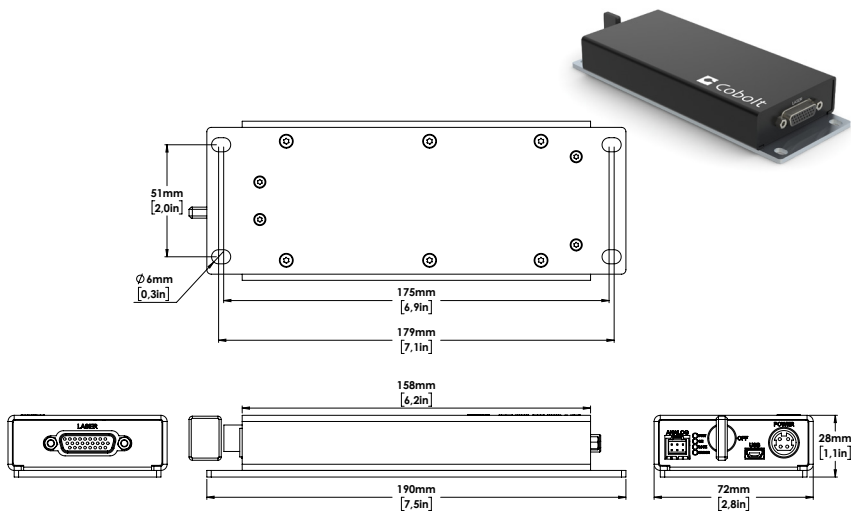
# Cobolt 04-01 Series

## Mechanical Specifications (cont.)

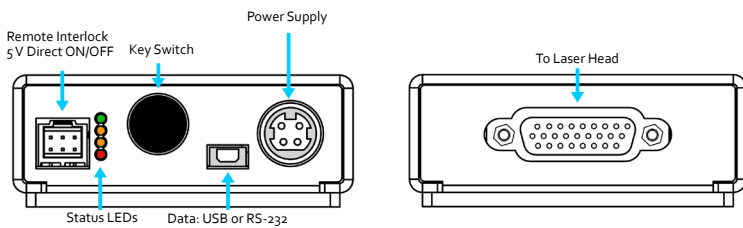
Laser head with integrated AOM dimensions : 04-05



### 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 o4-01 Series

## Options and Accessories

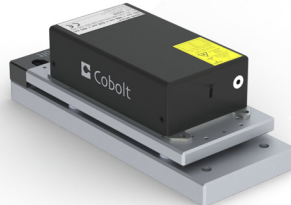
- C-FLEX Laser combiner
- Laser head heatsink HS-03
- TEC Plate for active baseplate temperature control
- 2 - to 1 Laser combiner for optogenetics



C-FLEX Laser Combiner



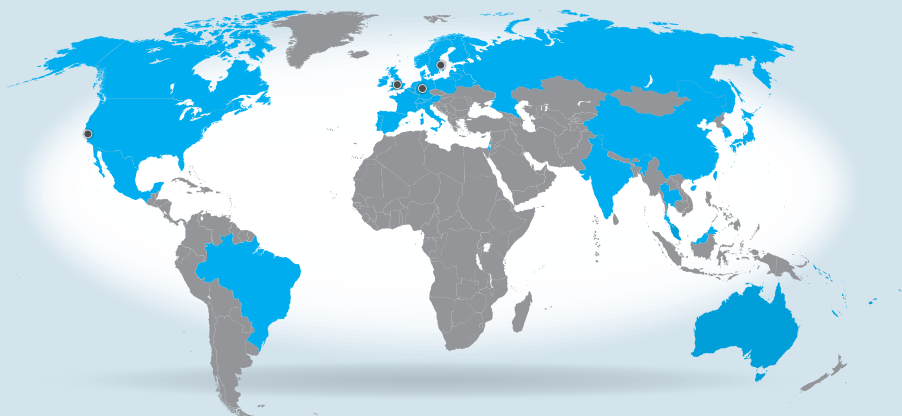
Heatsink HS-03



TEC-Plate for active baseplate temperature control



2-to1-Combiner for optogenetics



## Our Locations

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