

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 5th
and wavelength-tunable extensions

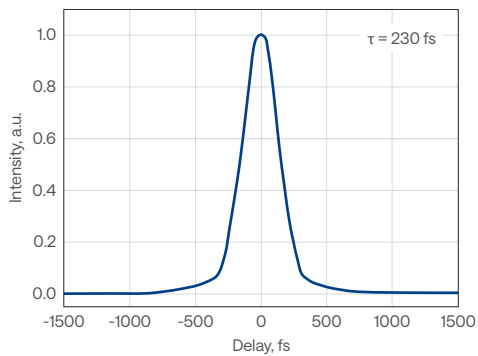
Air-cooled or water-cooled models



CARBIDE-CB3

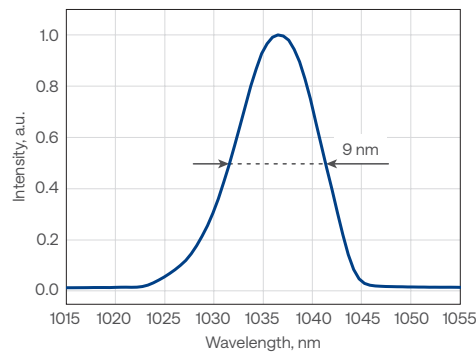
CARBIDE-CB3

Typical pulse duration



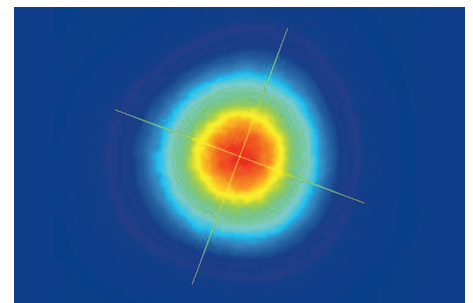
CARBIDE-CB3

Typical spectrum



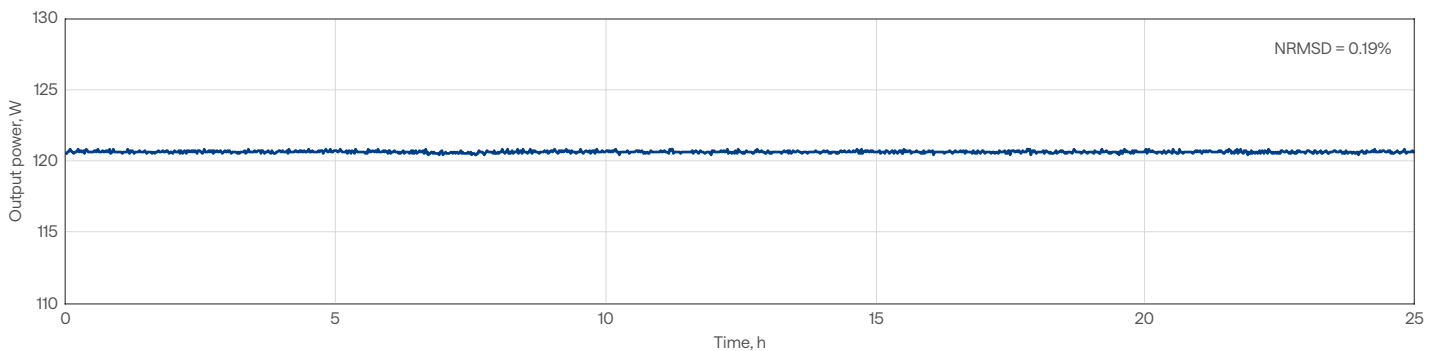
CARBIDE-CB3

Typical beam profile



CARBIDE-CB3-120W

Long-term power stability





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

Cooling method	Water-cooled				
Center wavelength	1030 ± 10 nm				
Maximum output power	20 W	40 W		80 W	120 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, 12 h ⁶⁾	< 0.5%				
Long-term power stability, 100 h ⁶⁾	< 0.5%				

MAIN OPTIONS

Oscillator output ⁷⁾	< 0.5 W, 120 – 250 fs, 1030 ± 10 nm, ≈ 65 MHz				
Harmonic generator ⁸⁾	515 nm, 343 nm, 257 nm, or 206 nm; see CARBIDE HG (page 12)				
Optical parametric amplifier ⁹⁾	UV – MIR; see I-OPA (page 30) or ORPHEUS (page 32)				
BiBurst option	Tunable GHz and MHz burst with burst-in-burst capability; see BiBurst (page 14)				

PHYSICAL DIMENSIONS

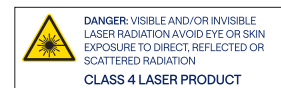
Laser head (L × W × H)	633 × 350 × 174 mm				
Chiller (L × W × H)	585 × 484 × 221 mm		680 × 484 × 307 mm		
24 V DC power supply (L × W × H)	352 × 195 × 75 mm			376 × 449 × 88 mm	

ENVIRONMENTAL & 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

¹⁾ Assuming a Gaussian pulse shape.
²⁾ Pulse duration can be reduced to < 250 fs if a 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. An optional integrated waveplate-based variable optical attenuator is available.
⁵⁾ Waveplate-based variable optical attenuator (VOA); an external analog control input is available. FEC is available for repetition rates up to 2 MHz.

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 an external harmonic generator, see HIRO (page 24).
⁹⁾ Integrated. For more details and stand-alone OPAs, see wavelength-tunable sources (page 29).



Model	CB5-6W	CB5-5W	CB5-SP
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, 12 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; see CARBIDE HG (page 12)		
Optical parametric amplifier ⁸⁾	UV – MIR; see I-OPA (page 30) or ORPHEUS (page 32)		
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 & 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	280 W		
Power consumption	250 W		

¹⁾ Water-cooled version available on request.

²⁾ Assuming a Gaussian pulse shape.

³⁾ FW 1/e², using maximum pulse energy.

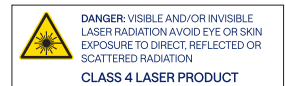
⁴⁾ Waveplate-based variable optical attenuator (VOA); an external analog control input is available.

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

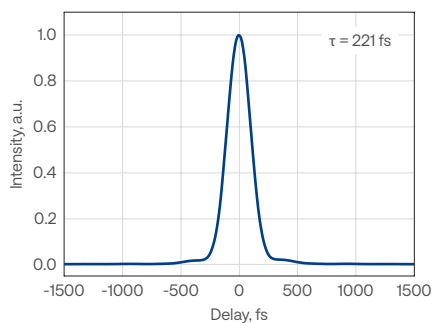
⁶⁾ Under stable environmental conditions. Expressed as normalized root mean squared deviation (NRMSD).

⁷⁾ Integrated. For an external harmonic generator, see HIRO (page 24).

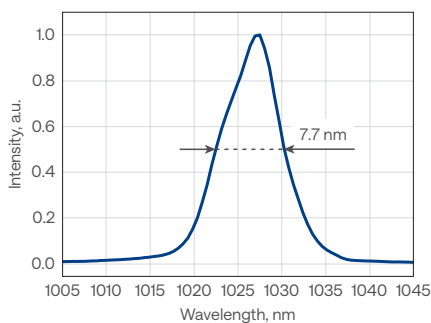
⁸⁾ Integrated. For more details and stand-alone OPAs, see wavelength-tunable sources (page 29).



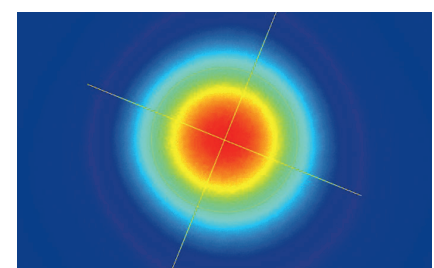
CARBIDE-CB5
Typical pulse duration



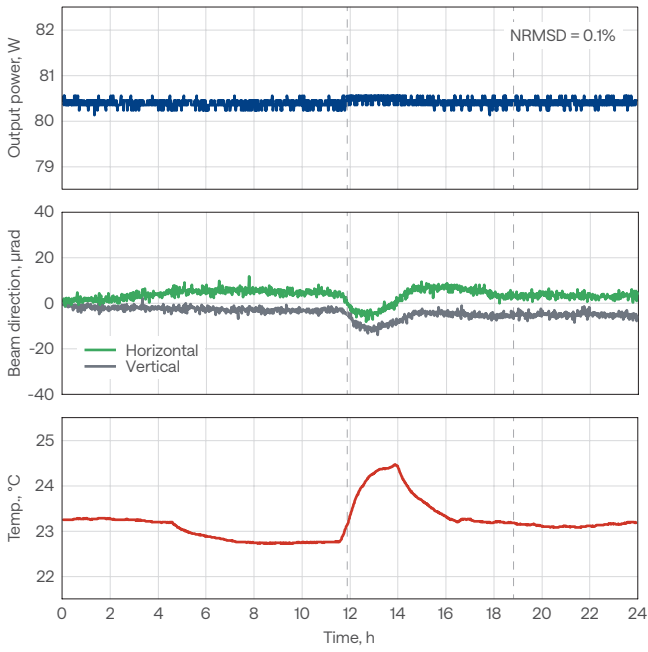
CARBIDE-CB5
Typical spectrum



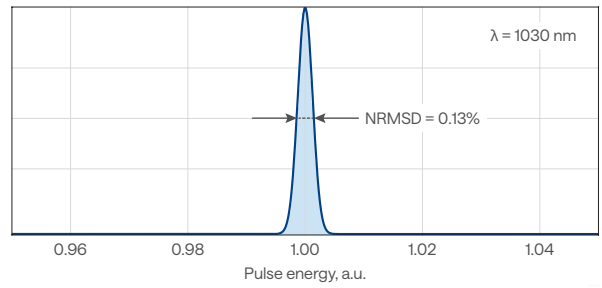
CARBIDE-CB5
Typical beam profile



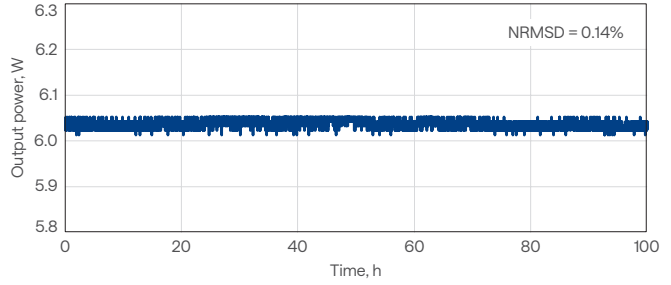
CARBIDE-CB3 output power and beam direction stability with power lock enabled, across varying environmental conditions



CARBIDE-CB3
Typical pulse-to-pulse energy stability

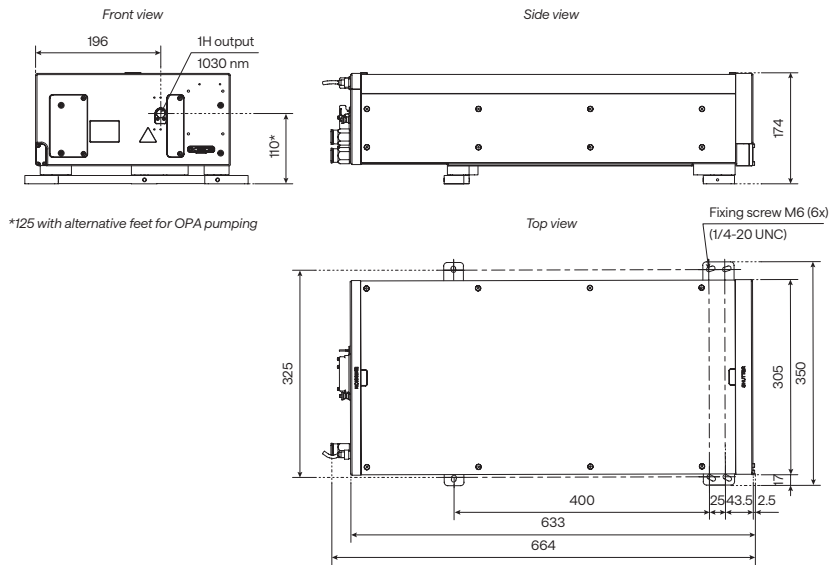


CARBIDE-CB5-6W
Long-term power stability

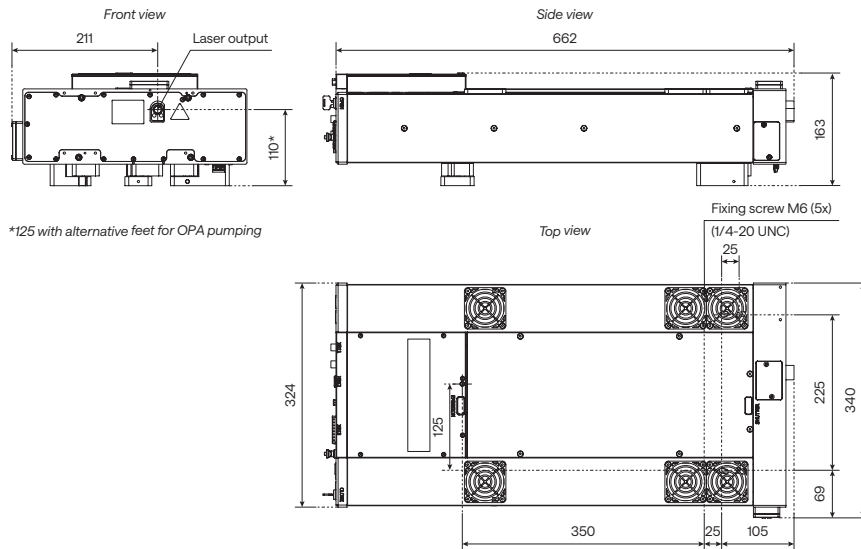


Drawings

CARBIDE-CB3



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



The drawings depend on the exact configuration. If crucial for integration, please contact sales@lightcon.com.

