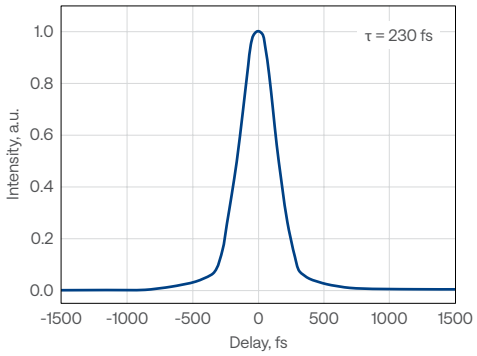
CARBIDE

Industrial Femtosecond Lasers

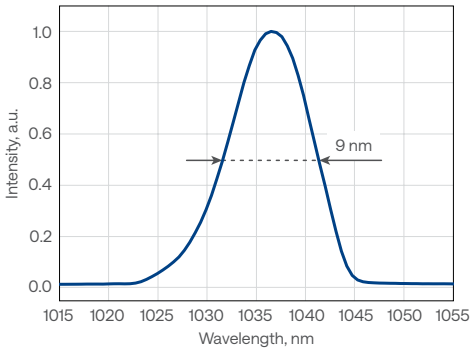
- Maximum output of 120 W (IR) or 50 W (UV)
- NEW — Single-shot – 10 MHz repetition rate
- Pulse-on-demand and BiBurst for pulse control
- Automated harmonics up to the 5th and wavelength-tunable extensions
- Air-cooled or water-cooled models

CARBIDE-CB3

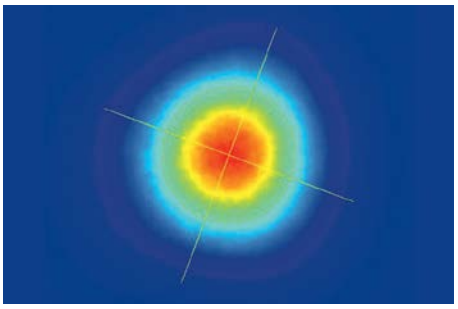
CARBIDE-CB3
Typical pulse duration



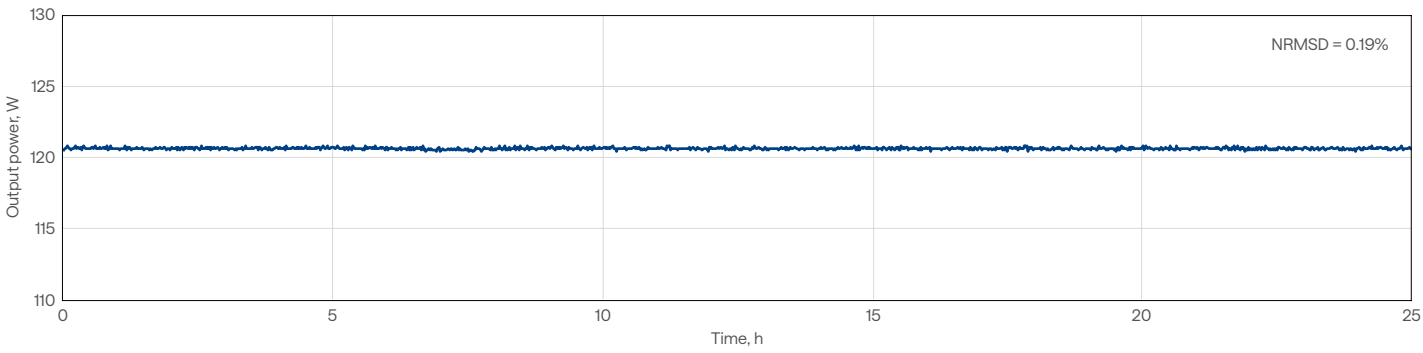
CARBIDE-CB3
Typical spectrum



CARBIDE-CB3
Typical beam profile



CARBIDE-CB3-120W
Long-term power stability



CARBIDE-CB3 specifications

NEW

High-power IR lasers

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 [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 / 1 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; refer to CARBIDE HG				
Optical parametric amplifier [9]	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 x 449 x 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
Electrical requirements – Chiller	100 – 230 V AC; 50 – 60 Hz		200 – 230 V AC; 50 – 60 Hz		
Rated power – Laser	1000 W		1000 W		2000 W
Rated power – Chiller	1400 W		2000 W		
Power consumption – Laser	500 W		900 W		1500 W
Power consumption – 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.*

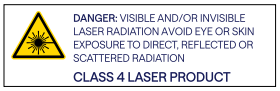
[8] *Integrated. For an external harmonic generator, refer to HIRO.*

[9] *Integrated. For more details and stand-alone OPAs, refer to wavelength-tunable sources.*

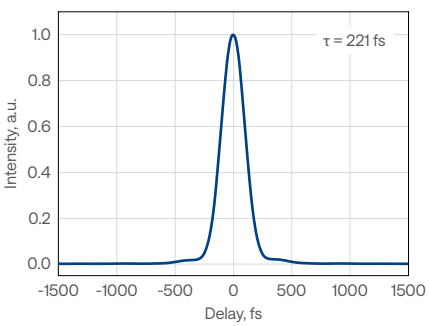
CARBIDE-CB5 specifications

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; refer to CARBIDE HG		
Optical parametric amplifier [8]	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 & 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		

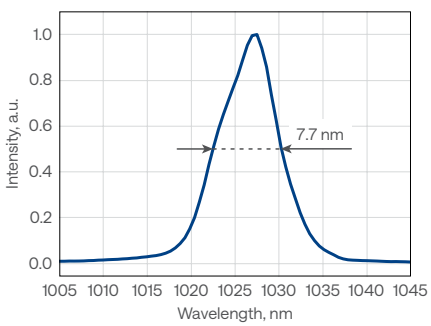
[1] *Water-cooled version available on request.*
[2] *Assuming a Gaussian pulse shape.*
[3] *FW 1/e^2, using maximum pulse energy.*
[4] *Waveplate-based variable optical attenuator (VOA); an external analog control input is available.*
[5] *Enhanced contrast AOM. Provides fast, full-scale individual 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, refer to HIRO.*
[8] *Integrated. For more details and stand-alone OPAs, refer to wavelength-tunable sources.*



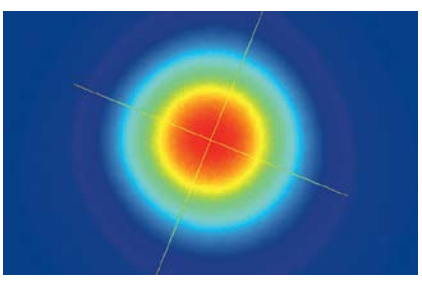
CARBIDE-CB5
Typical pulse duration



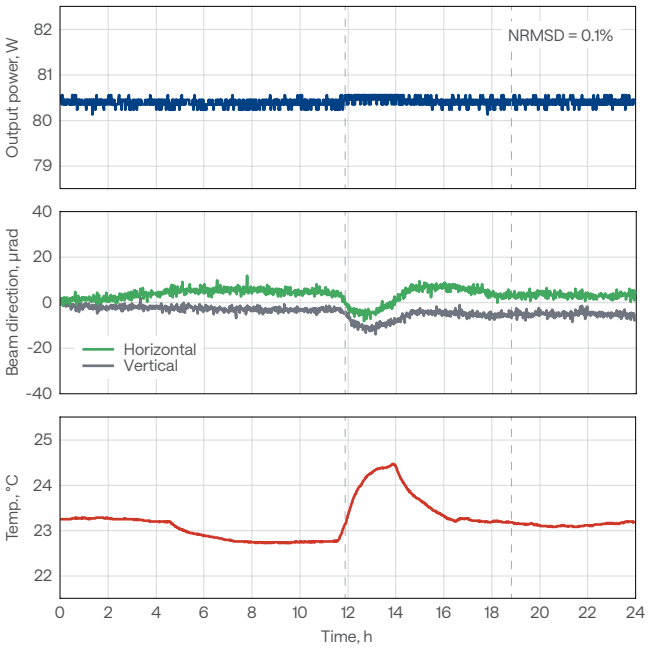
CARBIDE-CB5
Typical spectrum



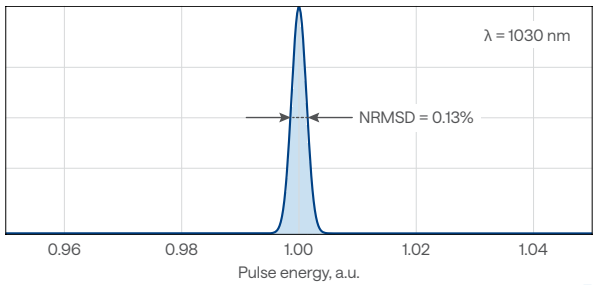
CARBIDE-CB5
Typical beam profile



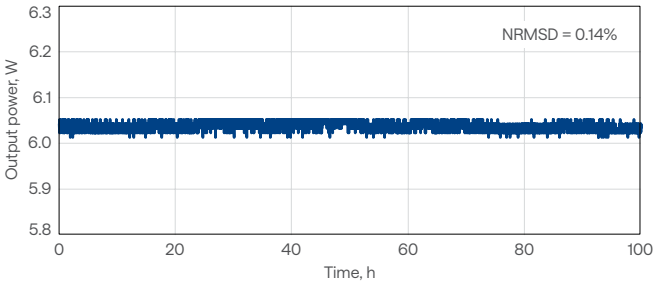
CARBIDE-CB3 output power and beam direction stability with power lock enabled, across varying environmental conditions



CARBIDE-CB3
Typical pulse-to-pulse energy stability

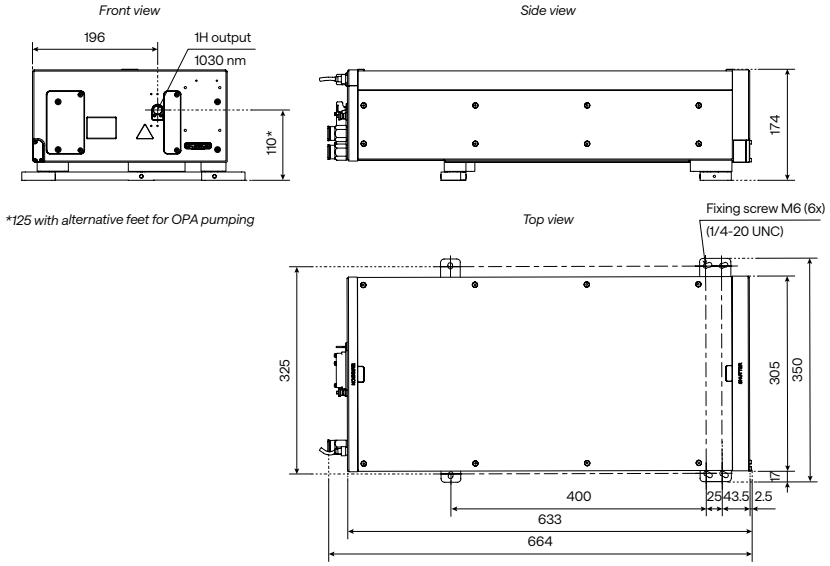


CARBIDE-CB5-6W
Long-term power stability

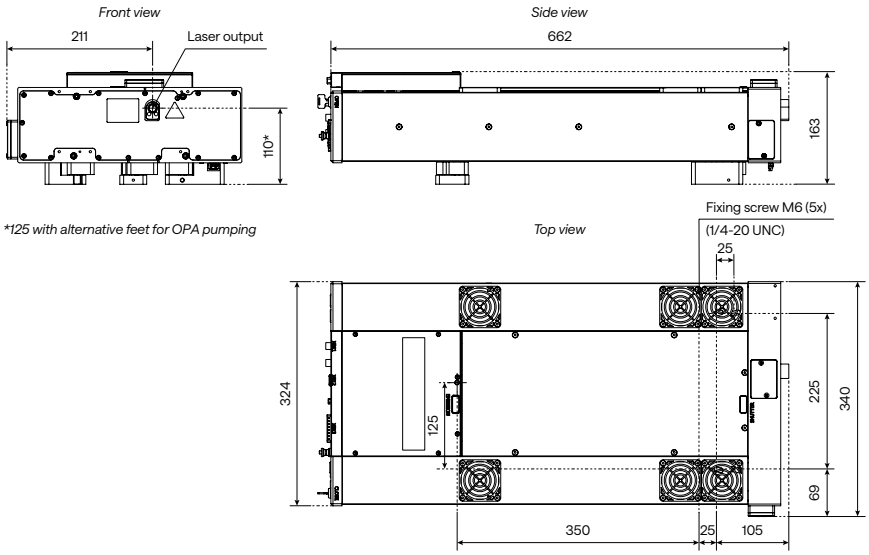


Drawings

CARBIDE-CB3



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



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