

## Industrial Femtosecond Lasers

Maximum output of 120 W (IR)  
or 50 W (UV)

NEW

Single-shot – 10 MHz repetition rate

Pulse-on-demand and  
BiBurst for pulse control

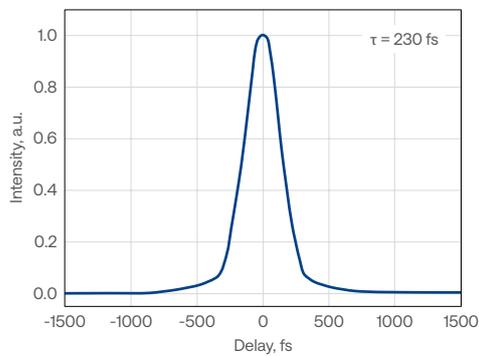
Automated harmonics up to the 5<sup>th</sup>  
and wavelength-tunable extensions

Air-cooled or water-cooled models

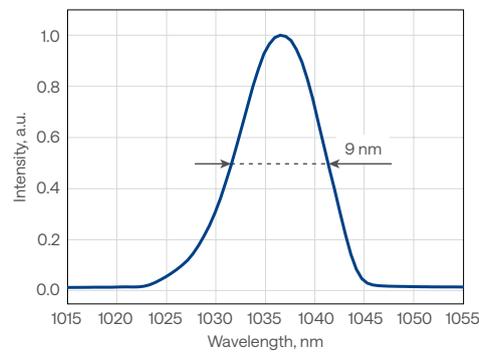


CARBIDE-CB3

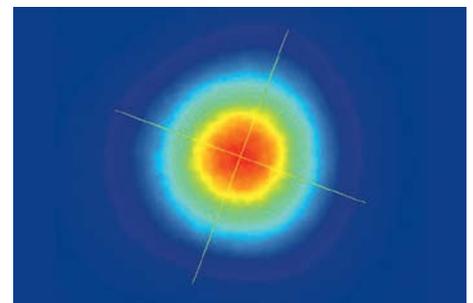
CARBIDE-CB3  
Typical pulse duration



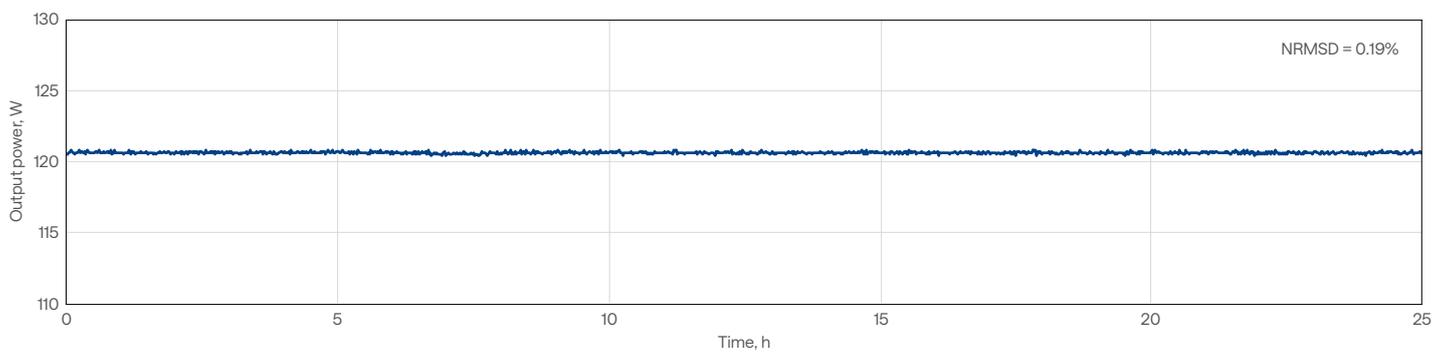
CARBIDE-CB3  
Typical spectrum



CARBIDE-CB3  
Typical beam profile



CARBIDE-CB3-120W  
Long-term power stability



Model	CB3-20W	CB3-40W	CB3-40W-10MHz	CB3-80W	CB3-120W
-------	---------	---------	---------------	---------	----------

## OUTPUT CHARACTERISTICS

Cooling method	Water-cooled				
Center wavelength	1030 ± 10 nm				
Maximum output power	20 W	40 W		80 W	120 W
Pulse duration <sup>1)</sup>	< 250 fs			< 350 fs <sup>2)</sup>	< 250 fs
Pulse duration tuning range	250 fs – 10 ps			350 fs – 10 ps	250 fs – 10 ps
Maximum pulse energy	0.4 mJ		0.2 mJ	0.8 mJ	2 mJ
Repetition rate	Single-shot – 1 MHz	Single-shot – 1 MHz (2 MHz on request)	Single-shot – 10 MHz	Single-shot – 2 MHz	
Pulse selection	Single-shot, pulse-on-demand, any fundamental repetition rate division				
Polarization	Linear, vertical; 1:1000				
Beam quality, M <sup>2</sup>	< 1.2				
Beam diameter <sup>3)</sup>	3.9 ± 0.4 mm			4.2 ± 0.4 mm	5.1 ± 0.7 mm
Beam pointing stability	< 20 µrad/°C				
Pulse energy control	FEC <sup>4)</sup>		Attenuator <sup>5)</sup>	FEC <sup>4)</sup>	
Pulse picker leakage	< 0.25%		< 0.5%	< 0.25%	
Pulse-to-pulse energy stability, 12 h <sup>6)</sup>	< 0.5%				
Long-term power stability, 100 h <sup>6)</sup>	< 0.5%				

## MAIN OPTIONS

Oscillator output <sup>7)</sup>	< 0.5 W, 120 – 250 fs, 1030 ± 10 nm, ≈ 65 MHz				
Harmonic generator <sup>8)</sup>	515 nm, 343 nm, 257 nm, or 206 nm; refer to CARBIDE HG				
Optical parametric amplifier <sup>9)</sup>	UV – MIR; refer to I-OPA or ORPHEUS				
BiBurst option	Tunable GHz and MHz burst with burst-in-burst capability; refer to BiBurst				

## PHYSICAL DIMENSIONS

Laser head (L × W × H)	633 × 350 × 174 mm				
Chiller (L × W × H)	585 × 484 × 221 mm		680 × 484 × 307 mm		
24 V DC power supply (L × W × H)	352 × 195 × 75 mm				376 × 449 × 88 mm

## ENVIRONMENTAL AND UTILITY REQUIREMENTS

Operating temperature	15 – 30 °C				
Relative humidity	< 80% (non-condensing)				
Electrical requirements	Laser	100 V AC, 7 A – 240 V AC, 3 A; 50 – 60 Hz	100 V AC, 12 A – 240 V AC, 5 A; 50 – 60 Hz	100 V AC, 15 A – 240 V AC, 7 A; 50 – 60 Hz	
	Chiller	100 – 230 V AC; 50 – 60 Hz	200 – 230 V AC; 50 – 60 Hz		
Rated power	Laser	1000 W	1000 W	2000 W	
	Chiller	1400 W	2000 W		
Power consumption	Laser	500 W	900 W	1500 W	
	Chiller	1000 W	1300 W	1800 W	

<sup>1)</sup> Assuming a Gaussian pulse shape.

<sup>2)</sup> Pulse duration can be reduced to < 250 fs if a pulse peak intensity of > 50 GW/cm<sup>2</sup> is tolerated by the customer setup.

<sup>3)</sup> FW 1/e<sup>2</sup>, using maximum pulse energy.

<sup>4)</sup> Fast energy control (FEC) provides fast, full-scale individual pulse energy control; an external analog control input is available.

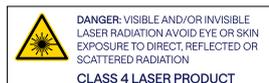
<sup>5)</sup> Waveplate-based variable optical attenuator (VOA); an external analog control input is available. FEC is available for repetition rates up to 2 MHz.

<sup>6)</sup> Under stable environmental conditions. Expressed as normalized root mean squared deviation (NRMSD).

<sup>7)</sup> Available simultaneously, requires a scientific interface. Contact sales@lightcon.com for more details or customized solutions.

<sup>8)</sup> Integrated. For an external harmonic generator, refer to HIRO.

<sup>9)</sup> Integrated. For more details and stand-alone OPAs, refer to wavelength-tunable sources.



Model	CB5-6W	CB5-5W	CB5-SP
-------	--------	--------	--------

**OUTPUT CHARACTERISTICS**

Cooling method	Air-cooled <sup>1)</sup>		
Center wavelength	1030 ± 10 nm		
Maximum output power	6 W	5 W	
Pulse duration <sup>2)</sup>	< 290 fs		< 190 fs
Pulse duration tuning range	290 fs – 20 ps		190 fs – 20 ps
Maximum pulse energy	100 µJ	83 µJ	100 µJ
Repetition rate	Single-shot – 1 MHz		
Pulse selection	Single-shot, pulse-on-demand, any fundamental repetition rate division		
Polarization	Linear, vertical; 1:1000		
Beam quality, M <sup>2</sup>	< 1.2		
Beam diameter <sup>3)</sup>	2.1 ± 0.4 mm		
Beam pointing stability	< 20 µrad/°C		
Pulse energy control	Attenuator <sup>4)</sup>	AOM <sup>5)</sup>	Attenuator <sup>4)</sup>
Pulse picker leakage	< 2%	< 0.1%	< 2%
Pulse-to-pulse energy stability, 12 h <sup>6)</sup>	< 0.5%		
Long-term power stability, 100 h <sup>6)</sup>	< 0.5%		

**MAIN OPTIONS**

Oscillator output	n/a
Harmonic generator <sup>7)</sup>	515 nm, 343 nm, 257 nm, or 206 nm; refer to CARBIDE HG
Optical parametric amplifier <sup>8)</sup>	UV – MIR; refer to I-OPA or ORPHEUS
BiBurst option	n/a

**PHYSICAL DIMENSIONS**

Laser head (L × W × H)	633 × 324 × 162 mm
Chiller	Not required
24 V DC power supply (L × W × H)	220 × 95 × 46 mm

**ENVIRONMENTAL AND UTILITY REQUIREMENTS**

Operating temperature	17 – 27 °C
Relative humidity	< 80% (non-condensing)
Electrical requirements	100 V AC, 3 A – 240 V AC, 1.3 A; 50 – 60 Hz
Rated power	300 W
Power consumption	150 W

<sup>1)</sup> Water-cooled version available on request.

<sup>2)</sup> Assuming a Gaussian pulse shape.

<sup>3)</sup>  $FW 1/e^2$ , using maximum pulse energy.

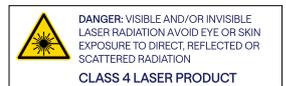
<sup>4)</sup> Waveplate-based variable optical attenuator (VOA); an external analog control input is available.

<sup>5)</sup> Enhanced contrast AOM. Provides fast, full-scale individual pulse energy control; an external analog control input is available.

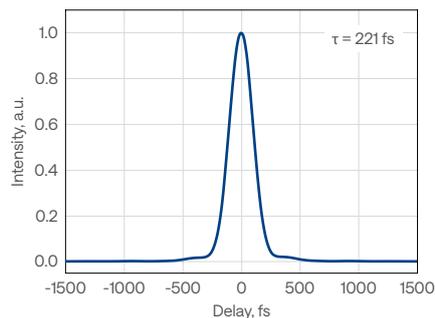
<sup>6)</sup> Under stable environmental conditions. Expressed as normalized root mean squared deviation (NRMSD).

<sup>7)</sup> Integrated. For an external harmonic generator, refer to HIRO.

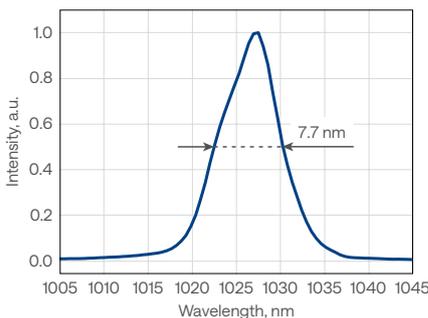
<sup>8)</sup> Integrated. For more details and stand-alone OPAs, refer to wavelength-tunable sources.



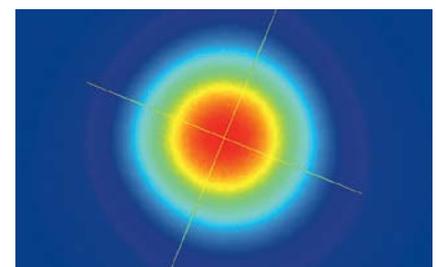
**CARBIDE-CB5**  
Typical pulse duration



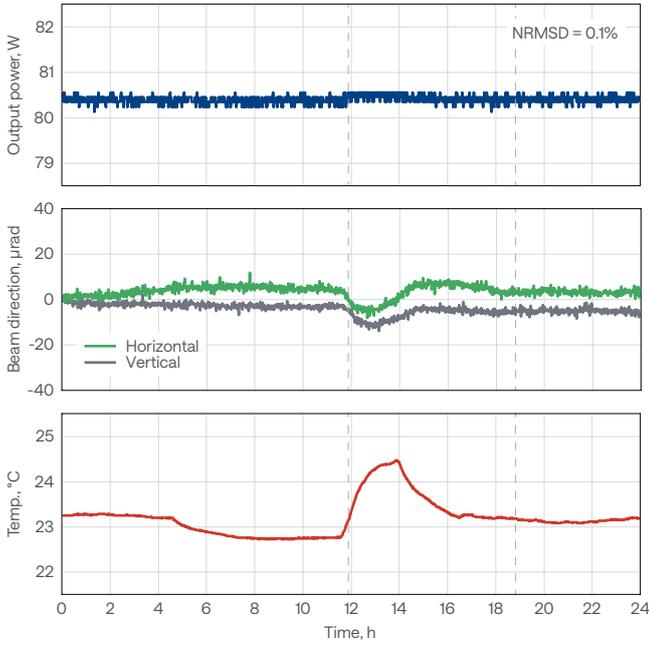
**CARBIDE-CB5**  
Typical spectrum



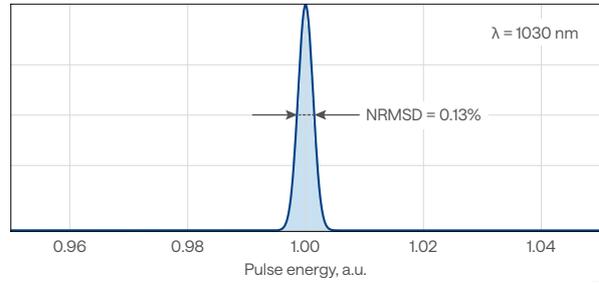
**CARBIDE-CB5**  
Typical beam profile



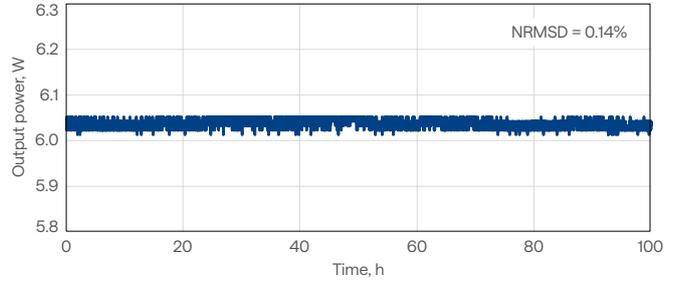
**CARBIDE-CB3** output power and beam direction stability with power lock enabled, across varying environmental conditions



**CARBIDE-CB3** Typical pulse-to-pulse energy stability

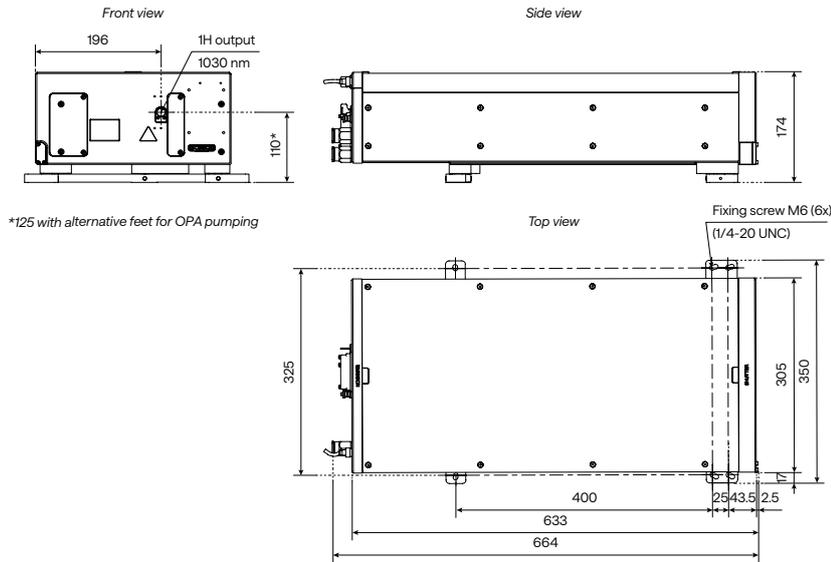


**CARBIDE-CB5-6W** Long-term power stability



**Drawings**

**CARBIDE-CB3**



**Air-cooled CARBIDE-CB5 with an attenuator**

