

CAREX 80-515

High power nanosecond visible laser with programmable pulses for high speed and precision micromachining

CAREX, the flexible nanosecond visible fiber laser, delivers fully programmable pulses combining high power and high pulse repetition rates. It is especially designed for high precision micro-processing.

CAREX combines process agility and throughput for demanding applications such as multi-material stacks processing. It delivers pulses from 2 ns up to 20 ns with any arbitrary temporal shape and possible burst operation. The innovative fast electronic design enables instantaneous switching between 2 pulse patterns for optimized complex material processing.

The fiber technology combined with the simply efficient laser head architecture makes CAREX a robust, flexible, and cost-effective visible laser for most demanding industrial applications. Manufactured with field proven and qualified components, good practices and high-quality, CAREX is the right answer to 24/7 operations in extended production cycle environments.

Wavelength	515 nm
Power	80 W
Pulse Duration	2 ns – 20 ns fully adjustable Programmable pulses Burst mode
Pulse Energy	Up to 800 µJ
Beam quality	$M^2 < 1.2$



Advantages

- ✓ High power 80 W
- ✓ High Pulse Repetition Rate up to 2 500 kHz
- ✓ Adjustable pulse duration from 2 ns up to 20 ns
- ✓ Fully programmable pulses (1 ns resolution)
- ✓ Excellent beam quality $M^2 < 1.2$ up to 2 500 kHz
- ✓ High peak power up to 80 kW
- ✓ Field proven technology
- ✓ HALT designed / HASS Certified

Applications

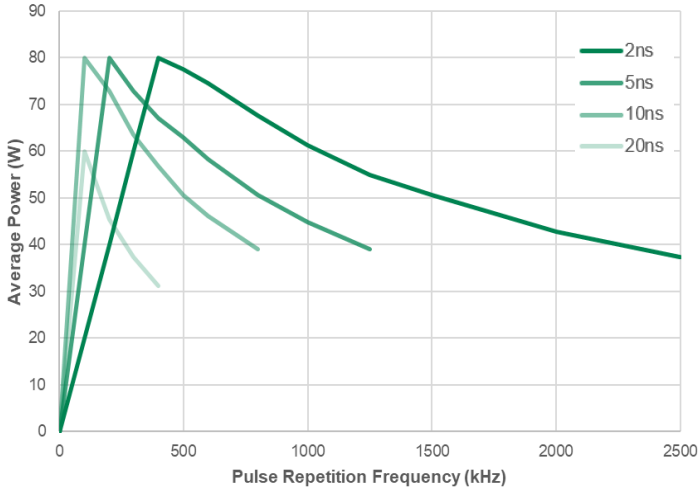
- ✓ Solar Cells processing
- ✓ Glass processing
- ✓ PERC processing
- ✓ ITO patterning
- ✓ CFRP processing
- ✓ Battery processing
- ✓ Ceramic scribing, cutting and drilling
- ✓ Material processing



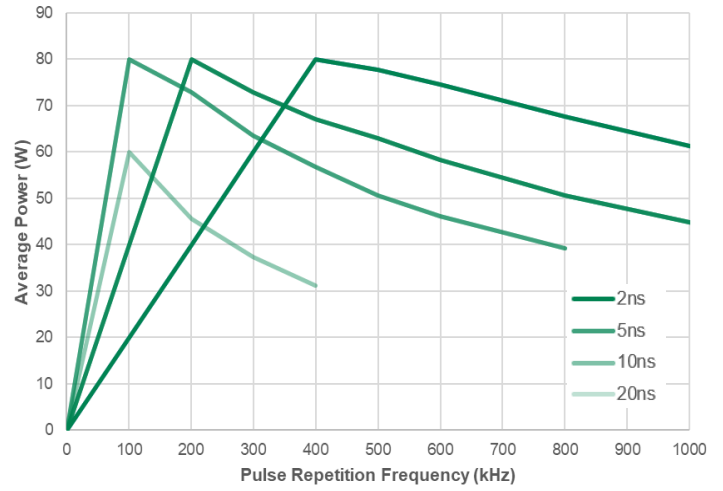
CAREX 80-515

Typical performances

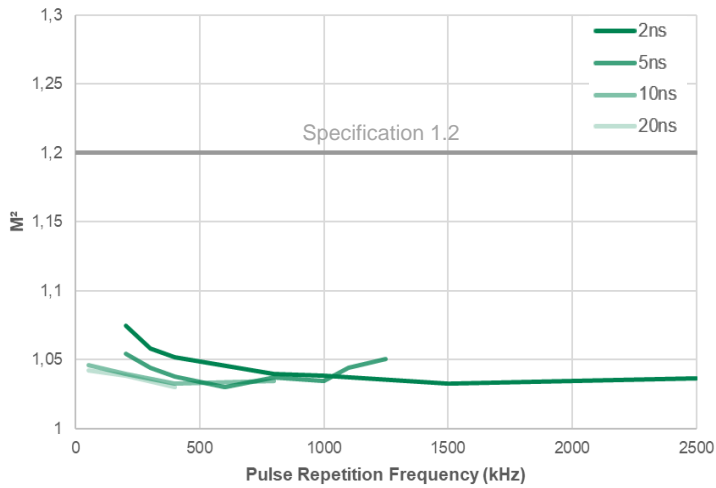
Power between 0 – 2.5 MHz



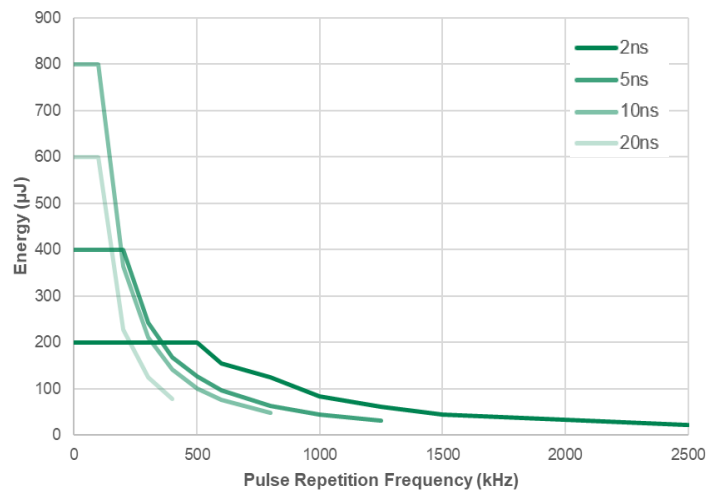
Power between 0 – 1 MHz



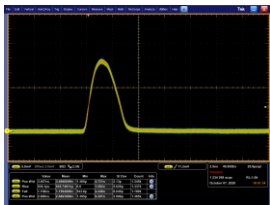
M²



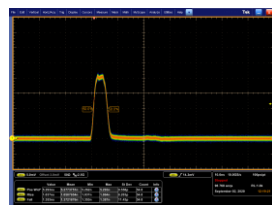
Pulse Energy



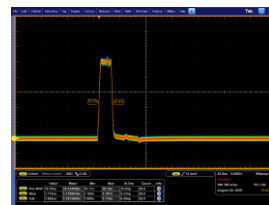
Programmable Pulses



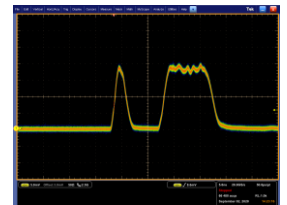
2 ns



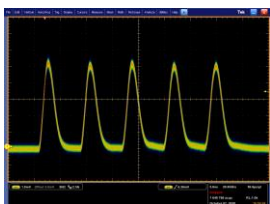
5 ns



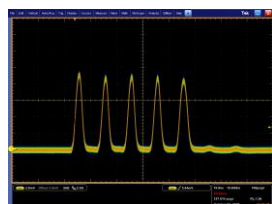
10 ns



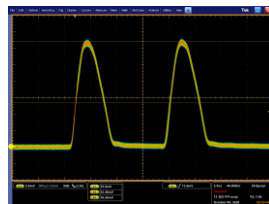
2 ns + 10 ns ; Δ = 10 ns



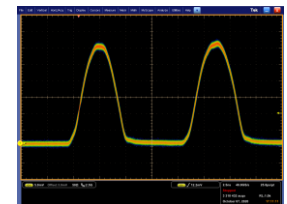
5 x 2 ns ; Δ = 2 ns



5 x 3.5 ns ; Δ = 5 ns



2 x 2 ns ; Δ = 2 ns



2 x 3.5 ns ; Δ = 5 ns



CAREX 80-515

Specifications

Output Characteristics

Center Wavelength	515 nm ± 0.5 nm			
Average Power	2 ns	5 ns	10 ns	20 ns
	80 W @ 400 kHz	80 W @ 200 kHz	80 W @ 100 kHz	60 W @ 100 kHz
Pulse Width	Fully programmable from 2 ns to 20 ns			
Pulse Repetition Rates	Single-shot to 2 500 kHz			
Power Stability	< 2%, 2σ over 8 hours			
Pulse to Pulse Energy Stability	< 3% RMS			

Beam Characteristics

Spatial Mode	TEM ₀₀
M ²	≤ 1.2
Polarization Ratio	≥ 100:1 linear
Polarization Direction	Vertical, ± 2°
Beam Divergence (full-angle)	< 0.45 mrad
4σ Beam Diameter @ exit (nominal)	3.5 mm ± 0.35 mm
Waist Location (from exit face of output window)	0 m ± 8 m
Astigmatism	≤ 30%
Beam Circularity	≥ 90%
Long Term Beam Pointing Stability, over 8 hours	≤ 25 μrad, full-angle

Operating Conditions

External Communications	Ethernet / RS-232 / USB
Warm-up Time	
Cold Start	≤ 30 minutes
Warm Start	≤ 2 minutes
Electrical Requirements	100 – 240V AC
Line Frequency	50 to 60 Hz
Power Consumption	< 900 W
Temperature Range	15°C to 35°C (59°F to 95°F)
Humidity	10% to 95% RH, non-condensing
Storage Conditions	
Temperature	0°C to 50°C (32°F to 122°F)
Humidity	5% to 95% RH
Altitude (non-operational)	Sea level to 11 000 meter

Chiller Requirements

Cooling Water Temperature	25°C +/- 0,1°C
Minimum Cooling Power	700 W
Cooling Water Flow	5 liter/min, 3 liter/min minimum

Physical Characteristics

Dimensions (L x W x H)	Laser Head : 1146 x 250 x 169 mm (45.11 x 9.84 x 6.65 in) Control Unit : 506 x 483 x 177 mm (19.92 x 19.01 x 6.97 in)
Weight	Laser Head : 50 kg (110 lbs) without water Control Unit : 25 kg (55 lbs)

Features

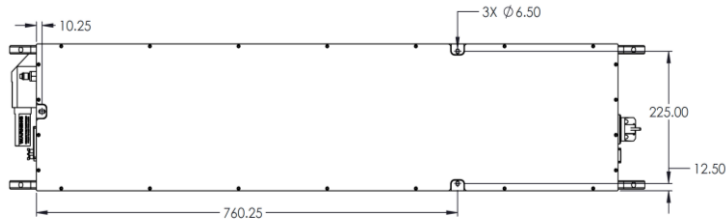
Extended Internal Power Monitoring	Power monitored at each stage of the laser
Ultra Wide Operation Range	Constant pulse width and beam parameters over the whole pulse repetition rate range
Industry Ready Data Logging	Long-term and short-term laser operation log, diagnosis, maintenance
Alignment Beam	Low power mode for laser installation and alignment
Sacrificial Window	Field Replaceable Unit
Advanced Support	Industry 4.0 ready, remote control, remote support, >30 sensors in laser head
Best Practices	Sealed laser head, multi-stage components cleaning and assembled in ISO 6 cleanroom



CAREX 80-515

Drawings

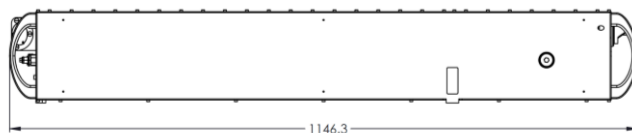
Laser Head (in mm)



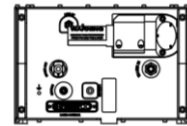
Bottom View



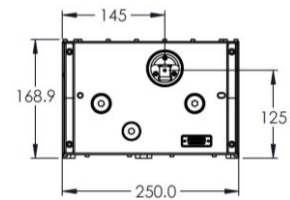
Top View



Side View

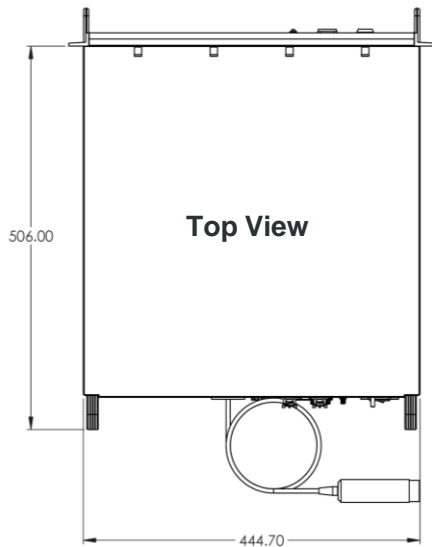


Rear View

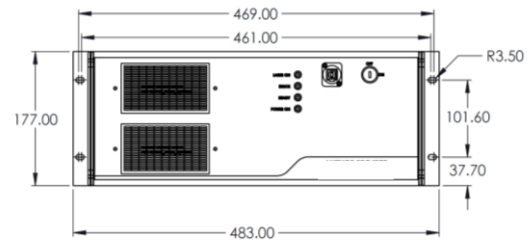


Front View

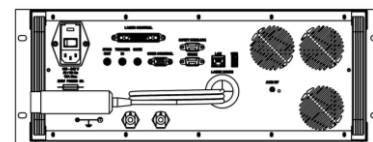
Power Supply (in mm)



Top View



Front View



Rear View

According to BLOOM continuous product improvements, specifications and drawings are subject to change without notice.