

Unibody-Design Femtosecond Lasers for Industry and Science



CARBIDE-CB3

Tunable pulse duration,
190 fs – 20 ps

Maximum output of
120 W, 1 mJ or 80 W, 2 mJ

Single-shot – 10 MHz
repetition rate

NEW

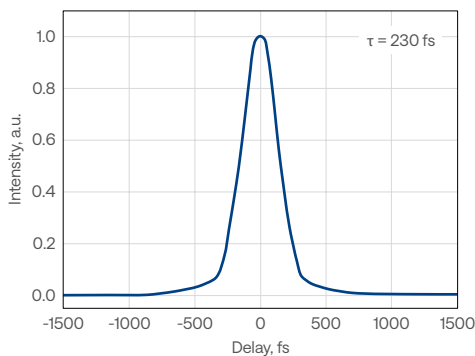
Pulse-on-demand and
BiBurst for pulse control

Up to 5th harmonic or
tunable extensions

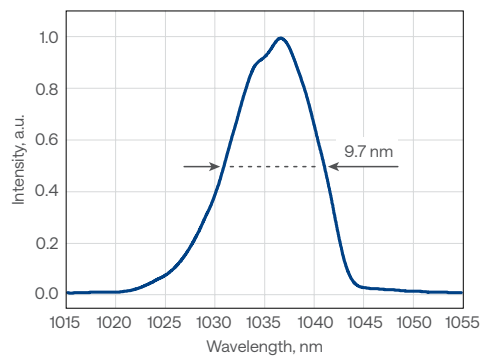
Air-cooled and
water-cooled models

Compact industrial-grade design

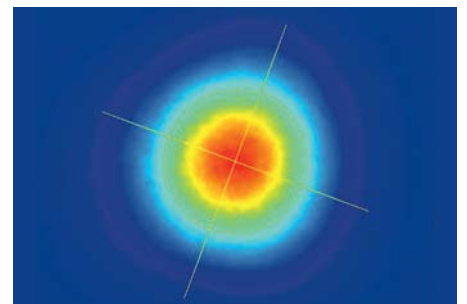
CARBIDE-CB3
Typical pulse duration



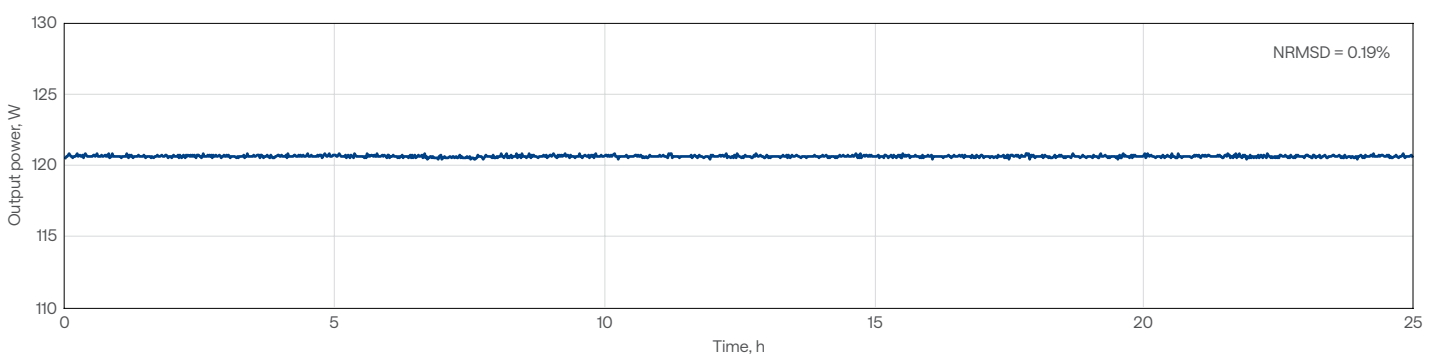
CARBIDE-CB3
Typical spectrum



CARBIDE-CB3
Typical beam profile



CARBIDE-CB3-120W
Long-term power stability



Model	CB3-20W	CB3-40W	CB3-80W	CB3-120W
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OUTPUT CHARACTERISTICS

Cooling method	Water-cooled				
Center wavelength	1030 ± 10 nm				
Maximum output power	20 W	40 W		80 W	
Pulse duration ¹⁾	< 250 fs			< 350 fs ²⁾	< 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 ²	< 1.2				
Beam diameter ³⁾	3.9 ± 0.4 mm		4.2 ± 0.4 mm	5.1 ± 0.7 mm	5 ± 0.5 mm
Beam pointing stability	< 20 µrad/°C				
Pulse energy control	FEC ⁴⁾		Attenuator ⁵⁾	FEC ⁴⁾	
Pulse picker leakage	< 0.25%		< 0.5%	< 0.25%	
Pulse-to-pulse energy stability, 24 h ⁶⁾	< 0.5%				
Long-term power stability, 100 h ⁶⁾	< 0.5%				

MAIN OPTIONS

Oscillator output	< 0.5 W, 120 – 250 fs, 1030 ± 10 nm, ≈ 65 MHz ⁷⁾		
Harmonic generator ⁸⁾	515 nm, 343 nm, 257 nm, or 206 nm		
Optical parametric amplifier ⁹⁾	320 – 10000 nm		n/a
BiBurst option	Tunable GHz and MHz burst with burst-in-burst capability		

PHYSICAL DIMENSIONS

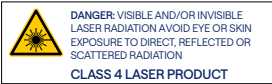
Laser head (L × W × H)	633 × 350 × 174 mm		
Chiller (L × W × H)	585 × 484 × 221 mm	680 × 484 × 307 mm	
24 V DC power supply (L × W × H)	280 × 144 × 49 mm ¹⁰⁾	320 × 200 × 75 mm	376 × 449 × 88 mm

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, 3A; 50 – 60 Hz	100 V AC, 12 A – 240 V AC, 5 A 50 – 60 Hz
	Chiller	100 – 230 V AC; 50 – 60 Hz	100 V AC, 15 A – 240 V AC, 7 A 50 – 60 Hz
Rated power	Laser	600 W	1000 W
	Chiller	1400 W	2000 W
Power consumption	Laser	500 W	900 W
	Chiller	1000 W	1300 W

¹⁾ Assuming Gaussian pulse shape.
²⁾ Pulse duration can be reduced to < 250 fs if pulse peak intensity of > 50 GW/cm² is tolerated by the customer setup.
³⁾ FW 1/e², using maximum pulse energy.
⁴⁾ Fast energy control (FEC) provides fast, full-scale individual pulse energy control; an external analog control input is available.
⁵⁾ Waveplate-based variable optical attenuator (VOA); an external analog control input is available.

⁶⁾ Under stable environmental conditions. Expressed as normalized root mean squared deviation (NRMSD)
⁷⁾ Available simultaneously, requires a scientific interface. Contact sales@lightcon.com for more details or customized solutions.
⁸⁾ Integrated. For external harmonic generator, refer to HIRO.
⁹⁾ Integrated. For more options and OPAs, refer to www.lightcon.com.
¹⁰⁾ Power supply can be different if optional 2 MHz version is selected.



CARBIDE-CB5 (air-cooled) specifications

Model	CB5	CB5-SP
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OUTPUT CHARACTERISTICS

Cooling method	Air-cooled ¹⁾		
Center wavelength	1030 ± 10 nm		
Maximum output power	6 W	5 W	
Pulse duration ²⁾	< 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 ²	< 1.2		
Beam diameter ³⁾	2.1 ± 0.4 mm		
Beam pointing stability	< 20 µrad/°C		
Pulse energy control	Attenuator ⁴⁾	AOM ⁵⁾	Attenuator ⁴⁾
Pulse picker leakage	< 2%	< 0.1%	< 2%
Pulse-to-pulse energy stability, 24 h ⁶⁾	< 0.5%		
Long-term power stability, 100 h ⁶⁾	< 0.5%		

MAIN OPTIONS

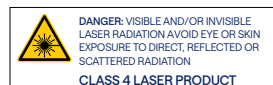
Oscillator output	n/a
Harmonic generator ⁷⁾	515 nm, 343 nm, 257 nm, or 206 nm
Optical parametric amplifier ⁸⁾	320 – 10000 nm
BiBurst option	n/a

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

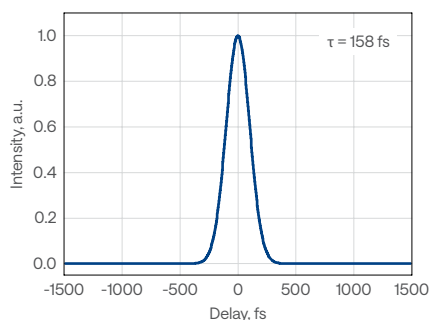
ENVIRONMENTAL AND UTILITY REQUIREMENTS

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

¹⁾ Water-cooled version available on request.²⁾ Assuming Gaussian pulse shape.³⁾ $FW\ 1/e^2$, using maximum pulse energy.⁴⁾ Waveplate-based variable optical attenuator (VOA); an external analog control input is available.⁵⁾ Enhanced contrast AOM. Provides fast amplitude control of output pulse train.⁶⁾ Under stable environmental conditions. Expressed as normalized root mean squared deviation (NRMSD).⁷⁾ Integrated. For external harmonic generator, refer to HIRO.⁸⁾ Integrated. For stand-alone OPAs, refer to www.lightcon.com.

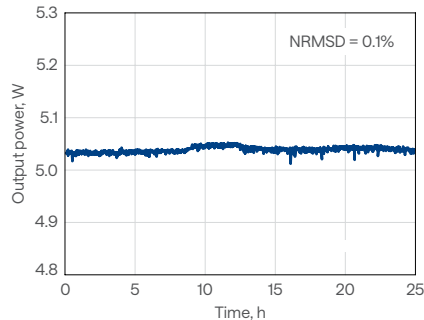
CARBIDE-CB5-SP

Typical pulse duration



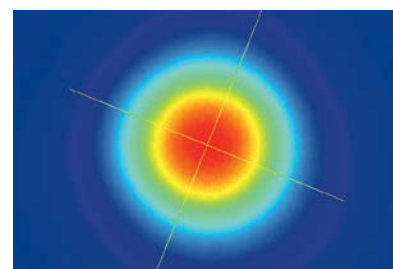
CARBIDE-CB5

Long-term power stability



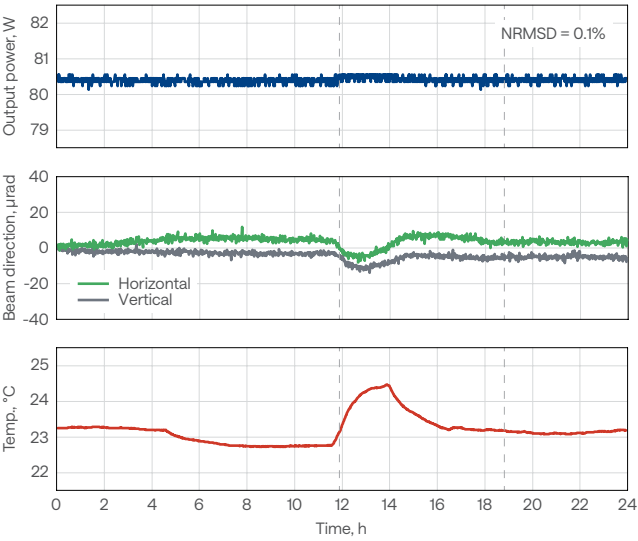
CARBIDE-CB5

Typical beam profile

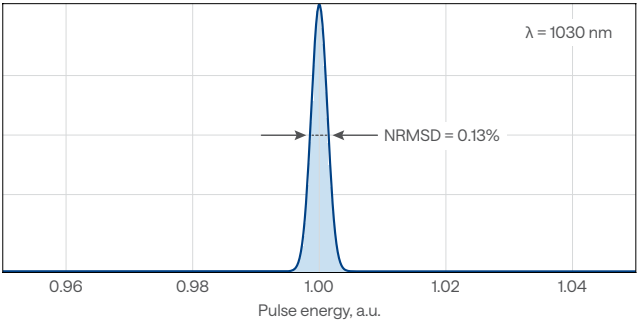


Stability measurements

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

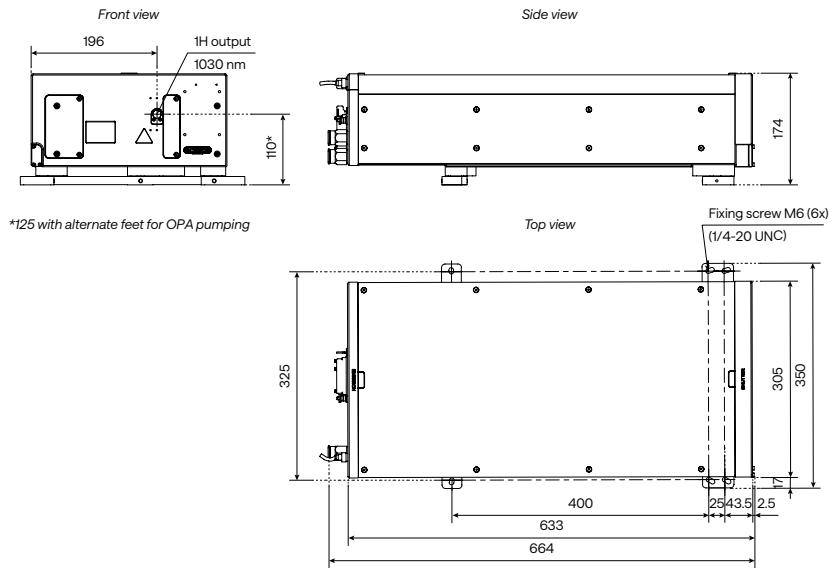


CARBIDE-CB3
Typical pulse-to-pulse energy stability



Drawings

CARBIDE-CB3 drawing



Air-cooled CARBIDE-CB5 with attenuator drawing

