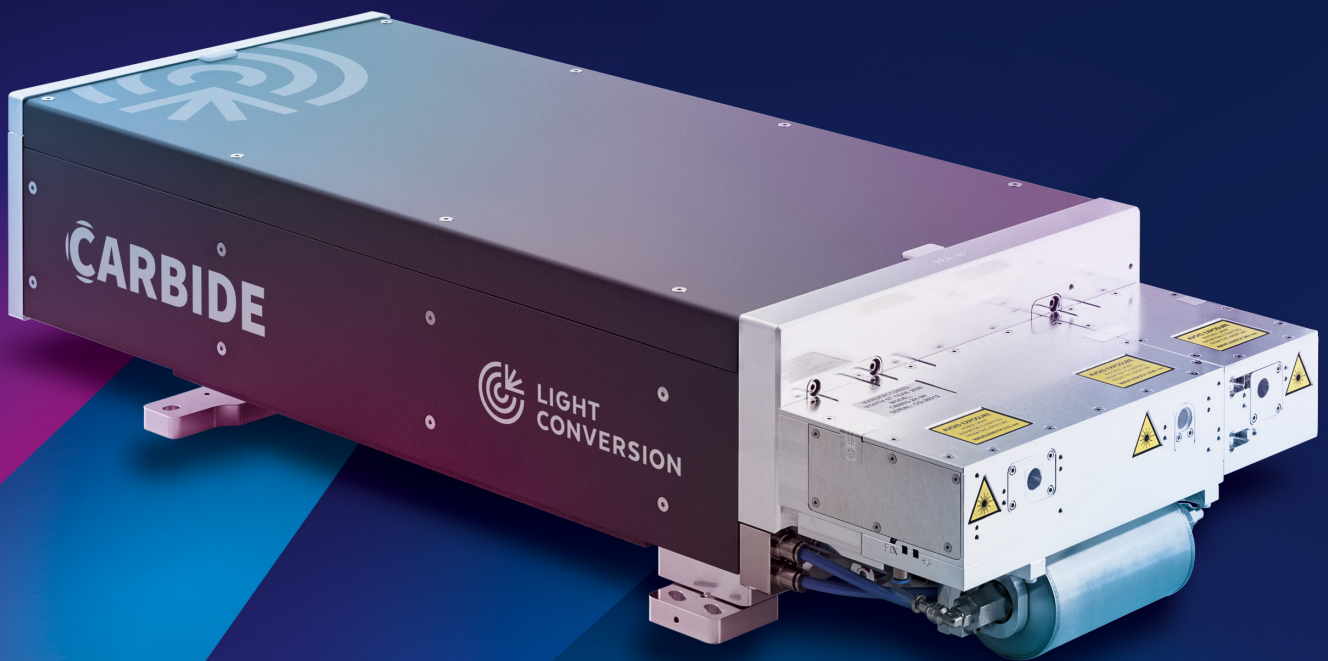




Do you have a femtosecond?



NEW MODELS!

MORE POWER MORE ENERGY

PHAROS

High Power and Energy Femtosecond Lasers

FEATURES

- 190 fs – 20 ps tunable pulse duration
- 2 mJ maximum pulse energy
- 20 W output power
- 1 kHz – 1 MHz tunable base repetition rate
- Pulse picker for pulse-on-demand operation
- Rugged industrial grade mechanical design
- Automated harmonics generators (515 nm, 343 nm, 257 nm, 206 nm)
- Optional CEP stabilization
- Possibility to lock oscillator to external clock



PHAROS-PH2

SPECIFICATIONS

| Model ¹⁾ | PH1-10W | PH1-15W | PH1-20W | PH1-SP-1mJ | PH2-SP-20W-2mJ |
|--|--|---------|---------|--|----------------|
| NEW | | | | | |
| OUTPUT CHARACTERISTIC | | | | | |
| Max. average power | 10 W | 15 W | 20 W | 6 W | 20 W |
| Pulse duration (assuming Gaussian pulse shape) | < 290 fs | | | < 190 fs | |
| Pulse duration adjustment range | 290 fs – 10 ps (20 ps on request) | | | 190 fs – 10 ps (20 ps on request) | |
| Max. pulse energy | > 0.4 mJ | | | > 1 mJ | > 2 mJ |
| Fundamental repetition rate ²⁾ | 1 kHz – 1 MHz | | | | |
| Pulse selection | Single-shot, Pulse-on-Demand, any base repetition rate division | | | | |
| Centre wavelength ³⁾ | 1030 ± 10 nm | | | | |
| Polarization | Linear, horizontal | | | | |
| Beam quality | TEM ₀₀ ; M ² < 1.2 | | | TEM ₀₀ ; M ² < 1.3 | |
| Pulse-to-pulse energy stability ⁴⁾ | RMS deviation ⁵⁾ < 0.5 % over 24 hours | | | | |
| Output power stability | RMS deviation ⁵⁾ < 0.5 % over 100 h | | | | |
| Beam pointing stability | < 20 µrad/°C | | | | |
| Pre-pulse contrast | < 1 : 1000 | | | | |
| Post-pulse contrast | < 1 : 200 | | | | |
| OPTIONAL EXTENSIONS | | | | | |
| Oscillator output | Optional. Please contact sales@lightcon.com for more details or customized solutions | | | | |
| Typical output | 1 – 6 W, 50 – 250 fs, ~1035 nm, ~ 76 MHz, simultaneously available | | | | |
| Harmonics generator | Integrated, optional (see page 8) | | | | |
| Output wavelength | 515 nm, 343 nm, 257 nm, 206 nm | | | | |
| Optical parametric amplifier | Integrated, optional (see page 15) | | | | |
| Tuning range | 640 – 4500 nm | | | | |
| BiBurst mode | Tunable GHz and MHz burst with burst-in-burst capability, optional (see page 9) | | | | |
| GHz-mode (P) | | | | | |
| Intra burst pulse separation ⁶⁾ | ~ 200 ± 40 ps | | | ~ 500 ± 40 ps | |
| Max no. of pulses ⁷⁾ | 1 .. 25 | | | 1 .. 10 | |
| MHz-mode (N) | | | | | |
| Intra burst pulse separation | ~ 16 ns | | | | |
| Max no. of pulses | 1 .. 9, (7 with FEC) | | | | |

¹⁾ More models are available on request.

²⁾ Some particular repetition rates are software-restricted due to system design.

³⁾ Precise wavelengths for specific models available upon request.

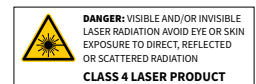
⁴⁾ Under stable environmental conditions.

⁵⁾ Normalized to average pulse energy.

⁶⁾ Custom spacing on request.

⁷⁾ Maximum number of pulses in a burst is dependent on the laser repetition rate. Custom number of pulses on request.

⁸⁾ Dimensions might increase for non-standard laser specifications.



CARBIDE

Femtosecond Lasers for Industry and Science

FEATURES

- < 290 fs – 10 ps tunable pulse duration
- > 800 μJ pulse energies
- > 80 W output power
- 60 – 2000 kHz tunable base repetition rate
- Includes pulse picker for pulse-on-demand operation
- Rugged, industrial-grade mechanical design
- Air or water cooling
- Automated harmonics generators (515 nm, 343 nm, 257 nm)
- Scientific interface enhancing system flexibility



CARBIDE-CB3

SPECIFICATIONS

| Model | CB3-40W | CB3-80W | NEW | CB5 |
|--|---|----------|--------------------------|---|
| OUTPUT CHARACTERISTICS | | | | |
| Cooling method | Water-cooled | | Air-cooled ¹⁾ | |
| Max. average power | > 40 W | > 80 W | > 6 W | > 5 W |
| Pulse duration (assuming Gaussian pulse shape) | < 290 fs | | | |
| Pulse duration adjustment range | 290 fs – 10 ps | | | |
| Max. pulse energy | > 0.4 mJ | > 0.8 mJ | > 100 μJ | > 83 μJ |
| Fundamental repetition rate ²⁾ | 100 – 2000 kHz | | 60 – 1000 kHz | |
| Pulse selection | Single-shot, Pulse-on-Demand, any base repetition rate division | | | |
| Centre wavelength ³⁾ | 1030 ± 10 nm | | | |
| Polarization | Linear, vertical | | | |
| Beam quality | TEM ₀₀ ; M ² < 1.2 | | | |
| Pulse-to-pulse energy stability ⁴⁾ | RMS deviation ⁵⁾ < 0.5 % over 24 hours | | | |
| Output power stability | RMS deviation ⁵⁾ < 0.5 % over 100 h | | | |
| Beam pointing stability | < 20 μrad/°C | | | |
| Pulse picker | FEC ⁶⁾ | included | included | included, enhanced contrast AOM ⁷⁾ |
| Pulse picker leakage | < 0.5 % | < 2 % | < 2 % | < 0.1 % |
| OPTIONAL EXTENSIONS | | | | |
| Harmonics generator | Integrated, optional (see page 14) | | | |
| Output wavelength | 515 nm, 343 nm, 257 nm | | | |
| Optical parametric amplifier | Integrated, optional (see page 15) | | | |
| Tuning range | 640 – 4500 nm | | | |
| BiBurst mode | Tunable GHz and MHz burst with burst-in-burst capability, optional (see page 9) | | | |
| GHz-mode (P) | | | | |
| Intra burst pulse separation | ~ 440 ± 40 ps ⁸⁾ | | | |
| Max no. of pulses | 1 .. 10 ⁹⁾ | | | |
| MHz-mode (N) | | | | |
| Intra burst pulse separation | ~ 16 ns | | | |
| Max no. of pulses | 1 .. 10 | | | |

¹⁾ Water-cooled version available on request.

²⁾ Lower repetition rates are available by controlling pulse picker.

³⁾ Precise wavelengths for specific models available upon request. 2nd (515 nm) and 3rd (343 nm) harmonic output also available.

⁴⁾ Under stable environmental conditions.

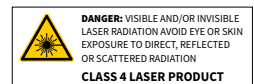
⁵⁾ Normalized to average pulse energy.

⁶⁾ Provides fast energy control; external analog control input available. Response time – next available RA pulse.

⁷⁾ Provides fast amplitude control of output pulse train.

⁸⁾ Custom spacing on request.

⁹⁾ Maximum number of pulses in a burst is dependent on the laser repetition rate. Custom number of pulses on request.



BiBurst

Tunable GHz and MHz burst with burst-in-burst capability

PHAROS and CARBIDE 40W (CB3) have an option for tunable GHz and MHz burst with burst-in-burst capability – called BiBurst. The distance between burst packet groups is called nanosecond burst, N (MHz-Burst). The distance between sub-pulses in the group is called picosecond burst, P (GHz-Burst).

In single pulse mode, one pulse is emitted at a time at some fixed frequency. In burst mode, the output consists of several picosecond burst packets each separated by an equal time period between each packet. Each packet can contain a number of sub-pulses which are also separated by an equal time period between each pulse.

High pulse energy femtosecond lasers PHAROS and CARBIDE with flexible BiBurst functionality bring new production capabilities to high-tech manufacturing industries such as consumer electronics, integrated photonic chip manufacturing, stent cutting, surface functionalization, future displays manufacturing and quantum computing.

BiBurst material fabrication areas cover:

- brittle material drilling and cutting
- deep engraving
- selective ablation
- transparent materials volume modification
- hidden marking
- surface functional structuring.

SPECIFICATIONS

| Model | | CARBIDE-CB3 (40 W) | PHAROS | PHAROS-SP |
|-------------|--|--------------------|----------------------|----------------------|
| P, GHz-mode | Intra burst pulse separation ¹⁾ | ~440 ± 40 ps | ~200 ± 40 ps | ~500 ± 40 ps |
| | Max no. of pulses ²⁾ | 1 .. 10 | 1 .. 25 | 1 .. 10 |
| N, MHz-mode | Intra burst pulse separation | ~16 ns | | |
| | Max no. of pulses | 1 .. 10 | 1 .. 9, (7 with FEC) | 1 .. 9, (7 with FEC) |

¹⁾ Custom spacing on request.

²⁾ Maximum number of pulses in a burst is dependent on the laser repetition rate. Custom number of pulses on request.

