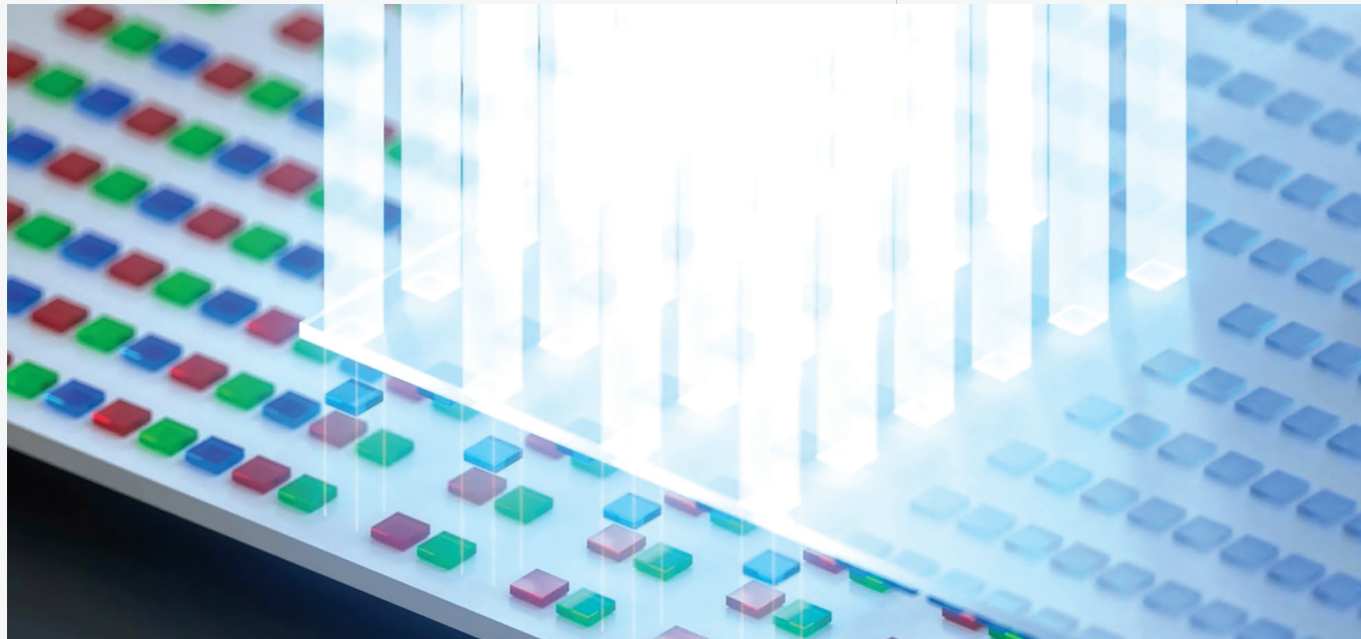




COHERENT PRODUCT CATALOG | 코히런트 제품 카탈로그

Product Catalog

Industrial Ultrashort Pulse
Picosecond/Femtosecond Lasers

Industrial Nanosecond Lasers

CO and CO₂ Lasers

Industrial Fiber Lasers

Excimer Lasers

Laser Measurement

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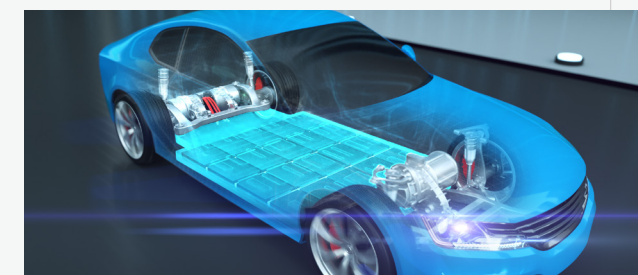
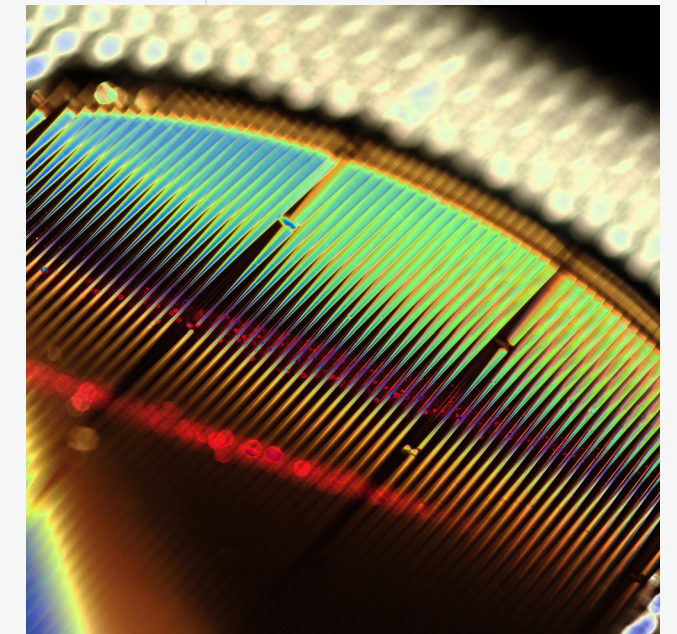
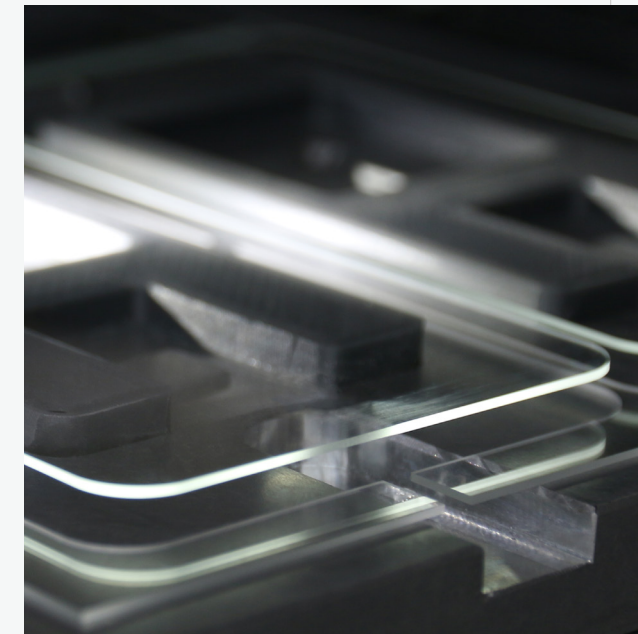
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연속 발진 타입 레이저

적외선 영역에서 자외선 영역에 이르는 다양한 제품구성으로 최적의 모델을 제안합니다



펄스 발진 타입 레이저

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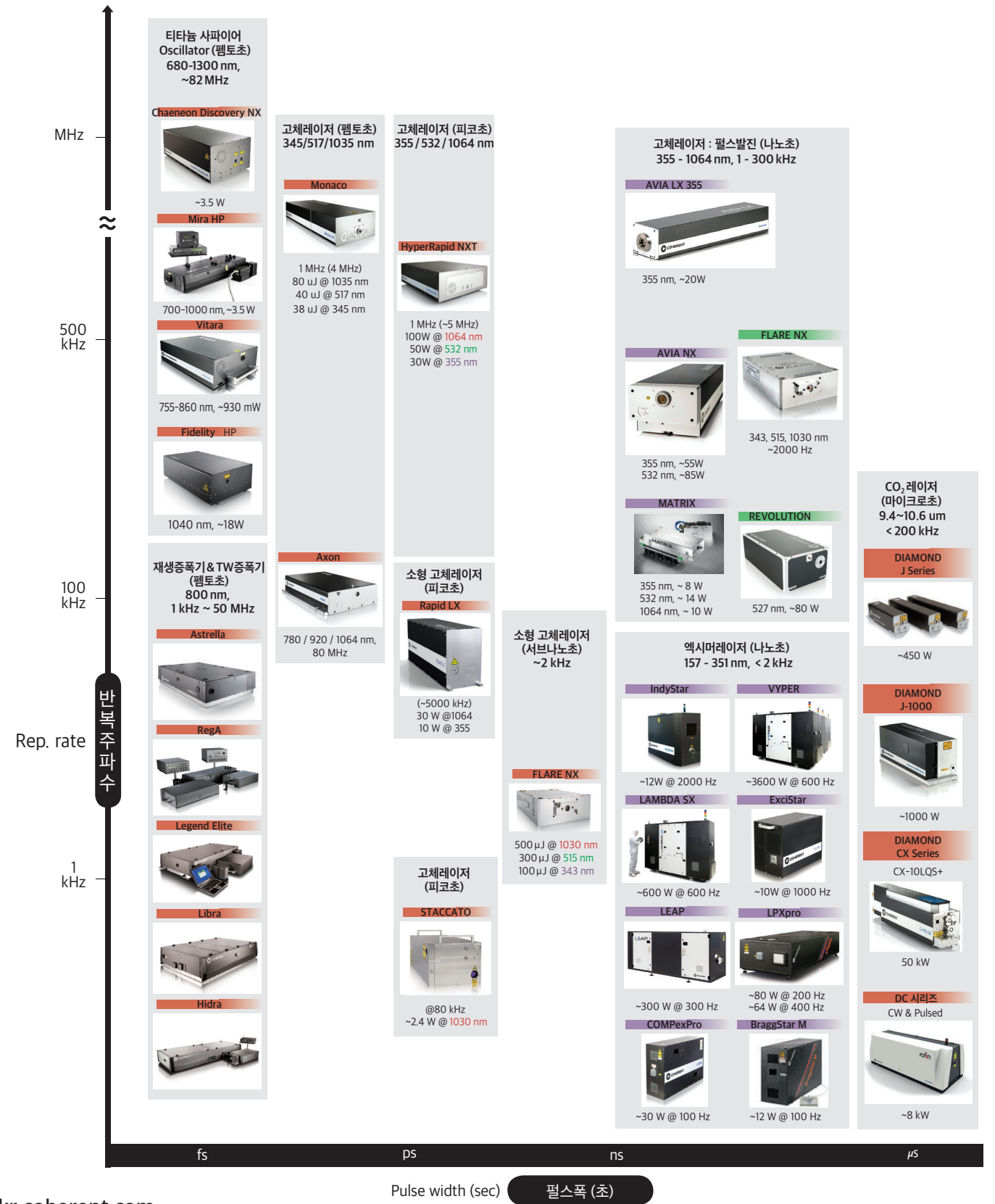


TABLE OF CONTENTS

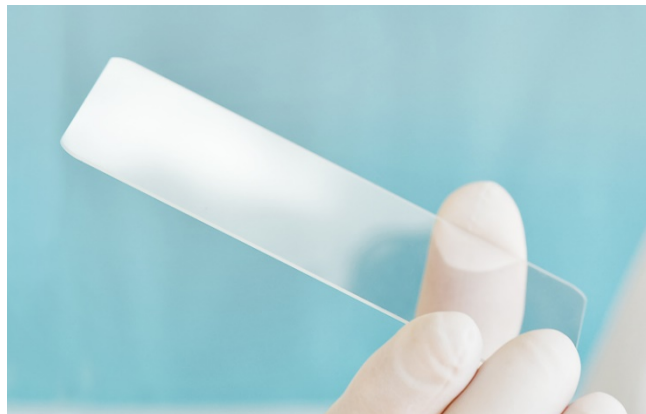
Industrial Ultrashort Pulse Picosecond Lasers	4
HyperRapid NXT	6
HyperRapid NXT SmartCleave	8
RAPID LX	12
Paladin Compact 355-2000/4000	15
Industrial Ultrashort Pulse Femtosecond Lasers	19
Monaco UV	21
Monaco 517	23
Monaco 1035	26
Monaco SmartCleave	29
Axon	32
Monaco HE	36
Industrial Nanosecond Lasers	38
AVIA LX	40
AVIA NX Green	42
AVIA NX UV	45
FLARE NX	48
MATRIX 355	50
CO and CO₂ Lasers	52
DIAMOND J-3-5	54
DIAMOND C/Cx Series	56
DIAMOND Cx-10 Series	62
DIAMOND Cx-10LDE+	64
DIAMOND Cx-10LQS+	66

TABLE OF CONTENTS

CO and CO₂ Lasers (continued)	
DIAMOND J-1000	68
DIAMOND J-2 Series	70
DIAMOND J-3 Series	72
DIAMOND J-5 Series	74
Industrial Fiber Lasers	78
HighLight FL-ARM	80
HighLight FL-ARM Compact	83
HighLight FL4000CSM-ARM Compact	86
HighLight FL	88
HighLight FL Compact	92
Excimer Lasers	96
ExciStar	98
IndyStar	100
COMPex	102
Laser Measurement	
Matrix of Recommendations	104
Notes	111

APPLICATION IMAGES PROCESSED BY PICOSECOND LASERS

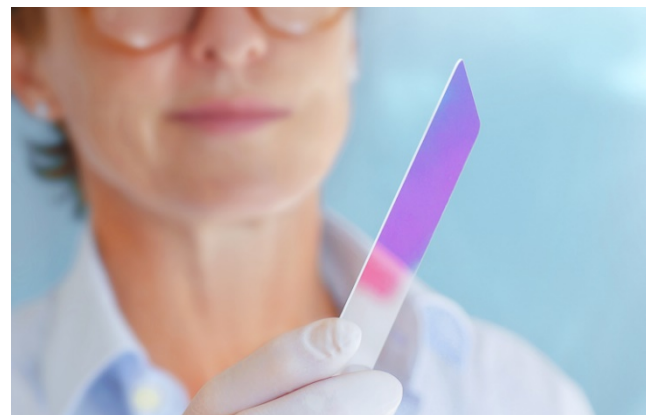
Glass cutting using Smartcleave: Mobile displays



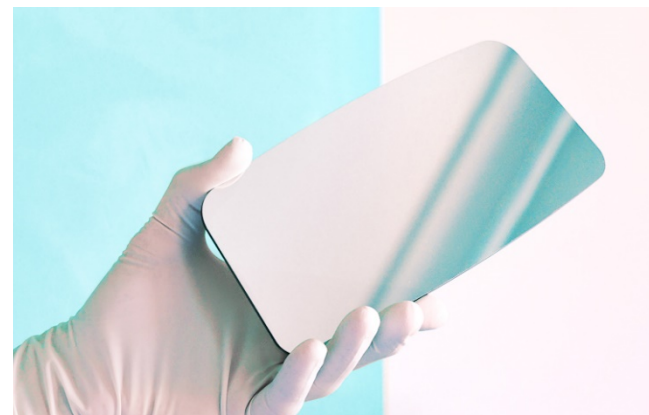
Glass cutting using Smartcleave: Mobile displays



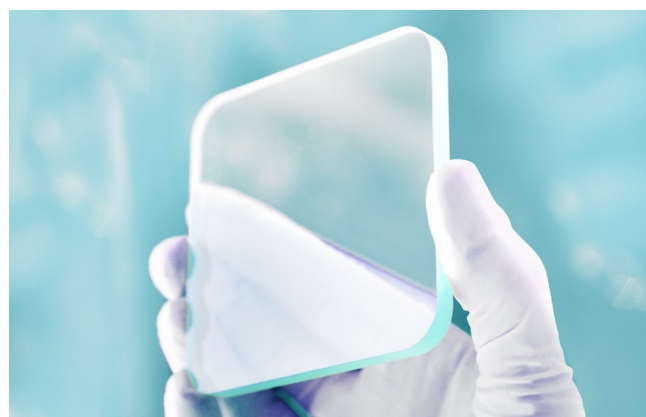
Glass cutting using Smartcleave: Mobile displays



Glass cutting using Smartcleave: Automotive parts



Glass cutting using Smartcleave: architecture

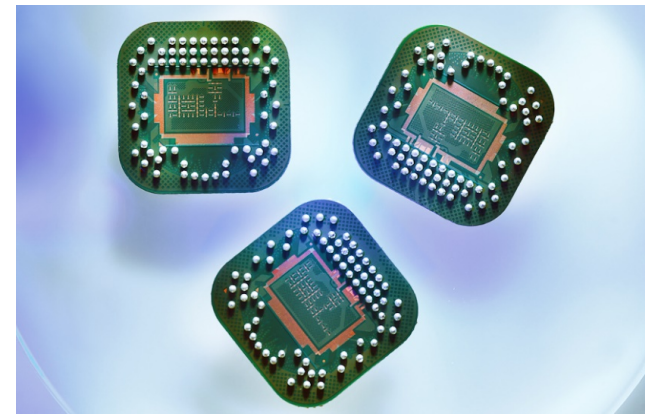


Ceramic parts for electronic applications

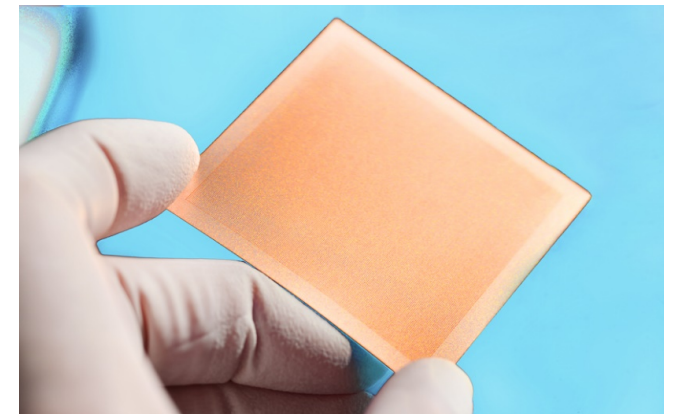


APPLICATION IMAGES PROCESSED BY PICOSECOND LASERS

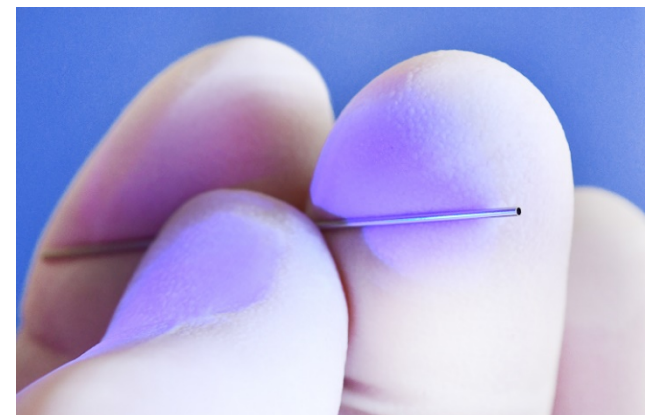
PCB cutting for microelectronics



Via holes drilling in Copper / PCB boards



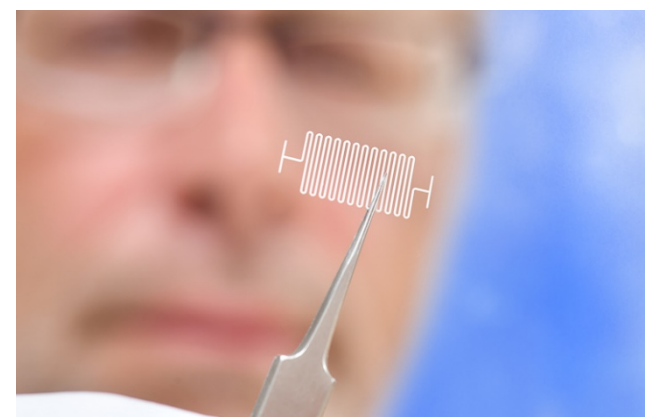
Metal wire cutting



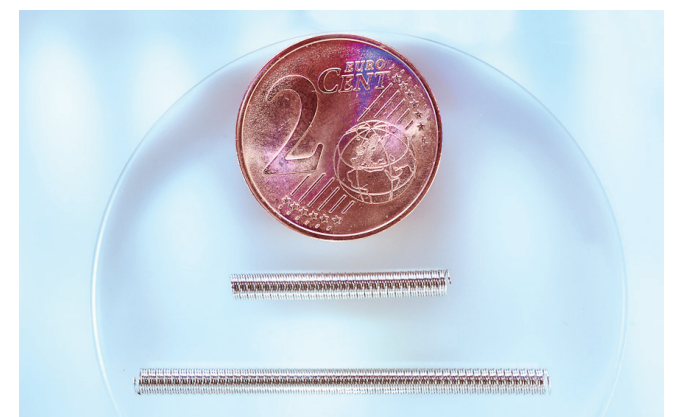
Ceramic gears

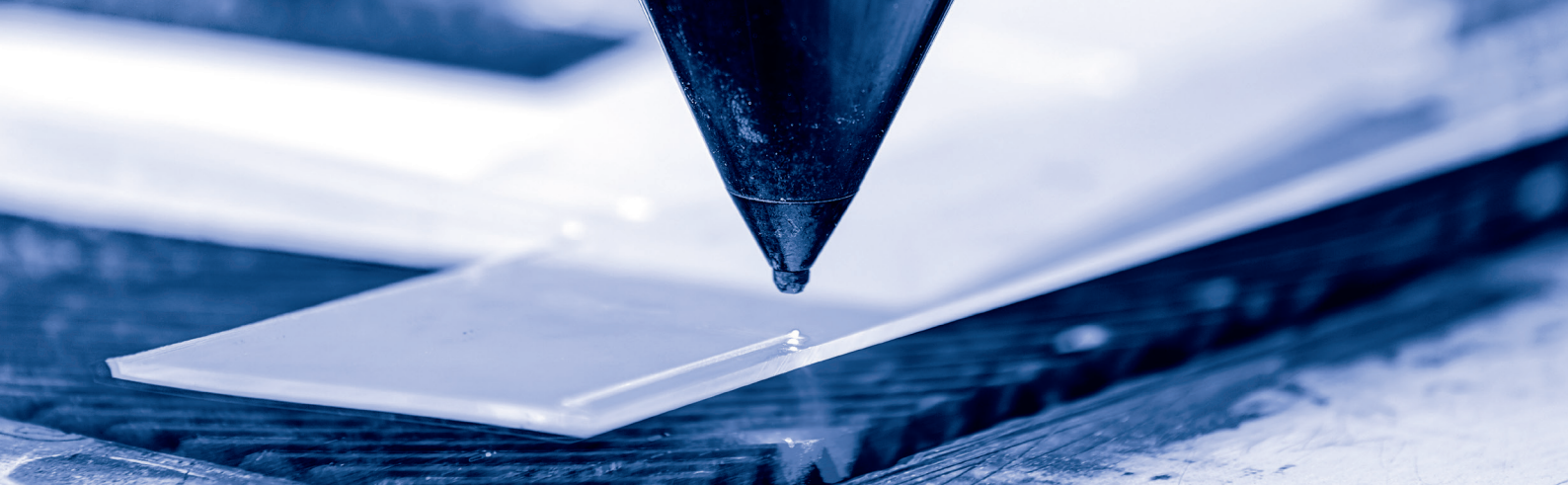


Ceramic meander structure cutting



Metal wire cutting : medical parts





HyperRapid NXT

Picosecond Lasers for Industrial Micro-machining with Maximum Flexibility

HyperRapid NXT는 Coherent의 고출력 산업용 피코초 레이저의 새로운 플랫폼으로, 산업용 Micromachining 응용분야의 기준을 제시하는 제품입니다. HyperRapid NXT는 콤팩트한 모듈형 설계로 동일한 외관 크기 (footprint)와 전자 인터페이스를 갖추고 있어 모든 출력과 파장에 대응합니다.

최고 수준의 레이저 출력을 제공하면서도 유연하게 작동할 수 있어 모든 상황에서 최적의 가공 성능을 발휘합니다. 평균 출력이 높기 때문에 처리량이 높고 부품당 단가가 최소화되는 반면, 반복률 (주파수)과 펄스 에너지를 자유롭게 조절할 수 있어 뛰어난 품질을 달성할 수 있습니다.

전 세계 서비스 지원을 통해 HyperRapid NXT 제품 지원이 이루어지기 때문에 가장 엄격한 수준의 가동률 요건과 보유 비용 요건 (Cost of Ownership)을 모두 충족할 수 있습니다.



FEATURES & BENEFITS

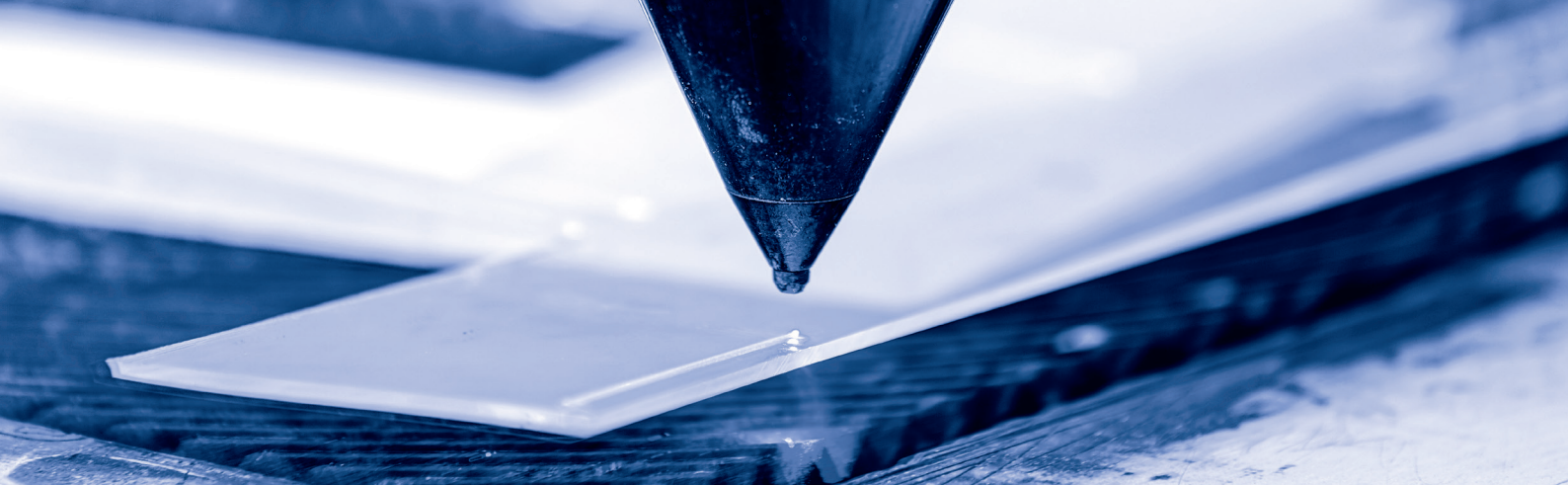
- Single wavelength output: 1064 nm, 532 nm, or 355 nm
- Unique combination of power and operational flexibility delivers significantly reduced cost-per-part for micromachining applications
- SmartPulse™ offers total pulse control to the user
- PulseEQ provides equal, perfectly stabilized pulse energy down to single shots with maximum timing accuracy
- Compact and light weight, common interfacing for all models
- Many product support options to optimize uptime and cost-of-ownership

APPLICATIONS

- Cutting and drilling of glass, sapphire, ceramics, and other brittle materials and composites at highest speeds
- Cutting, drilling, selective removal of complex composite structures from dissimilar materials, including oxides, plastics, and organics
- Micromachining and structuring of large surfaces with line focusing or multiple beams

SPECIFICATIONS ^{1,2,3,4}	HyperRapid NXT						
	1064-50	532-25	355-15	1064-100	532-50	355-30	355-30 HRR
Single Wavelength Output (nm)	1064	532	355	1064	532	355	355
Power ⁵ (W)	50	25	15	100	50	30	30
Pulse Repetition Rate Range (kHz)	Single-Shot to 4000						
Pulse Duration (ps)	<15						
Average Power Stability ⁶ (RMS 1σ,%)	≤1						
Maximum Pulse Energy (μJ)	220	125	75	250	125	75	37
Pulse-to-Pulse Energy Stability ⁸ (RMS 1σ, %)	≤1	≤2	≤2	≤1	≤2	≤2	≤2
PulseEQ Triggering (kHz)	Single-Shot to 1600						
Beam Quality Parameter (M²)	≤1.3						
Beam Diameter, 1 m in front of laser (mm)	5.0 ±0.5						
Beam Divergence, full angle (mrad)	≤1						
Beam Circularity, 1 m in front of laser (%)	≥85						
Beam-Pointing Stability (μrad/°C)	≤50 (peak-to-peak)						
Bore Sight Accuracy	≤1 ≤5						
Lateral (mm) (beam to specified exit location)							
Angular (mrad) (beam to specified exit direction)							
Direction of Polarization (Vertical/Horizontal)	V	H	H	V	H	H	H
Polarization Ratio	>100:1						
Warm-up Time from Chiller Start (minutes)	<45						
Electrical Supply	100 to 230V AC/50 to 60 Hz/2.5 kW						
Mounting Orientation	Horizontal						
Chiller	Water-to-Air or Water-to-Water						
Dimensions	600 x 780 x 245 mm (23.6 x 30.7 x 9.6 in.) 3U 19" rack 500 x 317 x 615 mm (19.7 x 12.5 x 24.2 in.)						
Laser Head							
Power Supply							
SMC Chiller							
Weight	≤67 kg (147.7 lbs.) 16 kg (35.3 lbs.) 43 kg (94.8 lbs.)						
Laser Head							
Power Supply							
SMC Chiller							
BURST MODE OPERATION							
Burst Mode Operation Range (kHz)	Single-Shot to 1600						
Total Energy in the Burst ⁷ (μJ)	500	N/A	N/A	500	N/A	N/A	N/A
Maximum Number of Pulses in Burst ⁸	10						
OPERATING SPECIFICATIONS							
Allowed Temperature Range During Operation	+15°C to +30°C (free of condensation)						
Humidity (%)	0 to 90 RH, non-condensing, Dew-point <22°C						

1 Due to our continuous product improvement program, specifications may change without notice.
2 After warm-up time, chiller temperature = 23 +/- 0.1°C.
3 Steady-state (no pulse gating or change of pulse repetition rate).
4 Single-pulse operation (burst number = 1).
5 Maximum power with variable attenuator and process shutter at maximum transmission.
6 Over 8 hours, ±1°C ambient temperature.
7 With 5 pulses in the burst, at the lowest burst mode operation range frequency.
8 (Pulse repetition rate) x (number of burst) cannot exceed 5 MHz.



HyperRapid NXT SmartCleave

High-Speed and High-Quality Brittle Material Processing

HyperRapid NXT SmartCleave는 투명 재료와 취성 재료를 고속으로 깔끔하게 절단하도록 최적화된 산업용 고출력 피코초 레이저입니다. Coherent가 특허를 보유한 SmartCleave 기술이 적용된 HyperRapid NXT는 임의의 곡선 내 외부 윤곽을 매끄럽게 절단할 수 있는 제품입니다.

HyperRapid NXT SmartCleave는 버스트 에너지가 1 mJ로 두꺼운 기판을 한 번에 절단할 수 있으며 이때 모서리의 조도는 마이크로 단위 미만입니다. 따라서 자동차 및 가전제품 시장에서 새로운 응용분야를 만들어 낼 수 있습니다.

50 W 평균 출력 모델은 비용에 민감한 응용분야에 최적화된 제품이며, 100 W 버전은 최대 2 m/s의 고속 응용분야에 활용 가능합니다.



FEATURES & BENEFITS

- 1064 nm output
- 100 W power to enable high throughput
- Over 1000 µJ burst energy to cut thicker samples
- Specified burst mode operation for repeatable performance in volume manufacturing
- Compact and light weight, same interfacing as standard HyperRapid NX to allow straightforward integration
- Right of use to the Coherent SmartCleave IP is included

APPLICATIONS

- Cutting of strengthened and unstrengthened glass, sapphire, and ceramics
- Scribing and drilling of glass, sapphire, ceramics, and composite materials

OPTICAL SPECIFICATIONS ^{1,2,3,4,5}	HyperRapid NXT SmartCleave 1064-50	HyperRapid NXT SmartCleave 1064-100
Single Wavelength Output (nm)	1064	
Amplifier Single Pulse Repetition Rate (kHz)	170 to 1000	400 to 1000
Output Pulse Repetition Rate Range (kHz)	0 to 1000	
Pulse Duration (ps)	<15	
Average Power (W)	50 ⁶	100
Average Power Stability ⁷ (RMS 1σ,%)	≤1	
Pulse Energy (μJ)	250	
Pulse-to-Pulse Energy Stability (RMS 1σ, %)	≤1	
Beam Quality Parameter (M²)	≤1.3	
Beam Diameter, 1 m in front of laser (mm)	5.0 ±0.5	
Beam Divergence , full angle (mrad)	≤1	
Beam Circularity, 1 m in front of laser (%)	≥85	
Beam-Pointing Stability (μrad/°C)	≤50 (peak-to-peak)	
Bore Sight Accuracy		
Lateral (mm) (beam to specified exit location)	≤1	
Angular (mrad) (beam to specified exit direction)	≤5	
Direction of Polarization	Vertical	
Polarization Ratio	>100:1	
Warm-up Time from Chiller Start (minutes)	<45	
Electrical Supply	100 to 230V AC/50 to 60 Hz/2.5 kW	
Mounting Orientation	Horizontal	
Chiller	Water-to-Air or Water-to-Water	
Dimensions		
Laser Head	600 x 780 x 245 mm (23.6 x 30.7 x 9.6 in.)	
Power Supply	3U 19" rack	
SMC Chiller	500 x 317 x 615 mm (19.7 x 12.5 x 24.2 in.)	
Weight		
Laser Head	70 kg (154.3 lbs.)	
Power Supply	16 kg (35.3 lbs.)	
SMC Chiller	43 kg (94.8 lbs.)	
BURST MODE OPERATION		
Maximum Number of Pulses in the Burst ⁸	20	
Burst Mode Operation Range (kHz)	See table on next page	
Total Energy in the Burst (μJ)	See table on next page	
OPERATING SPECIFICATIONS		
Allowed Temperature Range During Operation	+15°C to +30°C (free of condensation)	
Humidity (%)	0 to 90 RH, non-condensing, Dew-point <22°C	

1 At lowest amplifier pulse repetition rate, unless stated otherwise.
2 Maximum output power (variable attenuator and process shutter at maximum transmission).
3 After warm-up time.
4 Steady-state (no pulse gating or change of pulse repetition rate).
5 Single-pulse operation.
6 At 500 kHz.
7 Over 8 hours, ± 1°C ambient temperature.
8 Maximum number of pulses in the burst depends on repetition rate.

Specifications: HyperRapid NXT SmartCleave 1064-50

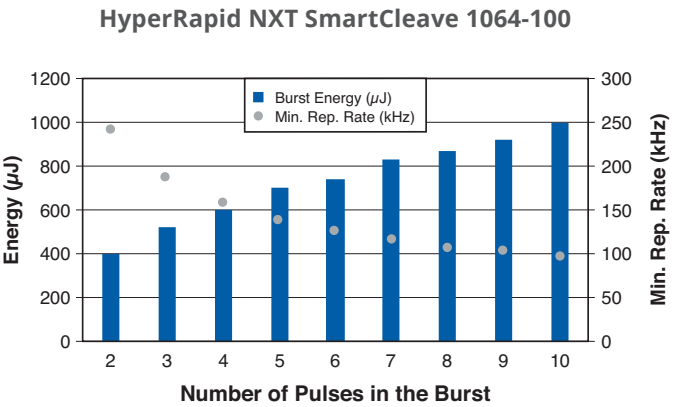
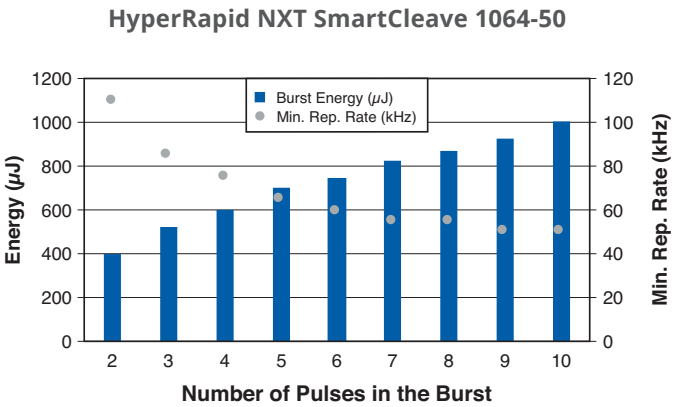
Number of Pulses in the Burst	Burst Energy ¹ (μJ)	Min. Rep. Rate (kHz)	Max. Rep. Rate (kHz)
2	400	110	1000
3	520	85	1000
4	600	75	1000
5	700	65	1000
6	750	60	830
7	830	55	710
8	875	55	620
9	925	50	550
10	1000	50	500

¹ Burst energy specification is given at the minimum repetition rate.

Specifications: HyperRapid NXT SmartCleave 1064-100

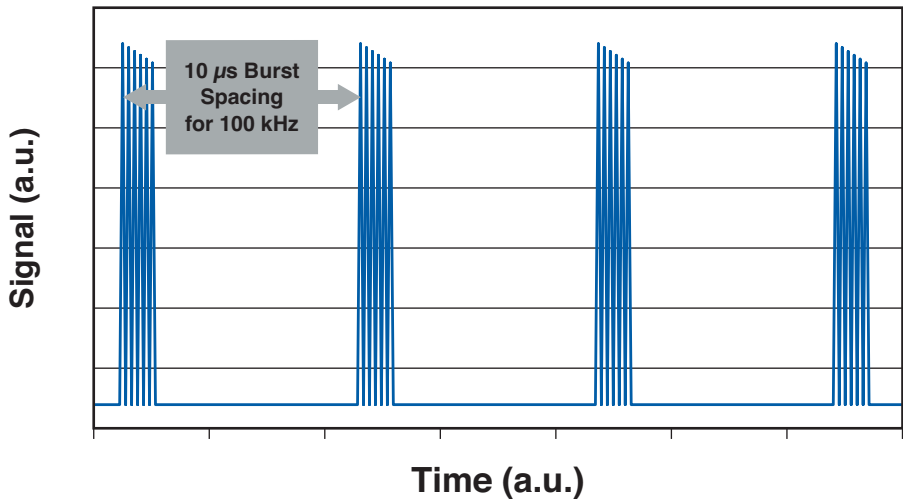
Number of Pulses in the Burst	Burst Energy ¹ (μJ)	Min. Rep. Rate (kHz)	Max. Rep. Rate (kHz)
2	400	240	1000
3	520	185	1000
4	600	155	1000
5	700	135	1000
6	750	125	830
7	830	115	710
8	875	105	620
9	925	100	550
10	1000	95	500

¹ Burst energy specification is given at the minimum repetition rate.



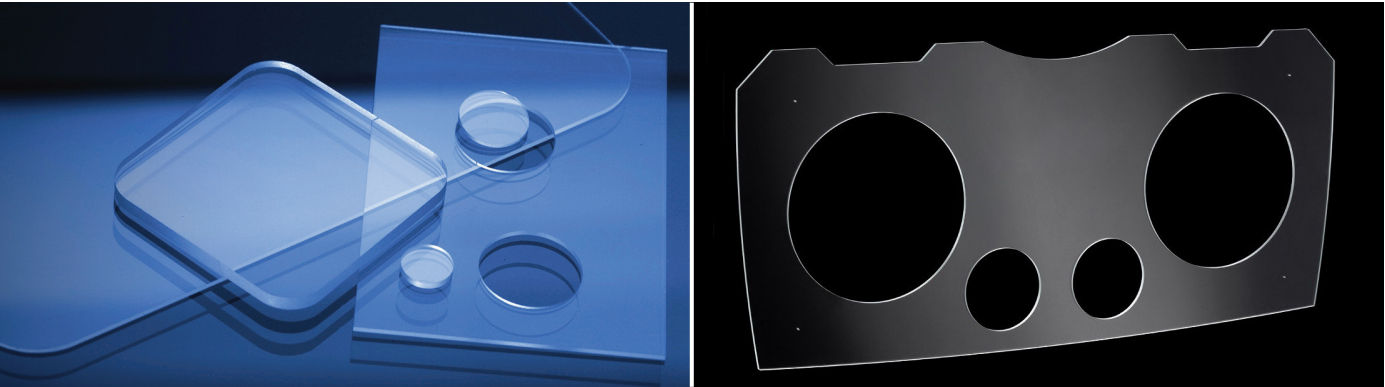
HyperRapid NXT Smartcleave Burst Mode Operation

Oscilloscope trace showing 5 pulses in the burst at 100 kHz repetition rate. The pulses in the burst are separated by 25 ns



HyperRapid NXT SmartCleave Applications

Typical industrial applications served by HyperRapid NXT SmartCleave: glass cutting (left), automotive dashboard cutting (right)





RAPID LX

Picosecond Lasers for Industrial Micro-machining with Maximum Flexibility and Unsurpassed Profitability

Rapid LX는 최첨단 산업용 피코초 레이저 제품군의 최신 제품입니다. 특히 까다로운 재료를 절단하는데 최적화된 높은 펄스 에너지와 버스트 기능은 물론 최고의 품질을 요구하는 절단, 스크라이빙 및 드릴링 작업에 적합한 안정적인 UV 펄스를 제공하도록 특별히 설계되었습니다.

검증된 설계는 전체 반복률 (주파수) 범위에서 우수한 빔 품질과 안정성을 제공합니다. PulseEQ 기능은 공정 개발에서 최대한의 유연성을 제공하고 복잡한 산업 응용 분야의 처리량과 공정 품질을 크게 향상시키는 데 도움이 됩니다. 새로운 Rapid LX는 모든 조건에서 완벽한 Align과 성능을 유지하기 위해 견고한 모듈식 설계를 특징으로 합니다. 작은 외관 사이즈 (Footprint), 원 박스 (one-box) 디자인 및 잘 정렬된 Beam pointing 및 Bore sight 사양은 손쉬운 통합을 보장합니다.

Rapid LX는 가장 까다로운 가동 시간 및 소유 비용 요구 사항을 충족하기 위해 전 세계 서비스 지원으로 백업됩니다.



FEATURES & BENEFITS

- 1064 nm or 355 nm
- Unique combination of pulse energy, operational flexibility and delivers significantly reduced cost-per-part for micromachining applications
- PulseEQ provides equal, perfectly stabilized pulse energy down to single shots with maximum timing accuracy
- Compact and light weight, with optimized footprint
- Many product support options to optimize uptime and cost-of-ownership

APPLICATIONS

- Cutting, drilling, selective removal of complex composite structures from dissimilar materials, including oxides, plastics and organics
- Ideally suited for applications in flat panel display and microelectronics processing
- Micromachining and structuring of large surfaces with line focusing or multiple beams

Industrial Ultrashort Pulse Picosecond Lasers **RAPID LX**

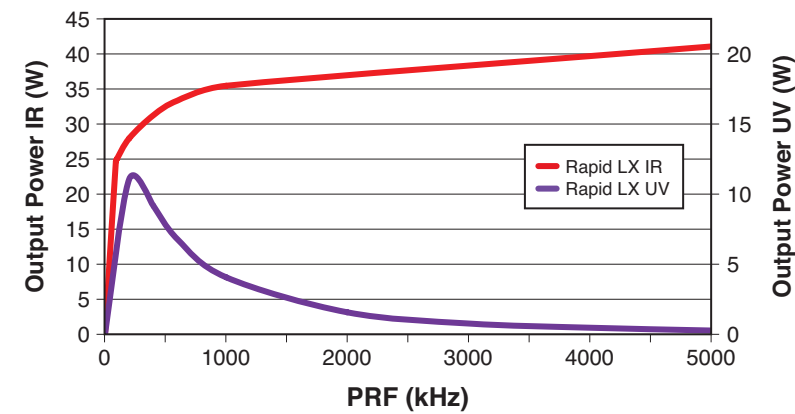


SYSTEM SPECIFICATIONS ^{1,2}	RAPID LX IR	RAPID LX UV
Single Wavelength Output (nm)	1064	355
Power ³ (W)	30	10
Pulse Repetition Rate Range (kHz)	Single Shot to 5000 kHz	
Pulse Duration ⁴ (ps)	<10	
Average Power Stability ⁵ (RMS 1σ,%)	≤1	
Maximum Pulse Energy ⁶ (μJ)	250	50
Pulse-to-Pulse Energy Stability ⁷ (RMS 1s, %)	≤1	≤2
PulseEQ Triggering	Single Shot to 1600 kHz	
Beam Quality Parameter (M²)	≤1.3	
Beam Diameter, 1 m in front of laser (mm)	3.0 ± 0.3	
Beam Divergence, full angle (mrad)	≤1	
Beam Circularity, 1 m in front of laser (%)	≥85	
Beam-Pointing Stability (μrad/°C)	≤50 (peak-to-peak)	
Bore Sight Accuracy		
Lateral (mm) (beam to specified exit location)	≤1	
Angular (mrad) (beam to specified exit direction)	≤5	
Direction of Polarization (vertical/horizontal)	H	V
Polarization Ratio	>100:1	
Warm-up Time from Chiller Start (minutes)	<40	
Electrical Supply	48 V DC ±10%, 1 kW 100 to 230 V AC, 50 to 60 Hz, 1 kW (PSU)	
Mounting Orientation	Horizontal	
Chiller	Water-to-Air or Water-to-Water	
Laser Head		
Dimensions	738 x 200 x 301 mm (29.06 x 7.87 x 11.85 in.)	
Weight	51 kgs (112.4 lbs)	
Power Supply		
Dimensions	1U 19" rack	
SMC Chiller		
Dimensions	500 x 317 x 615 mm (19.69 x 12.48 x 24.21 in.)	
BURST MODE OPERATION		
Burst Mode Operation Range ⁸ (kHz)	Single Shot to 2500	
Maximum Number of Pulses in Burst ⁸	20	
OPERATING SPECIFICATIONS		
Allowed Temperature Range During Operation	+15°C to +30°C (free of condensation)	
Humidity [(0 to 90)% RH]	Non-condensing, Dew-point <22°C (71.6°F)	

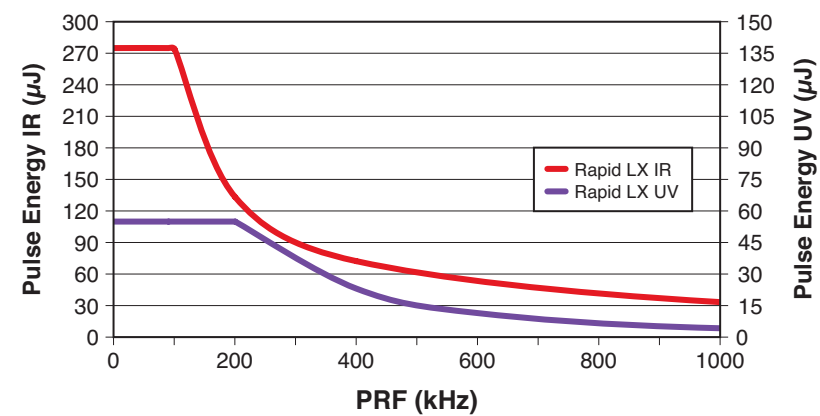
1 Due to our continuous product improvement program, specifications may change without notice.
2 All specifications at respective optimized repetition rate.
3 Maximum power at 1,000 kHz and 200 kHz respectively.
4 UV Autocorrelation at 200 kHz operation.
5 Over 8 hours, ± 1°C ambient temperature.
6 Single-pulse operation (burst number = 1).
7 Steady-state (no pulse gating or change of pulse repetition rate).
8 (Pulse repetition rate) x (number of burst) cannot exceed 5 MHz.

TYPICAL PERFORMANCE DATA

Rapid LX IR and UV:
Typical Power Output



Rapid LX IR and UV:
Typical Single Pulse Energy Output



Paladin Compact 355-2000/4000

Air-Cooled, Quasi-CW Modelocked UV Lasers

Paladin Compact는 매우 까다로운 OEM 응용분야를 위한 공냉식 소형 피코초 UV 레이저입니다. 120 MHz에서 높은 출력 안정도를 갖춘 준연속파 (quasi-cw) 레이저 펄스는 정밀한 이미징 응용분야에 매우 유용합니다.

Paladin Compact는 고난이도의 산업 환경에서 이루어지는 365일 24시간 양산 작업에 최적화되어 있습니다. Coherent PermAlign™ 기술이 적용되어 레이저의 견고성이 우수하고 현장에서 오랜 수명이 검증되었습니다. 현장에서 교체 가능한 다이오드 모듈과 클린 룸에서 제작된 밀봉형 레이저 공진 디자인 덕분에 긴 수명이 가능합니다.

FEATURES & BENEFITS

- PermAlign™ solder-bonded optics technology for ultra-robust operation in tough industrial environments
- Cleanroom-built and hermetically sealed for long-term reliability in commercial applications
- Aluminum-free Active Area (AAA™) diode material for industry-leading lifetime
- Smart power supply for complete hands-free operation
- Compact and modular laser design for easy integration
- Highest efficiency: only one pump diode

APPLICATIONS

- Materials Processing
- Stereolithography
- Inspection

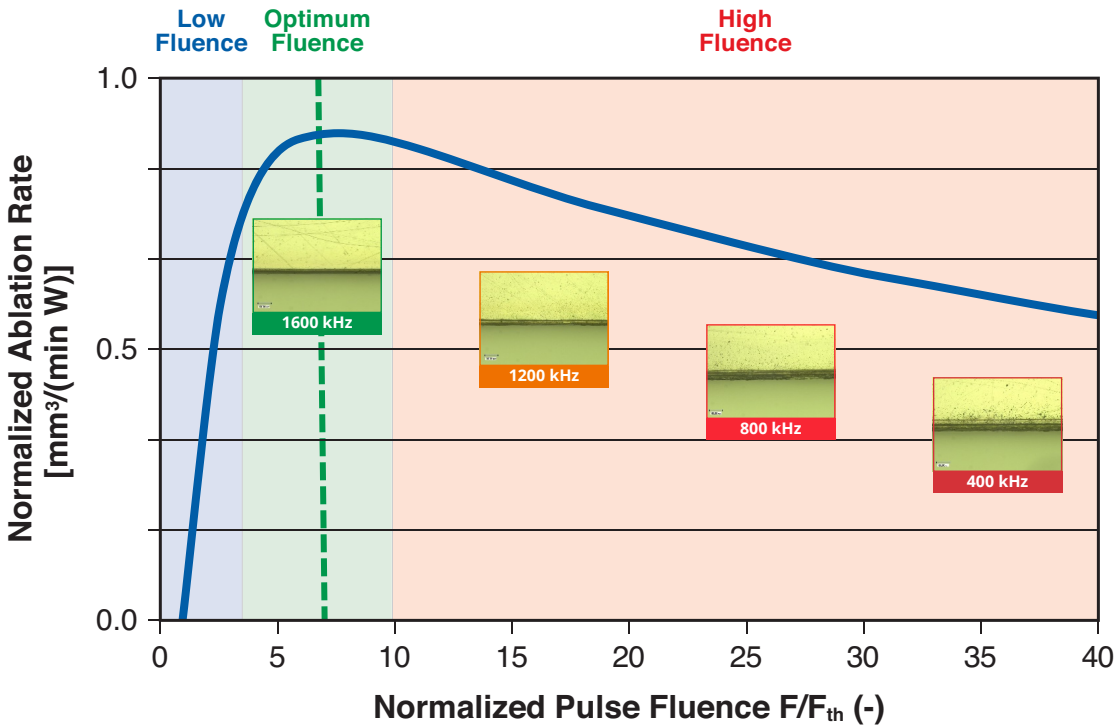


SPECIFICATIONS	Paladin Compact 355-2000/4000
Wavelength (nm)	355
Output Power (W) Paladin Compact 355-2000 Air-Cooled Paladin Compact 355-4000 Air-Cooled	>2 >4
Repetition Rate (MHz)	120 ±2
Pulse Length (ps)	15 at 1064 nm
Spatial Mode	TEM ₀₀
M ²	<1.2
Beam Diameter (mm)	1 ±10%
Beam Divergence (μrad) (full angle)	<550
Beam Ellipticity	0.9 to 1.1
Pointing Stability after Warm-Up (μrad/°C)	<25
Polarization	Linear, >100:1, vertical
Noise (10 Hz to 2 MHz)	<1% (rms)
Long-term Power Stability	<±2%
Maximum Warm-up Time From Standby (minutes) From Cold Start (hours)	<30 <1
Static Alignment Tolerances ¹ Beam Position (mm) Beam Angle (mrad)	<±0.5 <±2.5

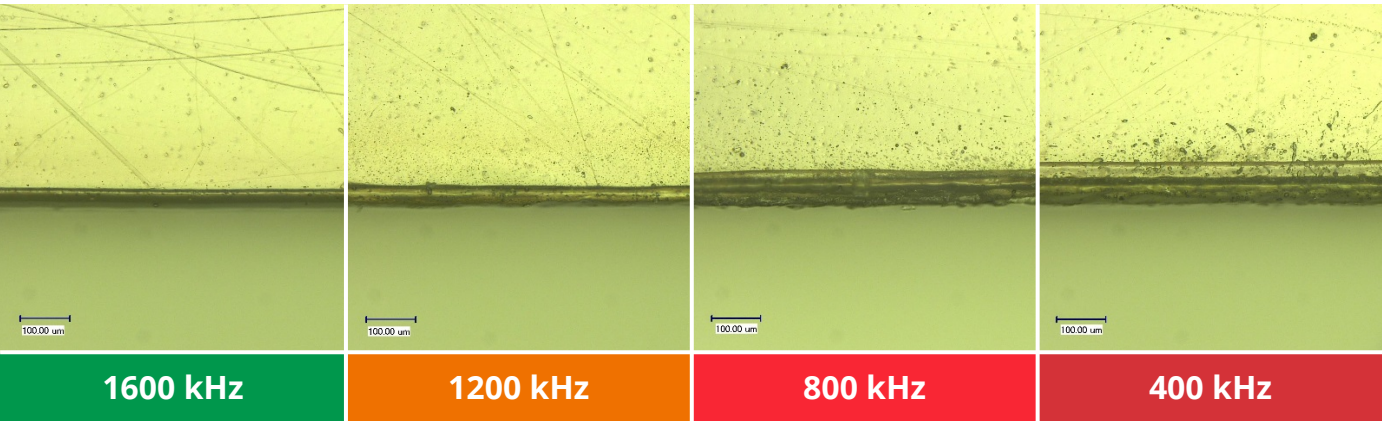
UTILITY AND ENVIRONMENTAL REQUIREMENTS	
Operating Voltage (VAC)	90 to 230, 50 to 60 Hz
Power Consumption (VA)	1000 (maximum)
Ambient Temperature	15 to 35°C (59 to 95°F)
Dimensions (W x H x L) Laser Head Power Supply Pump Fiber's Length	216 x 127 x 686 mm (8.5 x 5.0 x 27.0 in.) 482 x 177 x 505 mm (19.0 x 7.0 x 19.9 in.) 4.5m (15 ft.)
Weights Laser Head Power Supply	25 kg (55 lbs.) 28 kg (62 lbs.)

1 All measurements, such as power and energy made at 20°C ±0.5°C coolant temperature, 80 kHz PRF, and 5 μsec PW command.
1 Power Stability based on $\pm(P_{max}-P_{min})/(2 \times P_{max})$ average power measurement at constant duty cycle after 10-minute warmup at operating condition.
3 Pulse Width and Peak Power will vary depending on operating parameters, specifically Pulse Frequency and Duty Cycle.
4 Gaussian Correlation based on Spiricon Near Field Raw Beam measurement at 80 cm distance from laser output, 20°C, and steady state operation at 80 kHz PRF, and 5 μsec PW.
5 Ratio based on Far Field Divergence measurement at 20°C, 80 kHz PRF, and 5 μsec PW command.
6 Weight and Dimensions with Circular Polarizer or Isolator.
7 OptiShield+ is a trademark of the OptiTemp.

OPTIMUM FLUENCE LEADS TO MAXIMUM ABLATION RATE



MAXIMUM ABLATION RATE AT e² TIMES (~7.4) THE THRESHOLD FLUENCE

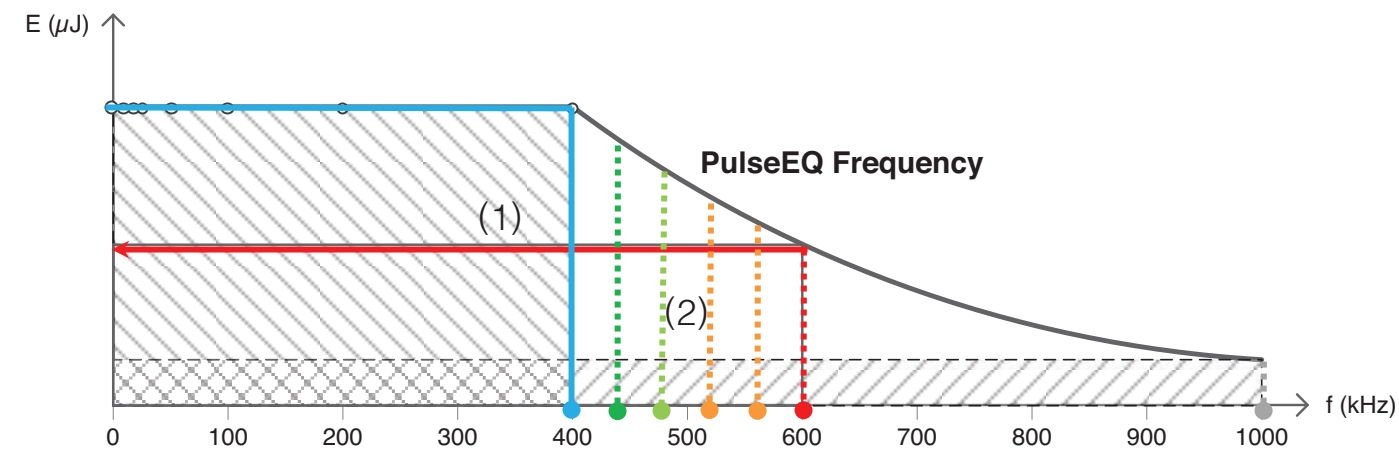


PulseEQ - SINGLE PULSE PICTURE

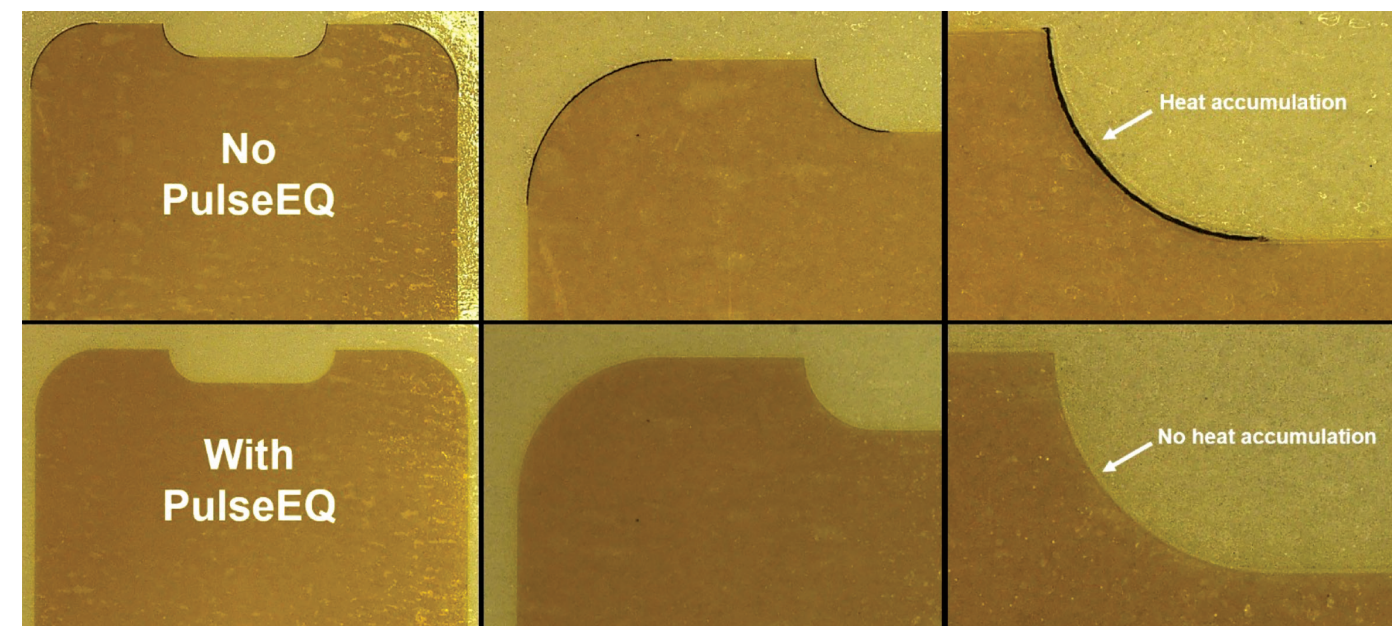
Without PulseEQ only repetition rates at PRR/n (here 400...200...100 kHz etc.)

Pulse EQ offers:

- Pulse energy stays constant for any frequency between 0 and PulseEQ frequency
- Changing PulseEQ frequency will set maximum pulse energy and usable frequency range



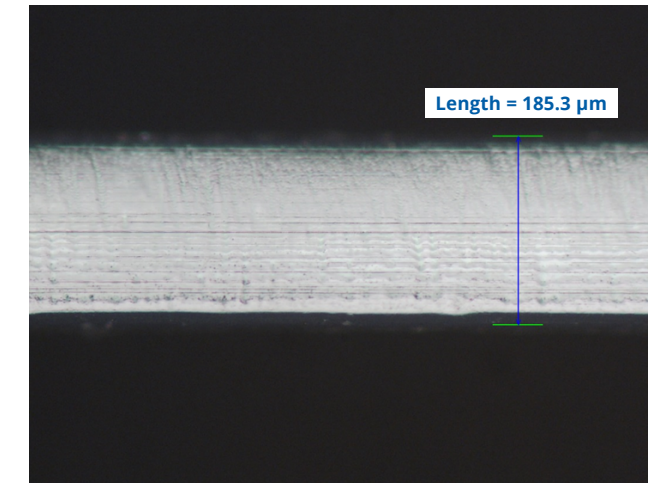
HyperRapid NXT PulseEQ TESTING RESULTS POLYIMIDE CUTTING



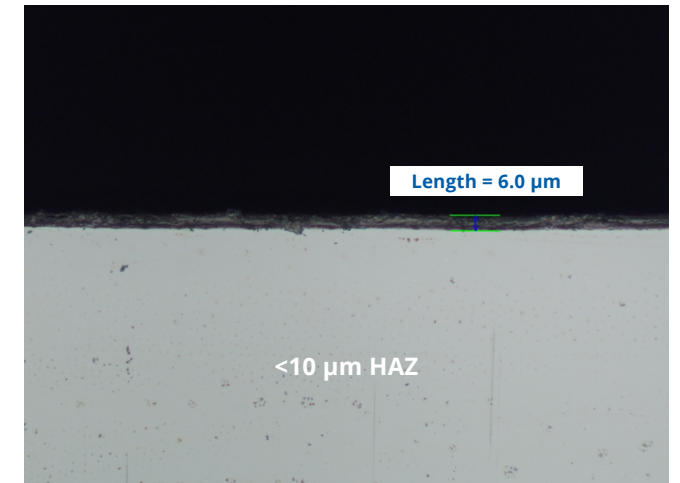
APPLICATION IMAGES PROCESSED BY FEMTOSECOND LASERS

PET with ITO Layer

4-pulse burst, 167 mm/sec



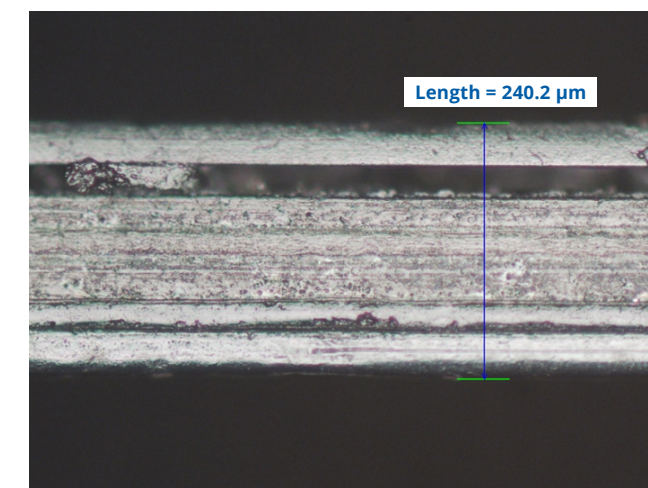
Cross section of 185-micron thick PET film with 100-nm ITO coating on upper surface.



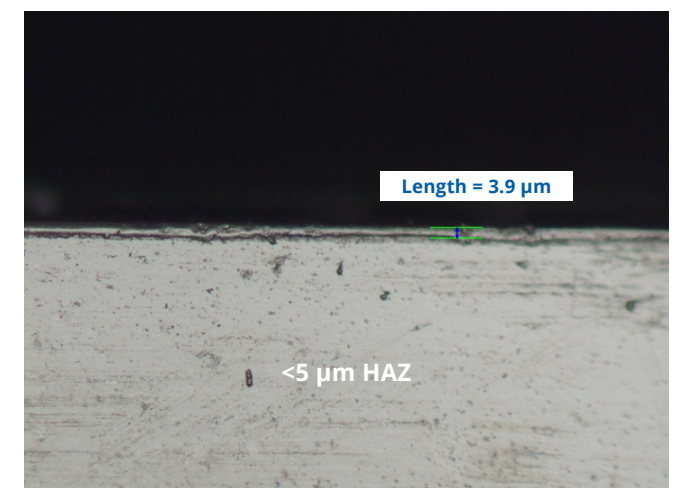
Top (laser incident surface) view of ITO-coated PET film cut using Monaco UV laser. HAZ is below 10 microns.

Polarizer with PF Layers

4-pulse burst, >100 mm/sec



Cross section of 240-micron thick multi-layer polymer polarizer sheet with protective films still in place cut using Monaco UV.

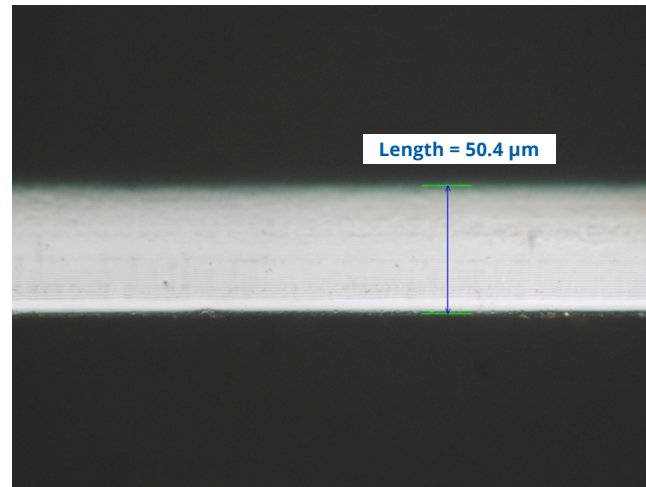


Top (laser incident surface) view of polymer polarizer sheet cut using Monaco UV laser. HAZ is below 5 microns.

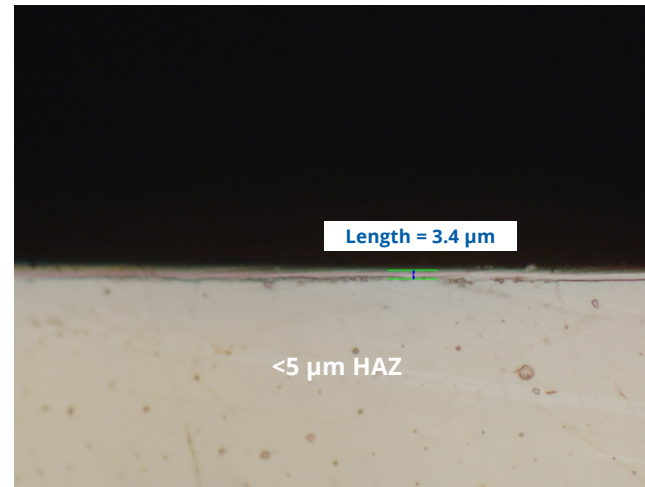
APPLICATION IMAGES PROCESSED BY FEMTOSECOND LASERS

Polyimide

4-pulse burst, 143 mm/sec



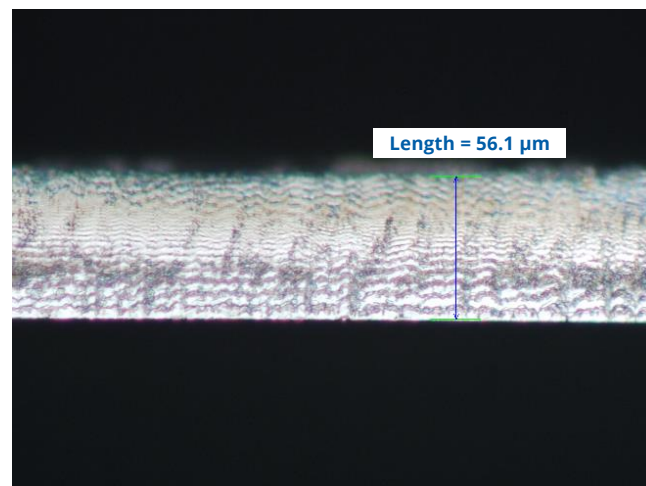
Cross section of 50-micron thick polyimide film cut using Monaco UV.



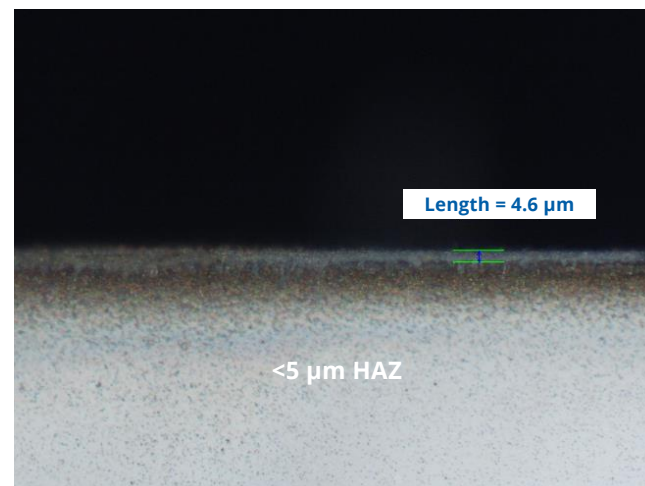
Top (laser incident surface) view of polyimide sheet cut using Monaco UV laser. HAZ is below 5 microns.

Silicon Wafer

4-pulse burst, >100 mm/sec



Cross section of 56-micron thick silicon wafer cut using Monaco UV.



Top (laser incident surface) view of silicon wafer cut using Monaco UV laser. HAZ is below 5 microns.

Monaco UV Industrial UV Femtosecond Laser

Monaco UV는 초정밀, 최소 열영향부(HAZ) 레이저 가공에 이상적인 제품입니다. 파장이 345 nm, Pulse width 350 fs 미만인 이 레이저는 재료의 가공 threshold를 최대 효율로 가공할 수 있도록 설계 및 최적화되었습니다. Single pulse 또는 Seed Burst mode 모두에서 High rep.rate으로 최적화된 energy 값을 사용하면서 365일 24시간 대량 생산도 가능합니다. Monaco UV THG 플랫폼은 산업용 Monaco IR 파이버 레이저에 추가되었으며 업계를 선도하는 Coherent의 HASS/HALT 신뢰도 규정에 따라 설계되고 테스트되어 가장 우수한 Life time을 구현하였습니다. Monaco UV는 고성능 산업용 펄스초 레이저 가공의 표준을 제시합니다.

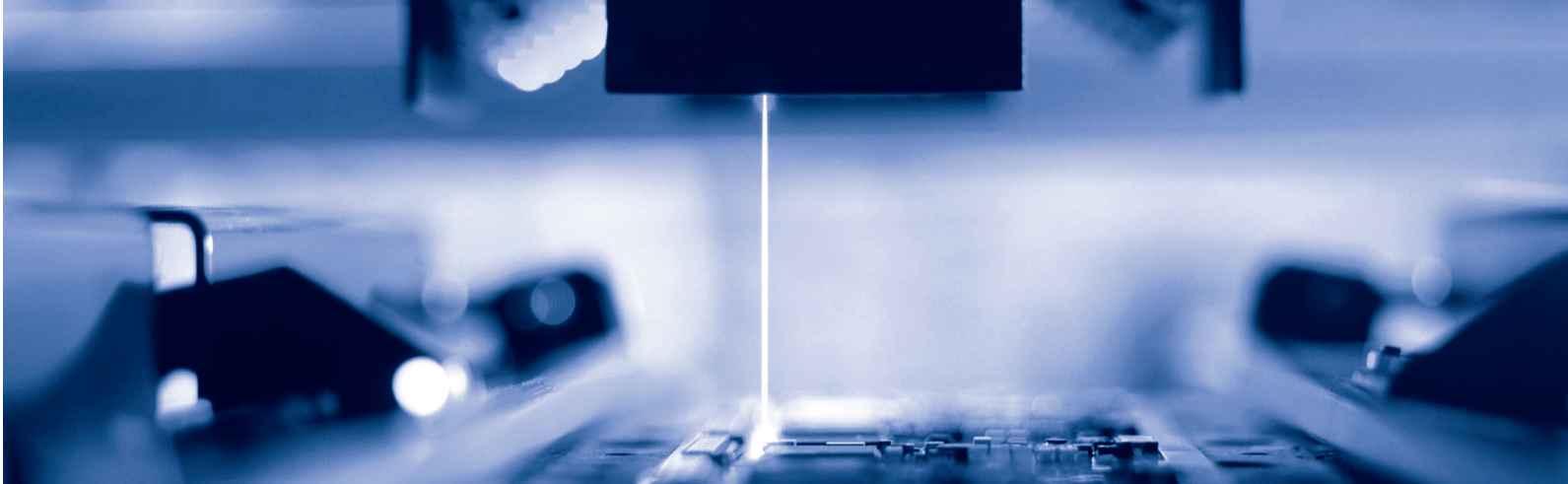
FEATURES & BENEFITS

- Energy matched to material ablation thresholds for high efficiency material removal
- >1 MHz rep rates and UV seeder burst mode for high throughput
- 345 nm, <350 fs for ultra-low HAZ in thin films, foils, and semiconductor wafers
- Proprietary integrated THG stage for stable long-life UV output
- HALT/HASS testing protocols for industry leading reliability
- PulseEQ pulse-on-demand for constant pulse spacing in contour cutting with stages and galvos

APPLICATIONS

- OLED Module and Contour Cutting
- Semiconductor Wafer Cutting
- Thin-Film and Foil Cutting
- Display Touch Sensor Cutting
- Flex Material Processing





Monaco 517

Industrial Femtosecond Laser

Monaco 517은 MOPA 아키텍처 기반의 산업용 펄초 레이저입니다. 이 레이저 제품군은 365일 24시간 내내 높은 가동률을 제공하도록 설계되었으며 517 nm에서 펄스당 40 μ J 이상을 제공합니다. 이 에너지는 750 kHz에서 사용 가능하여 높은 가공 threshold 값을 가진 재료를 매우 빠른 속도로 가공할 수 있습니다. Green-517 nm 파장은 구리, 폴리머와 같은 특정 재료와 상호작용 커플링이 우수하며 초점 심도가 탁월하다는 장점도 있습니다. Second Harmonizer unit은 레이저 공진기 안에 완벽히 통합되어 산업 환경에 적합한 견고하고도 매우 안정적인 Green-517 nm 레이저가 출력됩니다.

FEATURES & BENEFITS

- 40 μ J/pulse for processing of high ablation threshold materials
- 30 W average power for high throughput
- <350 fs standard pulsewidth for low HAZ machining
- Green wavelength is ideal for polymer, copper, and ceramics processing
- Green output to provide better depth of focus and smaller spot size
- Compact single box design for ease of integration
- HALT-designed and HASS-verified to ensure quality and reliability

APPLICATIONS

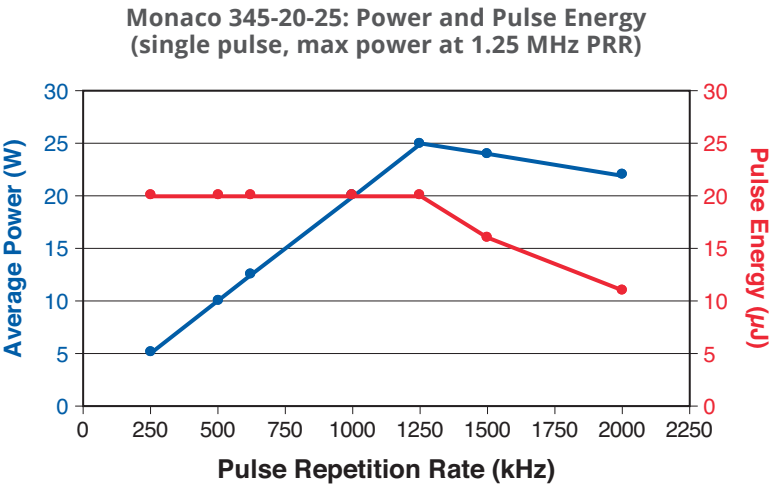
- Polymer Cutting
- Flex PCB Cutting
- IC Package Cutting
- Si Wafer Singulation
- Medical Device Manufacturing
- Thin Metal Foil Cutting and Texturing



OPTICAL SPECIFICATIONS ¹	Monaco 345-20-25	Monaco 345-38-30
Fundamental Center Wavelength (nm)	345 $\pm$ 2	
Output Power (W)	25	30
Energy (μ J)	20 (1.25 MHz)	37.5 (800 kHz)
Pulse Repetition Rate (kHz)	Single-Shot to 4 MHz	
Pulse Width (fs)	$\leq$ 350	$\leq$ 500
Pulsewidth Tuning Range	NA	
Spacial Mode	$M^2 < 1.3$	
Burst Mode (pulses at 800 and 1000 kHz)	3, 5	
PulseEQ Operation	Up to 1 MHz rep rate	
Beam Divergence (mrad, 2 θ)	$\leq$ 0.25	
Beam Diameter at Output ² (mm, D4 $\pm\sigma$)	5.0 $\pm$ 0.5	
Beam Circularity ² (%)	$\geq$ 85	
Polarization Ratio ³	$>100:1$	
Polarization Direction	Horizontal	
Beam Pointing Stability (urad/K)	$\leq$ 25	
Pulse Energy Stability ⁴ (% rms, $\pm\sigma$)	<3	
Warm-up Time (minutes)		
Cold Start	$\leq$ 45	$\leq$ 60
Warm Start	$\leq$ 15	$\leq$ 15
Long-Term Pointing Stability (urad)	$\pm$ 2.5 over 8 hours	
Head Weight	57 kg (126.6 lbs)	60 kg (132.3 lbs)
Power Consumption ⁵ (typical)(W)	<500 W, 48 VDC	<800 W, 48 VDC

1 All specifications at maximum pulse energy.
2 Measured 1 m ahead of laser front.
3 External isolation required depending on application.
4 External temp held to $\pm$ 1°C.
5 Optional 110 to 240 VAC power supply available.

TYPICAL PERFORMANCE DATA

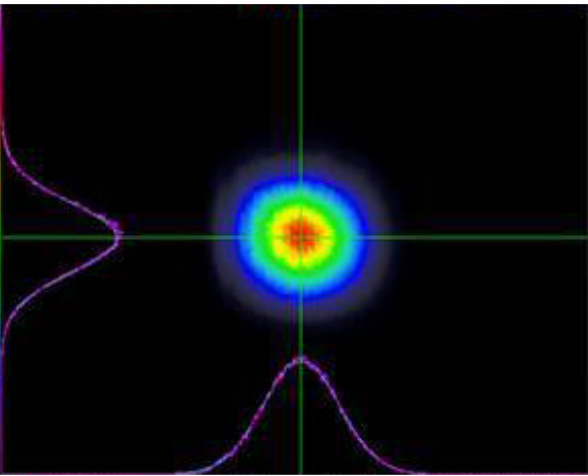


OPTICAL SPECIFICATIONS ¹	Monaco 517-20-20	Monaco 517-40-30
Fundamental Center Wavelength (nm)	517 ±5	517 ±5
Output Power (W)	20	30
Energy (μJ)	20 (at 1 MHz)	40 (at 750 kHz)
Repetition Rate	Single-shot to maximum repetition at maximum energy (defined above)	
Pulsewidth (fs)	<350	
Tuning Range	Custom pulse width range may optimized at factory	
Spatial Mode	TEM ₀₀ , M ² <1.2	
Beam Divergence (mrad, 2θ)	<1	
Beam Diameter at Output ² (mm, 1/e ²)	2.0 ±0.2	
Beam Circularity (%)	>85	
Polarization Ratio	>100:1	
Polarization Direction ³	Vertical ±3°	
Beam Pointing Stability (μrad/°C)	<25	
Pulse Energy Stability (%) (RMS)	<1.5	
Power Stability (%) (RMS, 2σ)	<1.5	
Warm-up Time (minutes)		
Cold Start	<45	
Warm Start	<15	
Long-term Pointing Stability (μrad)	±25 over 8 hours	
Head Weight	50 kg (110 lbs.)	
External Comms	RS-232, Ethernet, USB	
Power Consumption ⁴ (typical)	48VDC, <500W	
OPERATING SPECIFICATIONS		
Temperature (non-condensing)		
Laser Head	+10 to 30°C (50 to 86°F)	
Power Supply	-20 to +60°C (-4 to 140°F)	
Non-Operation (storage)	5 to 65°C (41 to 149°F)	
Relative Humidity (%)	<90, non-condensing	
SHIPPING SPECIFICATIONS		
Temperature	-20 to +60°C (-4 to 140°F)	

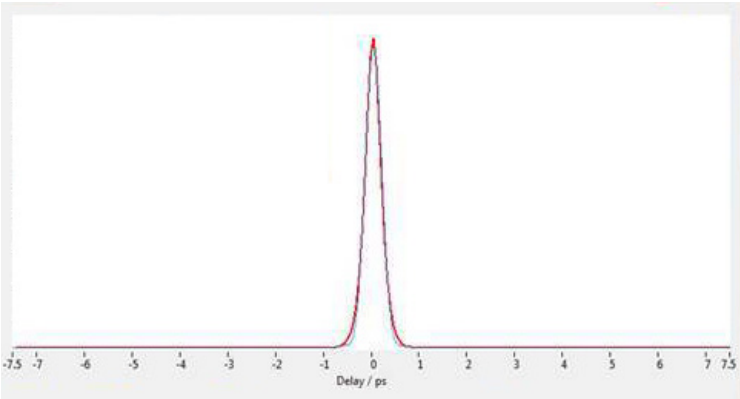
1 All specifications at maximum energy.
2 Measured at 1m from laser output window.
3 External isolation required depending on application.
4 Optional 110 to 240VAC power supply available.

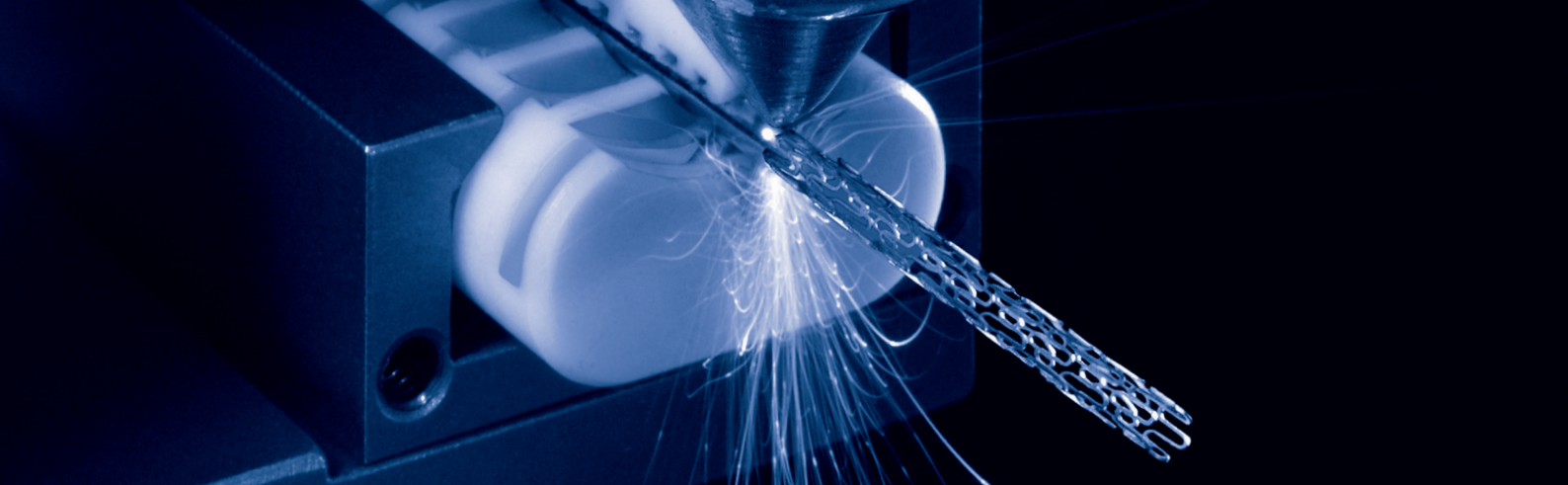
TYPICAL PERFORMANCE DATA

Monaco 517 Sample Spatial Mode at 1 MHz



Monaco 517 Sub-350 fs Temporal Profile (Autocorrelator)





Monaco 1035

Industrial Femtosecond Laser

Monaco 1035는 MOPA 아키텍처 기반의 산업용 펄초 레이저입니다. 이 레이저 제품군은 365일 24시간 내내 높은 가동률을 제공하도록 설계되었으며 1035 nm에서 펄스당 80 μ J을 제공합니다. 60 W에서 표준 반복률이 최대 50 MHz로, 재료 가공이나 초소형 전자기기 응용분야에서 현재 및 미래에 발생할 수 있는 Throughput 기대치도 충족할 수 있습니다. 350 fs 미만인 Monaco의 펄스 폭을 이용하면 FPD 및 모바일 시장의 복잡한 Multi layers뿐만 아니라 유리나 금속 같은 균질적인 재료의 가공에도 적합합니다. 뿐만 아니라 바로 Pulth width를 조정할 수 있기 때문에 사용자의 편의에 따라 10 ps 이상으로 펄스 폭을 변경할 수 있습니다.

FEATURES & BENEFITS

- 80 μ J/pulse for processing of high ablation threshold materials
- 60 W average power for high throughput
- <350 fs standard pulsewidth for low HAZ machining
- Variable pulsewidth from <350 fs to >10 ps for process tailoring
- Repetition rate to 50 MHz for fast processing with polygon scanners
- >320 μ J seeder burst mode for glass processing
- Compact single box design for ease of integration
- HALT-designed and HASS-verified to ensure quality and reliability

APPLICATIONS

- Glass Cutting and Welding
- Thin Film/Foil Cutting
- IC Package Cutting
- Medical Device Manufacturing
- OPA Pumping for Optogenetics



Industrial Ultrashort Pulse Femtosecond Lasers Monaco 1035

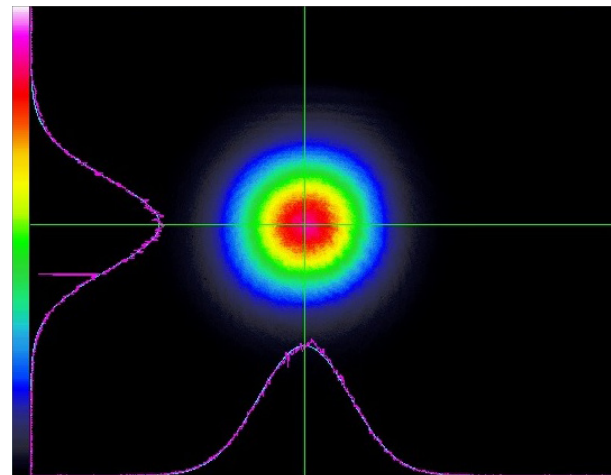


OPTICAL SPECIFICATIONS ¹	Monaco 1035-40-40	Monaco 1035-80-60
Fundamental Center Wavelength (nm)	1035 ±5	1035 ±5
Output Power (W)	40	60
Energy (μJ)	40 (at 1 MHz)	80 (at 750 kHz)
Seeder Burst Mode (μJ)	>200	>320
Repetition Rate	Single-shot to 1 MHz, higher rep. rates without AOM pulsepicking: 1 to 50 MHz standard	
Pulsewidth (fs)	<350	
Tuning Range	<350 fs to >10 ps	
Spatial Mode	TEM ₀₀ , M ² <1.2	
Beam Divergence (mrad, 2θ)	<1	
Beam Diameter at Output ² (mm, 1/e ²)	2.7 ±0.3	
Beam Circularity (%)	>85	
Polarization Ratio	>100:1	
Polarization Direction ³	Vertical ±3°	
Beam Pointing Stability (μrad/°C)	<25	
Pulse Energy Stability (%) (RMS)	<1.5	
Power Stability (%) (RMS, 2σ)	<1.5	
Warm-up Time (minutes)		
Cold Start	<45	
Warm Start	<15	
Long-term Pointing Stability (μrad)	±25 over 8 hours	
Head Weight	50 kg (110 lbs.)	
External Comms	RS-232, Ethernet, USB	
Power Consumption ⁴ (typical)	48VDC, <500W	
OPERATING SPECIFICATIONS		
Temperature (non-condensing)		
Laser Head	+10 to 30°C (50 to 86°F)	
Power Supply	-20 to +60°C (-4 to 140°F)	
Non-Operation (storage)	5 to 65°C (41 to 149°F)	
Relative Humidity (%)	<90, non-condensing	
SHIPPING SPECIFICATIONS		
Temperature	-20 to +60°C (-4 to 140°F)	

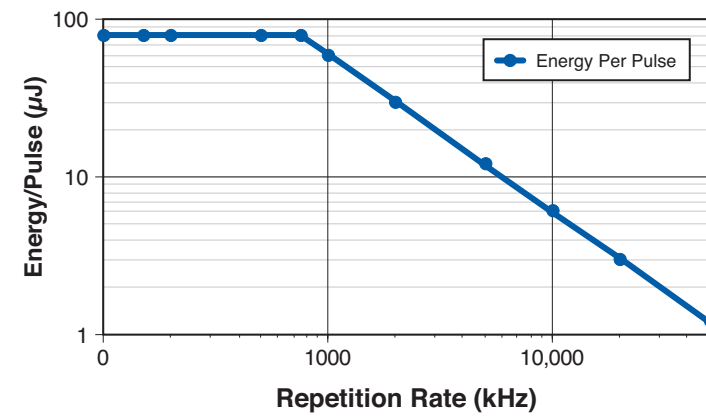
¹ All specifications at maximum energy.
² Measured at 1m from laser output window.
³ External isolation required depending on application.
⁴ Optional 110 to 240VAC power supply available.

TYPICAL PERFORMANCE DATA

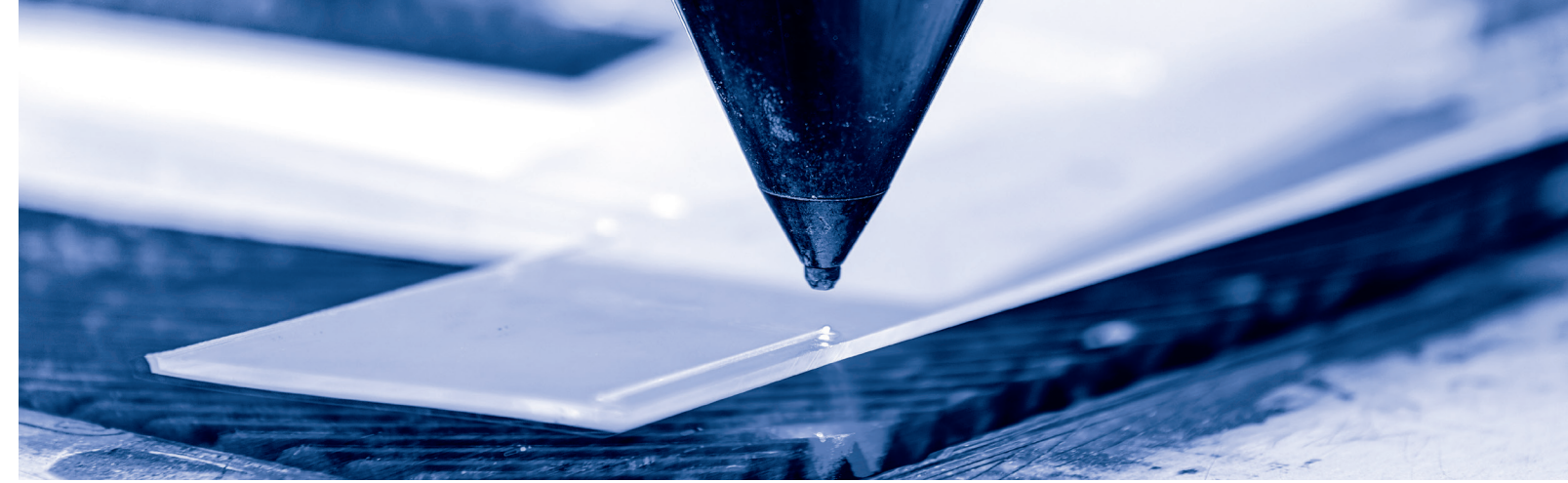
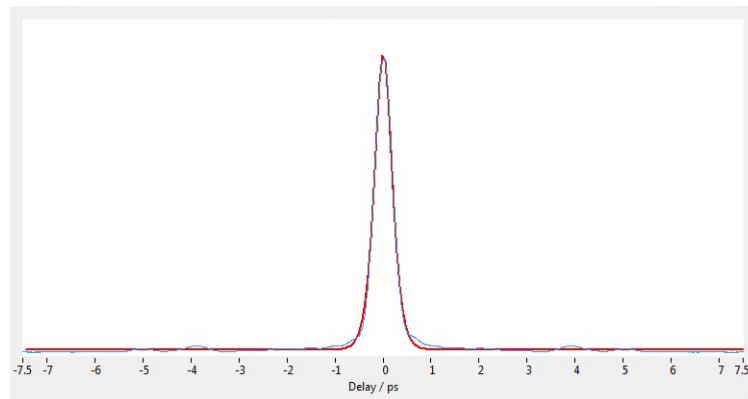
Monaco 1035 Sample Spatial Mode at 1 MHz



Monaco 1035 Energy/Pulse vs. Repetition Rate



Monaco 1035 Sub-350 fs Temporal Profile (Autocorrelator)



Monaco SmartCleave

Structured Transparent Material Cutting

Monaco SmartCleave는 MOPA 아키텍처 기반의 산업용 레이저입니다. Monaco 펄스초 플랫폼을 기반으로 한 SmartCleave 모델은 구조화된 유리 등 투명 재료를 절단할 수 있도록 구성 및 설정되어 있습니다. 320 μJ 이상의 높은 Seed burst energy로 두께 0.1 mm~2 mm의 재료를 한 번에 절단할 수 있습니다. 또한 Monaco는 펄스가 매우 짧기 때문에 적층 되어 있거나 코팅된 유리 및 사파이어를 HAZ가 거의 혹은 전혀 없이 가공할 수 있습니다. Monaco SmartCleave를 이용한 유리와 필름의 정밀 cutting은 차세대 디스플레이의 부속품에 최적의 solution이 될 것입니다.

FEATURES & BENEFITS

- >320 $\mu\text{J}/\text{pulse}$ for cutting 0.1 mm to >2 mm thick materials
- >150 kHz seeder burst mode to enable >1 m/s cutting speeds
- Femtosecond performance for filament and ablative cutting in a single laser
- Femtosecond operation to yield low HAZ in complex, layered materials
- Variable pulsewidth from <300 fs to >10 ps for process tailoring
- Compact single box design for ease of integration
- HALT-designed/HASS-verified for superior quality and reliability

APPLICATIONS

- Structured Glass Cutting
- Coated Transparent Material Cutting
- Structured Sapphire Cutting
- OLED Stack Cutting
- LCD Cutting and Tailoring
- Display Glass Cutting

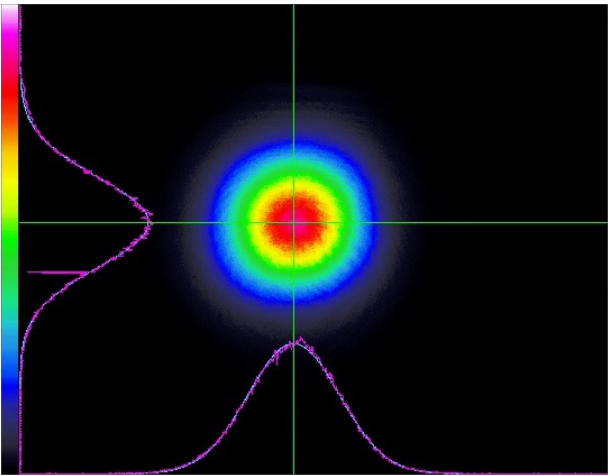


OPTICAL SPECIFICATIONS ¹	Monaco SmartCleave 1035-40-40	Monaco SmartCleave 1035-80-60
Fundamental Center Wavelength (nm)	1035 ±5	1035 ±5
Output Power (W)	40	60
Energy (μJ)	40 (at 1 MHz)	80 (at 750 kHz)
Seeder Burst Mode (μJ) (max. energy)	>200	>320
Seeder Burst Count (μJ) (max. energy)	5 x 40	4 x 80
Seeder Burst Mode Repetition Rate (kHz) (max. energy)	200	188
Native Repetition Rate	Single-shot to 1 MHz, higher rep. rates without AOM pulsepicking: 1 to 50 MHz standard	
Pulsewidth (fs)	<350	
Tuning Range	<350 fs to >10 ps	
Spatial Mode	TEM ₀₀ , M ² <1.2	
Beam Divergence (mrad, 2θ)	<1	
Beam Diameter at Output ² (mm, 1/e ²)	2.7 ±0.3	
Beam Circularity (%)	>85	
Polarization Ratio	>100:1	
Polarization Direction ³	Vertical ±3°	
Beam Pointing Stability (μrad/°C)	<25	
Pulse Energy Stability (%) (RMS)	<1.5	
Power Stability (%) (RMS, 2σ)	<1.5	
Warm-up Time (minutes)		
Cold Start	<45	
Warm Start	<15	
Long-term Pointing Stability (μrad)	±25 over 8 hours	
Head Weight	50 kg (110 lbs.)	
External Comms	RS-232, Ethernet, USB	
Power Consumption ⁴ (typical)	48VDC, <500W	
OPERATING SPECIFICATIONS		
Temperature (non-condensing)		
Laser Head	+10 to 30°C (50 to 86°F)	
Power Supply	-20 to +60°C (-4 to 140°F)	
Non-Operation (storage)	5 to 65°C (41 to 149°F)	
Relative Humidity (%)	<90, non-condensing	
SHIPPING SPECIFICATIONS		
Temperature	-20 to +60°C (-4 to 140°F)	

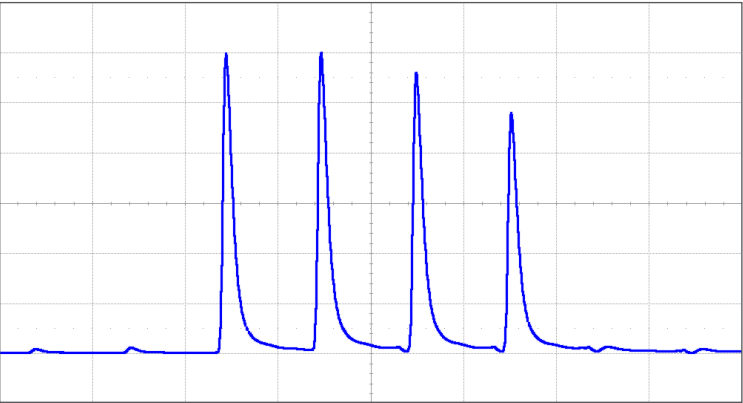
1 All specifications at maximum energy.
2 Measured at 1m from laser output window.
3 External isolation required depending on application.
4 Optional 110 to 240VAC power supply available.

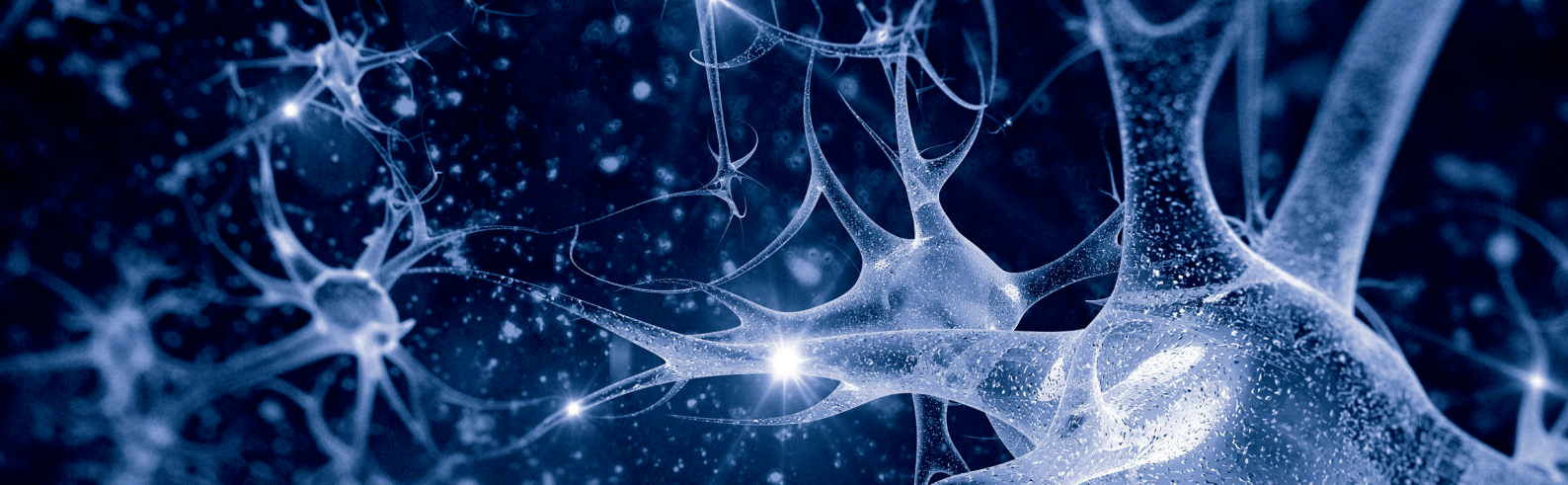
TYPICAL PERFORMANCE DATA

Monaco SmartCleave Sample Spatial Mode



Monaco SmartCleave Sample Seeder Burst with 20 ns Spacing





Axon

Compact Ultrafast Laser Sources

Axon 시리즈 펄초 레이저는 비용 대비 효율적인 이산 파장 초고속 광원으로 이미징, 생명 과학, 검사 및 나노 공정 분야의 다양한 응용 분야에서 사용됩니다.

MPE (Multiphoton Excitation) 현미경 응용분야에는 780 nm, 920 nm 및 1064 nm의 주요 파장에서 라벨 없는 이미징과 모든 형광 단백질 및 칼슘 지표를 제공합니다. 모든 모델에는 샘플 평면에서 최단 펄스를 제공하는 분광 사전 보정 기능이 있습니다. 또한 각 버전에는 신속한 출력 제어 및 플라이백 블랭킹에 사용할 수 있는 내장형 TPC (Total Power Control)를 옵션으로 장착할 수 있습니다.

시스템 통합자는 각 파장에 대해 동일한 폼 팩터를 사용하는 공통 Plug and Play 인터페이스의 이점을 누릴 수 있습니다. 이 시스템은 완벽한 공냉식으로 추가 부속품이나 유지 보수가 필요 없고, 낮은 운영비용과 긴 수명, 안정성을 제공합니다.



FEATURES & BENEFITS

- Compact and cost-effective
- Maintenance-free for low cost of ownership
- Air-cooled for flexible system integration
- Plug-and-play common interface
- Dispersion precompensation for optimal non-linear excitation
- Total Power Control (TPC) – optional built-in power control
- HALT-designed for longest lifetimes and high uptime

APPLICATIONS

- Multiphoton Excitation (MPE) Microscopy
- Second Harmonic Generation (SHG) Microscopy
- Two Photon Polymerization
- Nano-Processing
- Semiconductor Metrology
- Supercontinuum Generation
- Terahertz Generation

Industrial Ultrashort Pulse Femtosecond Lasers Axon

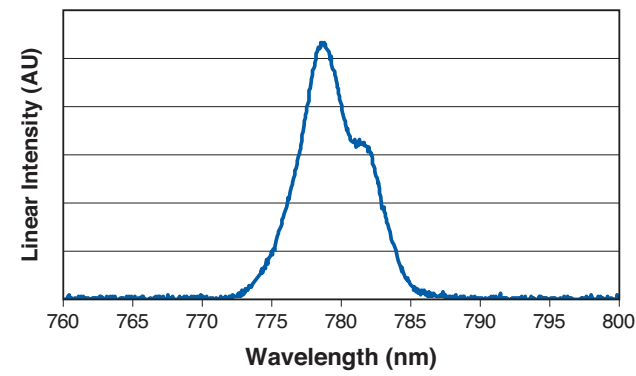


SPECIFICATIONS	Axon 780	Axon 780 TPC	Axon 920	Axon 920 TPC	Axon 1064	Axon 1064 TPC
Wavelength ¹ (nm)	780		920		1064	
Average Power (mW)	800	700	1000	800	1000	800
Pulse Duration ² (fs)	<150					
Repetition Rate (MHz)	80 ±1					
Beam Mode	M ² < 1.3					
Beam Asymmetry ^{3,4}	0.8 to 1.2					
Beam Diameter ⁴ (mm)	1.2 ±0.2					
Astigmatism (%)	<25					
Power Stability ⁵ (%)	±0.5					
Noise ⁶ (%)	<0.25					
Polarization	>100:1 Vertical					
Dispersion Precompensation ⁷ (fs ²)	-8000 to -23000 ¹⁰	0 to -15000	0 to - 30000	0 to - 22000	0 to - 20000	0 to -13000
Modulation Rise/Fall Time ⁸ (ns)	NA	< 1000	NA	< 1000	NA	<1000
Contrast Ratio ⁹	NA	>1000:1	NA	>1000:1	NA	> 1000:1
MECHANICAL AND ENVIRONMENTAL SPECIFICATIONS						
Laser Head Dimensions	212 x 318 x 62 mm (8.35 x 12.528 x 2.44 in.)					
Umbilical Length	7 m (22.97 ft.)					
Laser Power Supply Dimensions	3U, 19" rack mount unit					
Laser Head Mass	4.5 kg (9.92 lbs)					
Operating Temperature Range	19 to 26°C (66 to 79°F)					
Non-Operating Temperature	0 to 40°C (32 to 104°F)					
Relative Humidity (%)	<85, Non-Condensing					
Altitude (m ASL)	0 to 2000					
ELECTRICAL AND CONTROL REQUIREMENTS						
Power Requirements	100/240 VAC (50/60Hz), <500 VA					
Control Interface	RS-232 or USB					
Synch Output	BNC, 50% duty cycle, 3.5 V into 50 Ω					
Analog Power Control (V) (optional)	0 to 5					

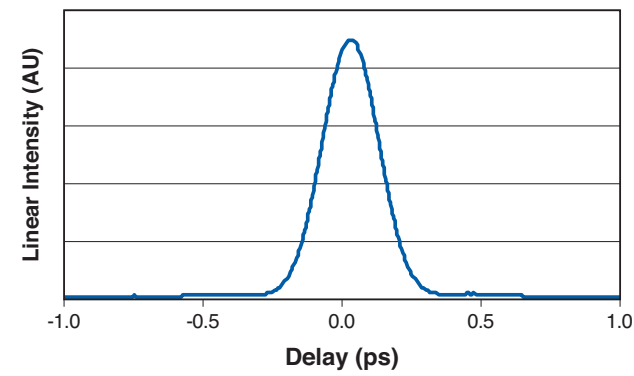
1 Center of mass, ±3 nm.
2 Assumes Sech² deconvolution factor.
3 Ratio of waist sizes.
4 Measured at beam waist locations.
5 Over 2 hours, environment stability ±1°C, after warm-up.
6 RMS, 10 Hz to 10 MHz.
7 Adjustable via externally accessible fine adjust. Higher values on request.
8 5% to 95% power level.
9 Measured at one meter from output port.
10 Option available for range starting from 0 fs².

TYPICAL PERFORMANCE DATA

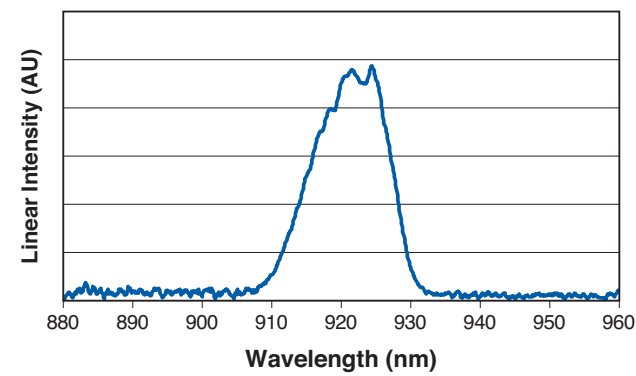
Typical Spectrum: Axon 780



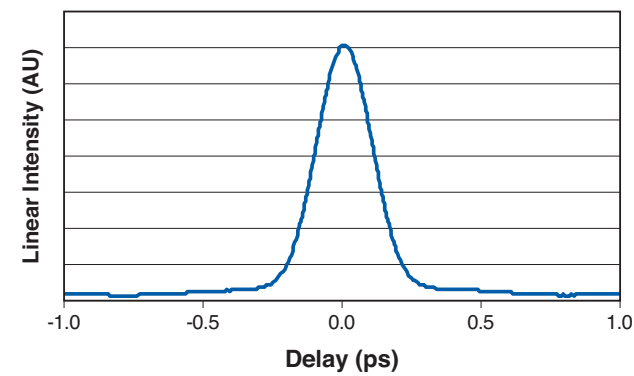
Typical Autocorrelation: Axon 780



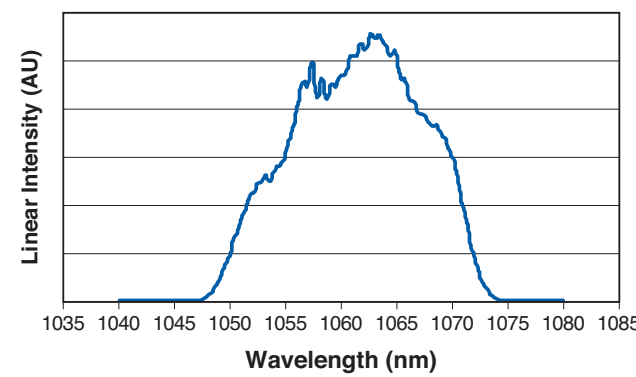
Typical Spectrum: Axon 920



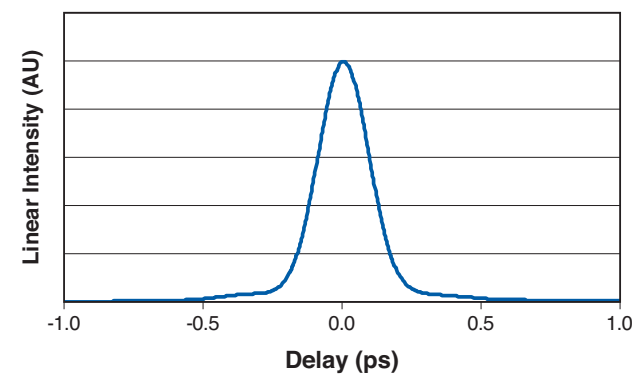
Typical Autocorrelation: Axon 920



Typical Spectrum: Axon 1064

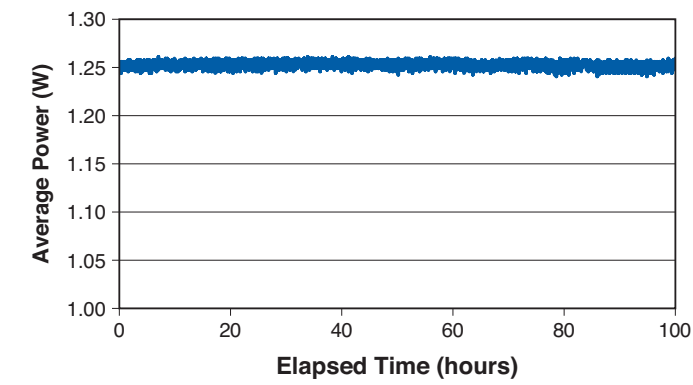


Typical Autocorrelation: Axon 1064

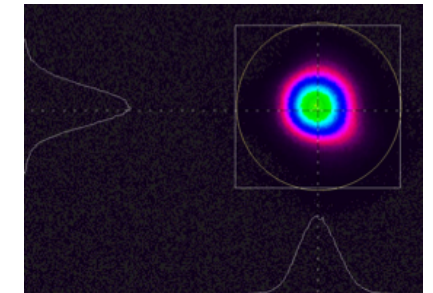


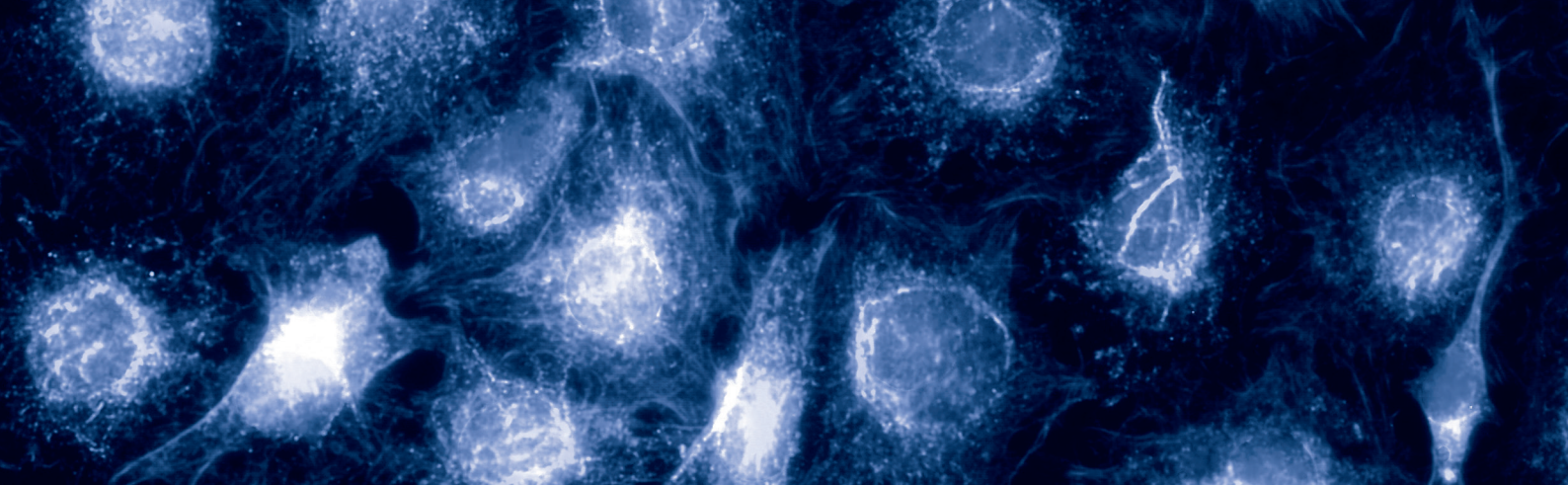
TYPICAL PERFORMANCE DATA

Axon 100 Hour Power Stability



Far Field Beam Profile: Axon





Monaco HE

Scientific Ultrafast Ytterbium Amplifier

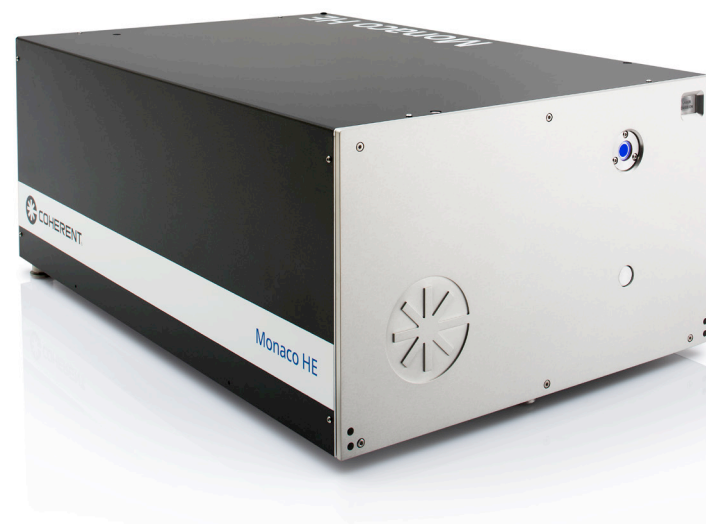
Monaco HE는 Monaco 초고속 증폭기 제품군의 신제품입니다. Monaco HE는 2 mJ (최대 10 kHz)의 고출력(>25 W, 최대 250 kHz)을 제공하며 펄스 폭을 변경할 수 있어서 다양한 과학 분야 또는(과학 분야와) 재료 가공에 응용할 수 있습니다. 사용자는 이러한 다양한 기능을 활용하여 레이저를 교환하지 않고도 실험이나 공정에 맞게 원하는 Rep.rate와 Energy로 조정할 수 있습니다. Coherent의 HALT/HASS 검사를 적용한 산업 신뢰도의 Monaco HE 제품은 매우 빠르며 어떠한 가공 속도에도 적용이 가능합니다.

FEATURES & BENEFITS

- Flexible, user adjustable energy, rep rate, pulse width
- >2 mJ from 1 kHz to 10 kHz
- >25 W at rep rates up to 250 kHz
- <350 fs pulse width
- Variable pulse width up to >10 ps
- HALT-designed and HASS-verified to ensure quality and reliability

APPLICATIONS

- Time-Resolved Spectroscopy
- Multidimensional Spectroscopy
- Material Processing
- Optical Parametric Amplifier Pumping
- 2-Photon Polymerization
- THz Generation



SPECIFICATIONS	Monaco HE-2000-25
Center Wavelength (nm) (nominal)	1030 ±5
Pulse Duration ¹ (fs) (FWHM)	<350
Tuning Range	<350 fs to >10 ps
Contrast Ratio ²	
Pre-Pulse	>1000:1
Post-Pulse	>100:1
Power Stability ^{3,4} (% rms)	<0.5
Beam Pointing Stability ^{3,4} (μrad) (rms)	<10
Beam Diameter (mm) (1/e ²) (nominal)	5
Spatial Mode	TEM ₀₀ , M ² <1.25
Polarization	Linear, Vertical
Repetition Rate ⁵	Single-Shot to 250 kHz
Energy per Pulse	
at 1 kHz	>2 mJ
at 10 kHz	>2 mJ
at 100 kHz	>250 μJ
at 200 kHz	>125 μJ

¹ Assuming Gaussian pulse shape.

² Contrast ratio is defined as the ratio between the peak intensity of the output pulse to the peak intensity of any other pulse that occurs greater than 1 ns before or after the output pulse.

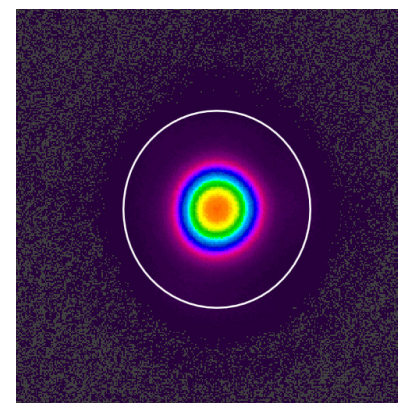
³ Under stable environmental conditions after system warm-up.

⁴ Over 24 hrs.

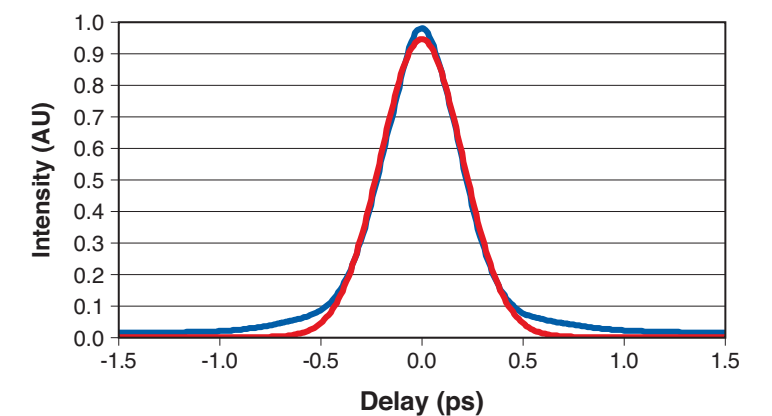
⁵ User selectable, some repetition rates are not accessible due to system design.

TYPICAL PERFORMANCE DATA

Sample Spatial Mode
at 2 mJ, 10 kHz

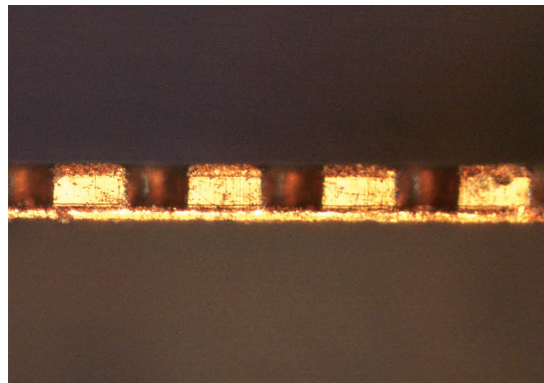


320 fs Pulse Width
(FWHM)

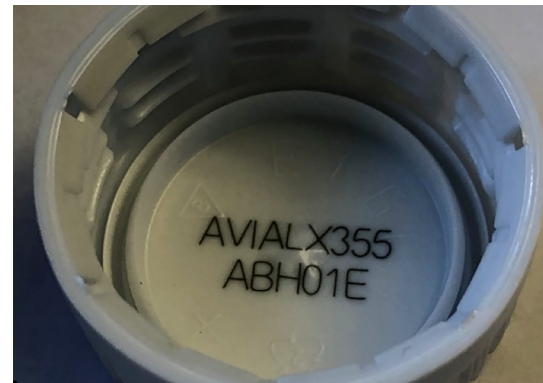


APPLICATION IMAGES PROCESSED BY NANOSECOND LASERS

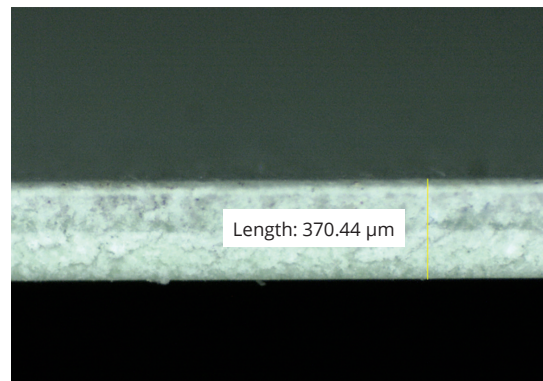
PCB Via Drilling



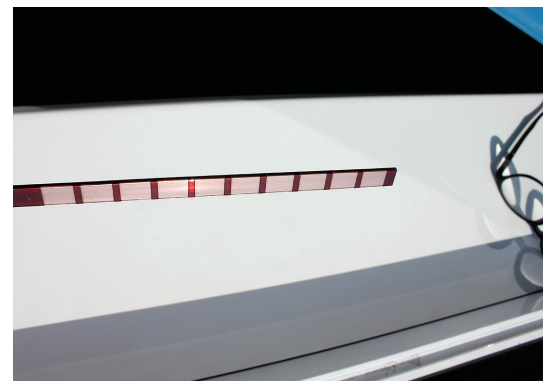
High Speed Marking



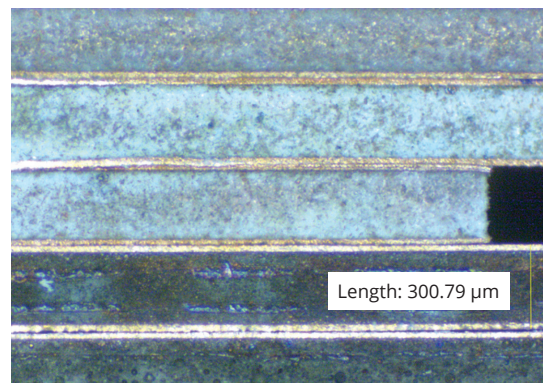
LTCC cutting – support structures in PCBs and packages



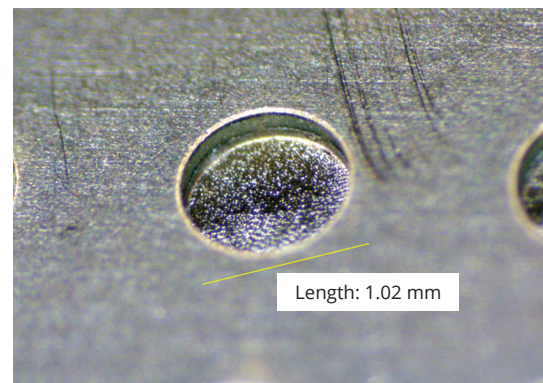
Hairpin stripping : < 0.5 RFU automotive



Different LCP materials cut in cross section with no HAZ mobile phones

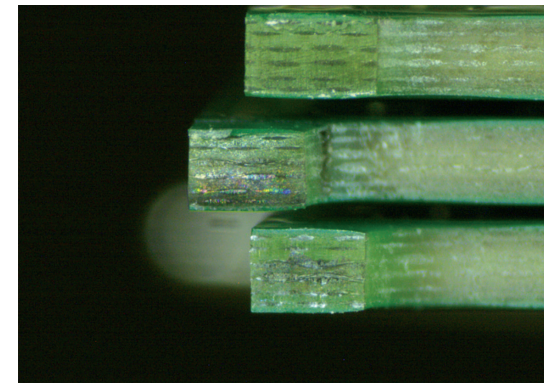


LCP Bind hole drilling, without damage of the lower copper layer mobile phones

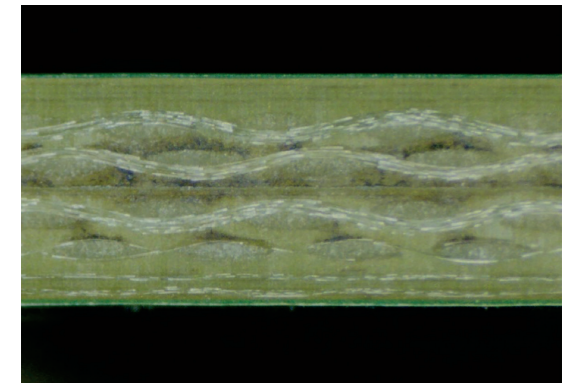


APPLICATION IMAGES PROCESSED BY NANOSECOND LASERS

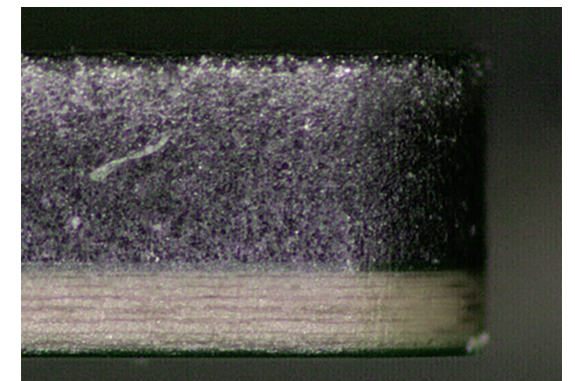
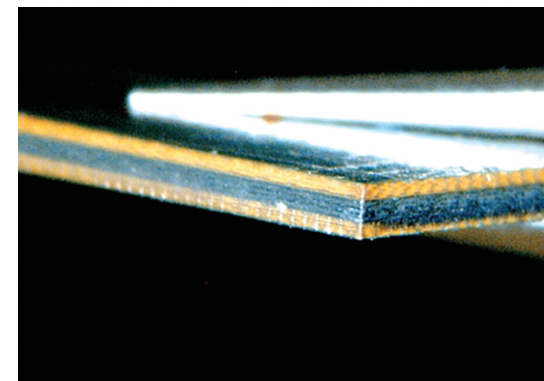
PCB cutting different effective cutting speeds resulting in different qualities

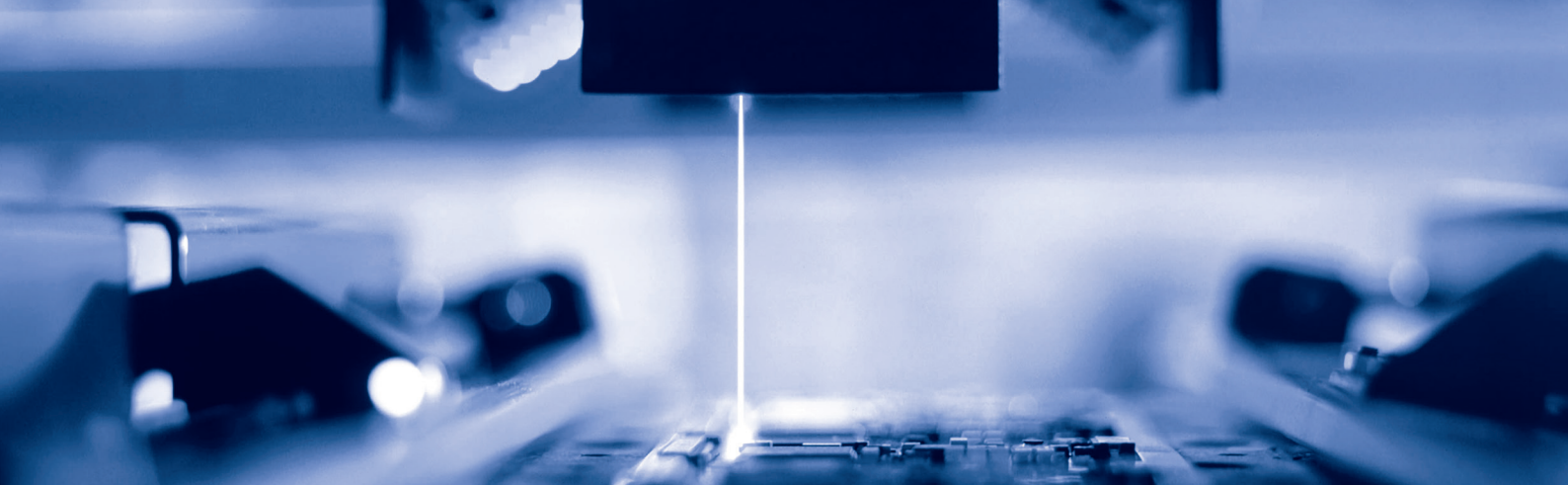


PCB Cutting / De-Paneling



Antenna Package & SIP Cutting





AVIA LX

Solid-State Q-Switched Ultraviolet Lasers

AVIA LX는 20 W (@355 nm) 다이오드 펌핑, Q 스위치 고체 나노초 레이저로 타의 추종을 불허하는 높은 신뢰성, 우수한 성능 및 낮은 소유 비용을 동시에 제공합니다. 이는 뛰어난 수명과 핸즈프리 작동을 제공하는 코히런트 PureUV™ 액티브 레이저 클리닝 엔진을 사용하여 달성됩니다. 이러한 특성 덕분에 AVIA LX는 PCB와 연성 재료의 비아 드릴링, 절단, 3D 칩 패키지 제조, IC 패키지 트리밍, 웨이퍼 스크라이빙 등 까다로우면서도 높은 처리량이 필요하고 비용에 민감한 응용분야에 가장 적합한 레이저입니다. 시스템 구축 면에서 AVIA LX는 부피가 작고 인터페이스가 단순하기 때문에 레이저 기반 장비에 쉽게 통합할 수 있습니다.

FEATURES & BENEFITS

- Repetition rates single-shot to 100s of kHz
- High beam quality $M^2 < 1.2$
- Industry leading compact footprint
- Simplified user interface at laser head
- High reliability between long maintenance cycles

APPLICATIONS

- Via Hole Drilling
- Flex Materials Cutting
- 3D Package Manufacturing
- IC Package Trimming
- Wafer Scribing and Singulation
- Solar Cell Scribing

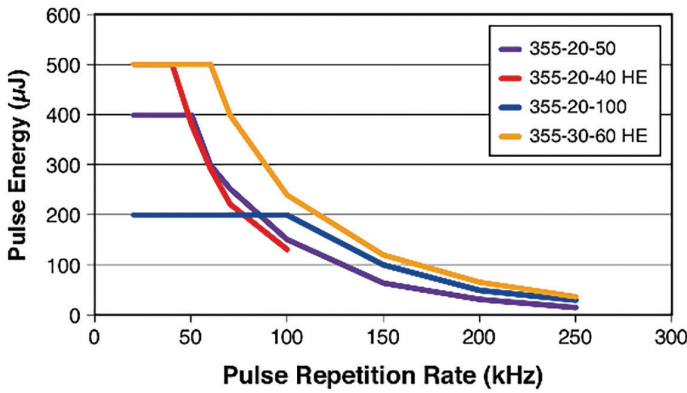
Industrial Ultrashort Pulse Nanosecond Lasers AVIA LX

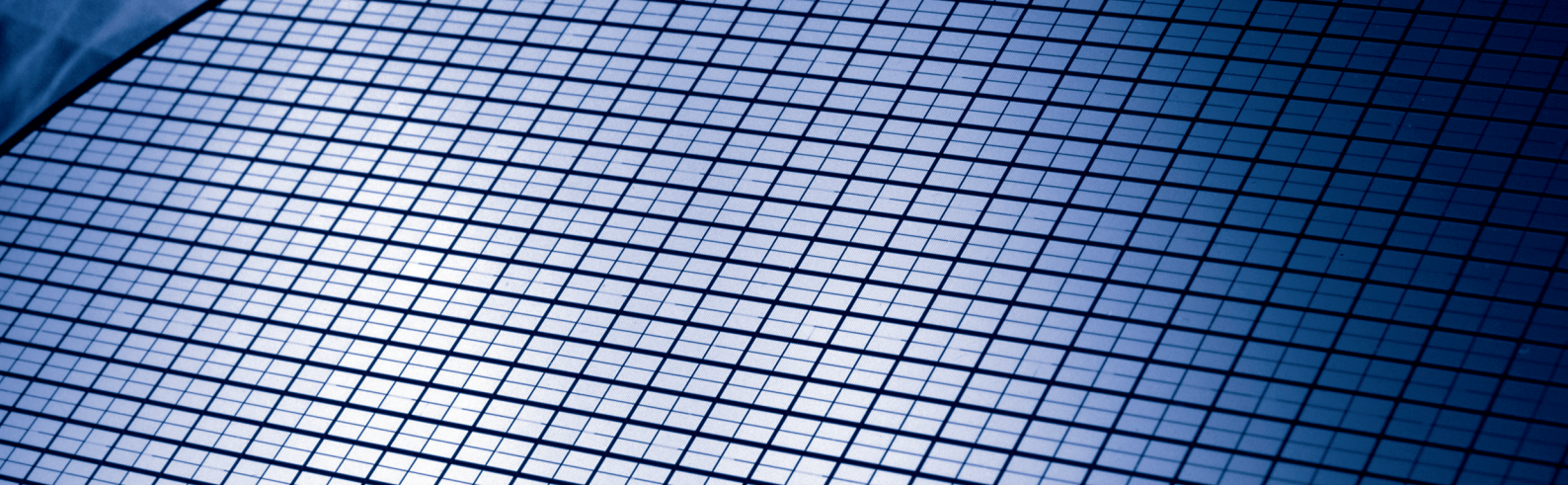


SPECIFICATIONS	AVIA LX 355-20-50		AVIA LX 355-20-100		AVIA LX 355-20-40 HE		AVIA LX 355-30-60 HE
	1.5 mm	3.0 mm	1.5 mm	3.0 mm	1.5 mm	3.0 mm	3.0 mm
Output Power (W) (specified)	>20 at 50 kHz		>20 at 100 kHz		>20 at 40 kHz		30 at 60 kHz
Output Power (W) (typical)	>15 at 100 kHz >10 at 150 kHz >5 at 200 kHz		>13 at 150 kHz >9 at 200 kHz >7 at 250 kHz		>14 at 60 kHz >12 at 80 kHz >10 at 100 kHz		
Pulse Energy (μJ)	Up to 400		Up to 200		Up to 500		Up to 500
Repetition Rate	Single-shot to 300 kHz		Single-shot to 300 kHz		Single-shot to 100 kHz		Single-shot to 300 kHz
Pulse Width (ns)	<25 at 50 kHz		<30 at 100 kHz		<25 at 40 kHz		<25 at 60 kHz
Spatial Mode ¹	TEM ₀₀ , M ² <1.2						
Beam Divergence (mrad)	<0.5	<0.3	<0.5	<0.3	<0.5	<0.3	<0.3
Beam Waist Diameter (mm, 1/e ²)	1.5 ±10%	3.0 ±10%	1.5 ±10%	3.0 ±10%	1.5 ±10%	3.0 ±10%	3.0 ±10%
Beam Circularity (%)	>90						
Polarization Ratio	>100:1						
Polarization Direction	Vertical						
Pulse Energy Stability (%) (RMS)	<2						
Power Stability (%) (RMS, 2σ) (over 8 hours)	<2						
Warm-up Time (minutes)							
Cold Start	<20						
Warm Start	<5						
Head Weight	12.5 kg (27.5 lbs.)						
External Comms	RS-232, Ethernet, USB						
Power Consumption (W) (VAC)	<500						
OPERATING SPECIFICATIONS							
Temperature (non-condensing)							
Laser Head	+15 to 40°C (59 to 104°F)						
Non-Operation (storage)	-20 to +60°C (-4 to 140°F)						
Shipping Specifications							
Temperature	-20 to +60°C (-4 to 140°F)						
Relative Humidity (%)	5 to 80						
Optional Accessory							
Beam Expander	>2x						
Chiller	>110V and 230V						

¹ Nominal M² at each fresh prequalified THG spot.

AVIA LX





AVIA NX GREEN

Solid-State Q-Switched Green Lasers

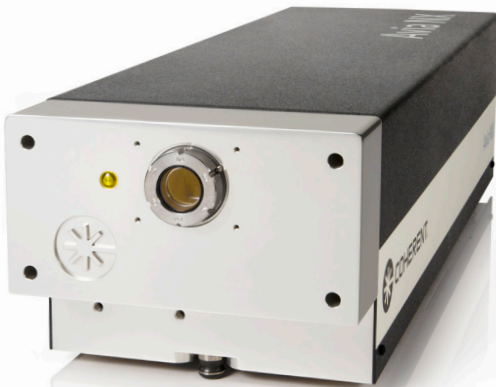
AVIA NX (green)는 믿을 수 없을 정도로 컴팩트한 통합 패키지로 고성능과 신뢰도를 자랑하는 나노초 펄스 레이저입니다. AVIA NX는 532 nm에서 36 W ~ 85 W 출력 범위의 그린 버전에서 사용할 수 있습니다. 80 kHz 구성은 펄스당 에너지가 800 μJ 이상으로 동급 최강의 성능을 자랑합니다. AVIA NX는 사내 HALT/HASS 설비를 이용한 극한 환경시험을 설계와 제조에 모두 적용하여 다른 펄스 Green 또는 UV 레이저와 비교할 수 없는 신뢰성과 견고성을 제공합니다.

FEATURES & BENEFITS

- 36 W to 85 W average power at 532 nm
- High energy option to 800 μJ
- Rep rates single-shot to 100s of kHz
- High beam quality M² <1.3
- Industry leading compact footprint
- Simplified user interface at laser head
- HALT designed/HASS certified
- High reliability between long maintenance cycles

APPLICATIONS

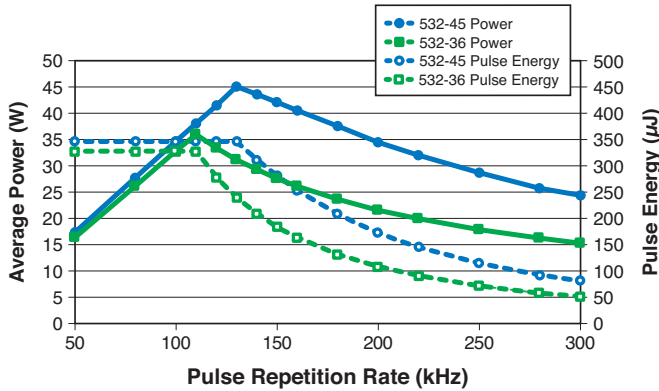
- Drilling & Cutting PCBs
- Micromaching Copper
- Scribing & Grooving Silicon
- Cutting and Machining Ceramics
- Solar Cell Scribing



SPECIFICATIONS ¹	AVIA NX 532-36	AVIA NX 532-45
Fundamental Center Wavelength (nm)	532	532
Output Power and Energy	36 W, 327 μJ at 110 kHz	45 W, 346 μJ at 130 kHz
Repetition Rate	Single-shot to 300 kHz	Single-shot to 300 kHz
Pulse Width (ns)	<33 up to 110 kHz	<35 up to 130 kHz
Spatial Mode	TEM ₀₀ , M ² <1.3	
Beam Divergence (mrad)	<0.3	
Beam Waist Diameter (mm, 1/e ²)	3.50 ±0.35	
Beam Waist Location	At output port ±25% of Rayleigh Range	
Astigmatism (%)	<30	
Beam Circularity (%)	>85	
Polarization Ratio	>100:1	
Polarization Direction	Vertical, ±3°	
Beam Pointing Stability (μrad/°C)	<25	
Pulse Energy Stability (%) (RMS)	<5	
Power Stability (%) (RMS, 2σ) (over 8 hours)	<2	
Warm-up Time (minutes)		
Cold Start	<45	
Warm Start	<15	
Long-term Pointing Stability at Fixed Rep-rate (μrad)	±25 over 8 hours	
Head Weight	21.5 kg (47.4 lbs.)	
External Comms	RS-232, Ethernet, USB	
Power Consumption (VAC)	100 to 240, <500 W	100 to 240, <600 W
OPERATING SPECIFICATIONS		
Temperature (non-condensing)		
Laser Head	+ 10 to 35°C (50 to 95°F)	
Power Supply	+ 10 to 35°C (50 to 95°F)	
Non-Operation (storage)	-20 to +50°C (-4 to 122°F)	
Shipping Specifications		
Temperature	-20 to +60°C (-4 to 140°F)	
Relative Humidity (%)	5 to 80	

¹ All specifications measured at the optimized pulse repetition rate.

AVIA NX 532-45 and 532-36 Spec Performance

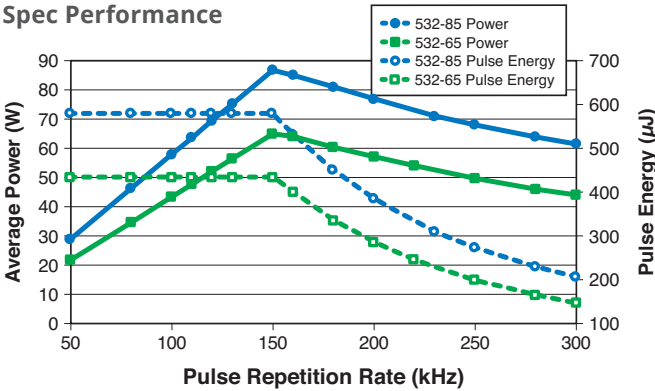




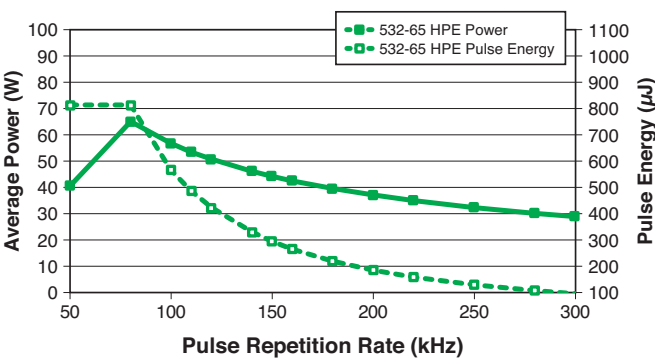
SPECIFICATIONS ¹	AVIA NX 532-65	AVIA NX 532-85	AVIA NX 532-65 HPE
Fundamental Center Wavelength (nm)	532	532	532
Output Power and Energy	65 W, 433 µJ at 150 kHz	85 W, 531 µJ at 160 kHz	65 W, 813 µJ at 80 kHz
Repetition Rate	Single-shot to 300 kHz	Single-shot to 300 kHz	Single-shot to 300 kHz
Pulse Width (ns)	<45 up to 150 kHz	<45 up to 160 kHz	<30 up to 100 kHz
Spatial Mode	TEM ₀₀ , M ² <1.3		
Beam Divergence (mrad)	<0.3		
Beam Waist Diameter (mm, 1/e ²)	3.50 ±0.35		
Beam Waist Location	At output port ±25% of Rayleigh Range		
Astigmatism (%)	<30		
Beam Circularity (%)	>85		
Polarization Ratio	>100:1		
Polarization Direction	Vertical, ±3°		
Beam Pointing Stability (µrad/°C)	<25		
Pulse Energy Stability (%) (RMS)	<5		
Power Stability (%) (RMS, 2σ) (over 8 hours)	<2		
Warm-up Time (minutes)			
Cold Start	<45		
Warm Start	<15		
Long-term Pointing Stability at Fixed Rep-rate (µrad)	±25 over 8 hours		
Head Weight	22.5 kg (49.6 lbs.)		
External Comms	RS-232, Ethernet, USB		
Power Consumption (VAC)	100 to 240, <700 W	100 to 240, <900 W	100 to 240, <700 W
OPERATING SPECIFICATIONS			
Temperature (non-condensing)			
Laser Head	+ 10 to 35°C (50 to 95°F)		
Power Supply	+ 10 to 35°C (50 to 95°F)		
Non-Operation (storage)	-20 to +50°C (-4 to 122°F)		
Shipping Specifications			
Temperature	-20 to +60°C (-4 to 140°F)		
Relative Humidity (%)	5 to 80		

¹ All specifications measured at the optimized pulse repetition rate.

AVIA NX 532-85 and 532-65 Spec Performance



AVIA NX 532-65 HPE Spec Performance



AVIA NX UV

Solid-State Q-Switched Ultraviolet Lasers

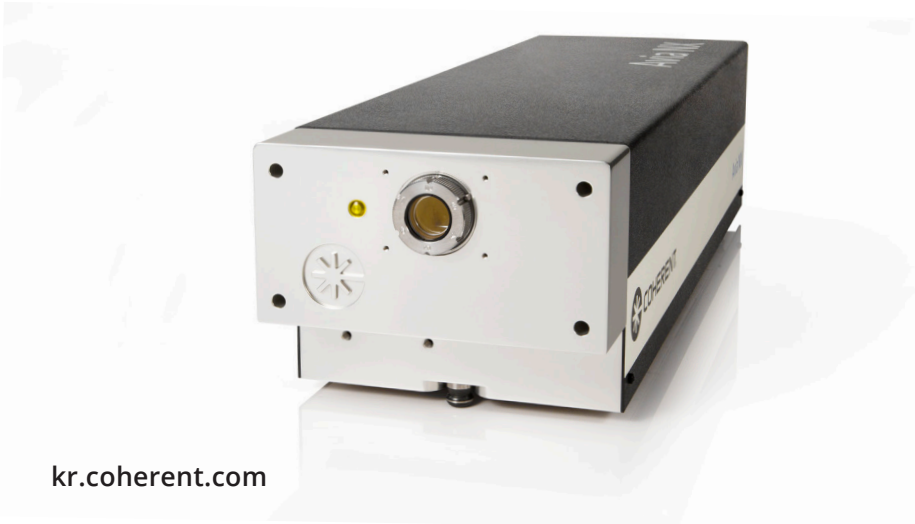
AVIA NX (UV)는 유명한 AVIA 나노초 UV 레이저 제품군의 제4세대 모델입니다. 탁월한 혁신 기능을 장착한 AVIA NX는 처음부터 다시 설계되어 성능, 컴팩트한 크기, 신뢰성 면에서 새로운 차원을 이루어낸 제품입니다. 20 W~55 W의 출력을 제공하는 AVIA NX는 현 세대 AVIA와 동일하게 검증된 아키텍처를 기반으로 구축되었습니다. 하지만 전체 광학 설계와 전자 장치가 간소화되었으며 단일 소형 패키지에 스마트하게 통합되었습니다. AVIA NX는 다른 나노초 레이저가 따라올 수 없는 탁월한 신뢰성을 제공하며 보유 비용이 매우 낮습니다. 모든 레이저 관리를 하나의 헤드 보드에 담은 독자적인 SoloBoard™ 전자기기 인터페이스와 PureUV™ Active 레이저 클리닝 엔진에 힘입어 복잡성이 낮아지고 핸즈프리 기능이 구현되었습니다. AVIA NX의 설계와 제조는 업계에서 가장 엄격한 시험 기준에 따라 이루어집니다. HALT (Highly Accelerated Life Test) 및 HASS (Highly Accelerated Stress Screen) 표준은 AVIA NX의 디자인 철학을 보여줍니다. 전체 시스템뿐만 아니라 모든 구성품을 정상적인 응용 조건을 훨씬 뛰어넘는 환경 수준까지 시험합니다. 까다로운 시험을 통과하기 위한 노력으로 AVIA NX의 품질과 신뢰성 수준은 다른 나노초 레이저를 능가합니다. AVIA NX는 PCB와 연성 재료의 비아 드릴링, 3D 칩 패키지 제조, IC 패키지 트리밍, 웨이퍼 스크라이빙 등의 응용분야에 가장 적합한 제품입니다. AVIA NX는 부피가 작고 인터페이스가 단순하여 레이저 장비에 아주 쉽게 적용시킬 수 있습니다.

FEATURES & BENEFITS

- 20 W to 55 W configurations
- Rep rates single-shot to 100s of kHz
- High beam quality M² <1.2
- Industry leading compact footprint
- Simplified user interface at laser head
- HALT designed/HASS certified
- High reliability between long maintenance cycles

APPLICATIONS

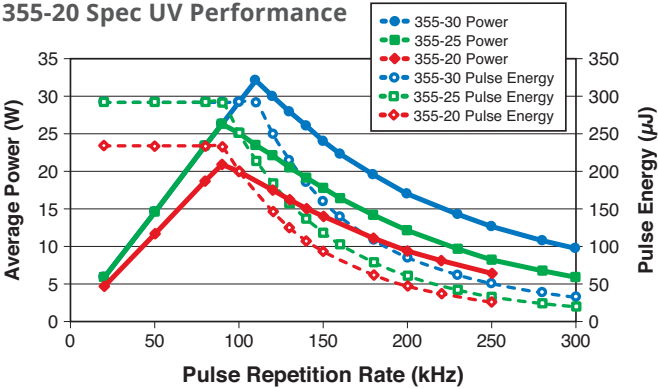
- Via Hole Drilling
- Flex Materials Cutting
- 3D Package Manufacturing
- IC Package Trimming
- Wafer Scribing and Singulation
- Solar Cell Scribing



SPECIFICATIONS ¹	AVIA NX 355-20	AVIA NX 355-25	AVIA NX 355-30
Fundamental Center Wavelength (nm)	354.7	354.7	354.7
Output Power and Energy	20 W, 200 µJ at 100 kHz	25 W, 250 µJ at 100 kHz	30 W, 250 µJ at 120 kHz
Repetition Rate	Single-shot to 250 kHz	Single-shot to 300 kHz	Single-shot to 300 kHz
Pulse Width (ns)	<30 up to 100 kHz	<30 up to 100 kHz	<32 up to 120 kHz
Spatial Mode	TEM ₀₀ , M ² <1.2		
Beam Divergence (mrad)	<0.2		
Beam Waist Diameter (mm, 1/e ²)	3.50 ±0.35		
Beam Waist Location	At output port ±25% of Rayleigh Range		
Astigmatism (%)	<30		
Beam Circularity (%)	>90		
Polarization Ratio	>100:1		
Polarization Direction	Vertical, ±3°		
Beam Pointing Stability (µrad/°C)	<25		
Pulse Energy Stability (%) (RMS)	<5		
Power Stability (%) (RMS, 2s) (over 8 hours)	<2		
Warm-up Time (minutes)			
Cold Start	<45		
Warm Start	<15		
Long-term Pointing Stability at Fixed Rep-rate (µrad)	±25 over 8 hours		
Head Weight	21.5 kg (47.4 lbs.)		
External Comms	RS-232, Ethernet, USB		
Power Consumption (VAC)	100 to 240, <500 W	100 to 240, <500 W	100 to 240, <600 W
OPERATING SPECIFICATIONS			
Temperature (non-condensing)			
Laser Head	+ 10 to 35°C (50 to 95°F)		
Power Supply	+ 10 to 35°C (50 to 95°F)		
Non-Operation (storage)	-20 to +50°C (-4 to 122°F)		
Shipping Specifications			
Temperature	-20 to +60°C (-4 to 140°F)		
Relative Humidity (%)	5 to 80		

¹ All specifications measured at the optimized pulse repetition rate.

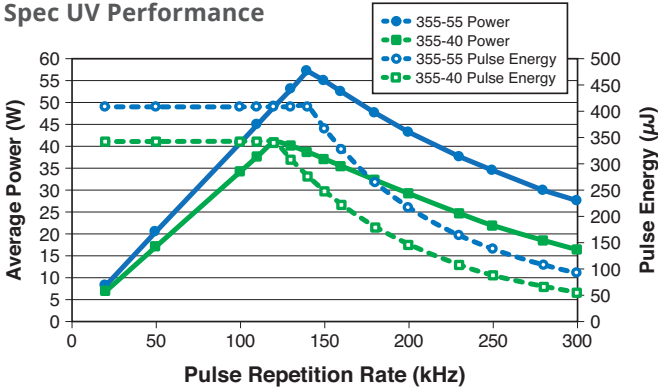
AVIA NX 355-30, 355-25, and 355-20 Spec UV Performance



SPECIFICATIONS ¹	AVIA NX 355-40	AVIA NX 355-55
Fundamental Center Wavelength (nm)	354.7	354.7
Output Power and Energy	40 W, 308 µJ at 130 kHz	55 W, 367 µJ at 150 kHz
Repetition Rate	Single-shot to 300 kHz	Single-shot to 300 kHz
Pulse Width (ns)	<35 up to 130 kHz	<35 up to 150 kHz
Spatial Mode	TEM ₀₀ , M ² <1.2	
Beam Divergence (mrad)	<0.2	
Beam Waist Diameter (mm, 1/e ²)	3.50 ±0.35	
Beam Waist Location	At output port ±25% of Rayleigh Range	
Astigmatism (%)	<30	
Beam Circularity (%)	>90	
Polarization Ratio	>100:1	
Polarization Direction	Vertical, ±3°	
Beam Pointing Stability (µrad/°C)	<25	
Pulse Energy Stability (%) (RMS)	<5	
Power Stability (%) (RMS, 2s) (over 8 hours)	<2	
Warm-up Time (minutes)		
Cold Start	<45	
Warm Start	<15	
Long-term Pointing Stability at Fixed Rep-rate (µrad)	±25 over 8 hours	
Head Weight	22.5 kg (49.6 lbs.)	
External Comms	RS-232, Ethernet, USB	
Power Consumption (VAC)	100 to 240, <700 W	100 to 240, <900 W
OPERATING SPECIFICATIONS		
Temperature (non-condensing)		
Laser Head	+ 10 to 35°C (50 to 95°F)	
Power Supply	+ 10 to 35°C (50 to 95°F)	
Non-Operation (storage)	-20 to +50°C (-4 to 122°F)	
Shipping Specifications		
Temperature	-20 to +60°C (-4 to 140°F)	
Relative Humidity (%)	5 to 80	

¹ All specifications measured at the optimized pulse repetition rate.

AVIA NX 355-55 and 355-40 Spec UV Performance





FLARE NX

Short-Pulsed Diode-Pumped Solid-State Lasers

FLARE NX는 생명과학과 분석 기기 시장의 까다로운 응용분야에 적합하도록 설계된 차세대 패시브 Q 스위치 다이오드 펌프 고체 (DPSS) 레이저입니다.

적외선(IR)부터 자외선(UV)을 아우르는 넓은 파장 범위를 제공하는 FLARE NX는 펄스 지속시간이 1 ns 미만으로 아주 짧습니다. 또한 FLARE NX는 최대 2 kHz의 높은 반복률과 최대 500 μ J의 펄스 에너지를 제공합니다. 고체 기술을 적용하여 수명이 길고 품질과 처리량이 뛰어납니다.

FLARE NX 레이저 헤드의 컴팩트하고 견고한 패키징에 디지털 드라이버 개념을 결합시켜 OEM 디자인에 바로 통합이 가능합니다. 우수한 성능과 검증된 신뢰성 및 견고성, 간편한 작동에 이르기까지 FLARE NX는 경제적인 고성능 솔루션입니다.

FEATURES & BENEFITS

- Available wavelengths:
 - 1030 nm
 - 515 nm
 - 343 nm
- High pulse energy up to:
 - 500 μ J at 1030 nm
 - 300 μ J at 515 nm
 - 100 μ J at 343 nm
- Short pulses ~1 ns range
- Pulse on demand, repetition rates from single-shot up to 2 kHz
- Excellent beam quality TEM₀₀/M² <1.2

APPLICATIONS

- Laser Induced Fluorescence Spectroscopy
- MALDI-TOF Spectroscopy
- Laser Micro Dissection
- LIDAR
- Inspection and Process including Environmental Control
- Materials Processing
 - e.g. Repair of Memories, Displays



SPECIFICATIONS	FLARE NX 1030-1.0-2	FLARE NX 515-0.6-2	FLARE NX 343-0.2-2
Wavelength (nm)	1030 $\pm$ 1	515 $\pm$ 0.5	343 $\pm$ 0.5
Pulse Energy ¹ (μ J)	>500	>300	>100
Pulse Energy Variation ptp (%)	< $\pm$ 5		
Pulse Repetition Rate (Hz)	up to 2000		
Pulse Width (ns)	1.5 $\pm$ 0.2	1.3 $\pm$ 0.2	1.0 $\pm$ 0.2
Spatial Mode	TEM ₀₀		
M ² (Beam Quality)	<1.2		
Beam Waist Diameter at 1/e ² (μ m)	490 $\pm$ 35	360 $\pm$ 35	300 $\pm$ 30
Beam Waist Location ² (mm)	140 $\pm$ 15	200 $\pm$ 30	190 $\pm$ 30
Beam Symmetry (%)	>90	>90	>85
Static Alignment Tolerances - Beam Position (mm) - Beam Angle (mrad)	<$\pm$1 <$\pm$1		
Polarization	>100:1, vertical $\pm$ 5°		
Warm-up Time to Stand By (s)	<150		
Base Plate Operating Temperature	15 to 35°C (59 to 95°F)		
Ambient Temperature - Operating - Storage	15 to 40°C (59 to 104°F) -20 to +50°C (-4 to 122°F)		
Laser Head Heat Dissipation ³ (W)	$\leq$ 40		
Relative Humidity (%) (non-condensing)	$\leq$ 80		
Dimensions (L x W x H) - Laser Head - Controller	155.6 x 93.5 x 38.25 mm (6.13 x 3.68 x 1.5 in.) 160 x 130 x 45 mm (6.3 x 5.12 x 1.77 in.)		
Weight - Laser Head - Controller	~1.25 kg (2.75 lbs.) ~0.75 kg (1.65 lbs.)		
Controller Cable Length	1 m (3.28 ft.)		
Operating Voltage ⁴ (VDC)	24 $\pm$ 2		
Laser Control Electronics	Digital, OEM ⁴		
Communication Interface	RS-232		

¹ Pulse energy at 2000 Hz, maximum decrease over warranty period <10%.
² The beam waist location is inside the laser head. Reference surface is the output window.
³ Baseplate temperature 30°C.
⁴ Power supply not included, PC required.



MATRIX 355

Solid-State, Q-Switched Laser

MATRIX UV 제품군은 0.5 W~8 W의 출력 수준을 갖추고 있습니다. 독특한 멀티패스 고조파 기술을 적용하여 주파수 변환 크리스탈 내부의 출력 밀도가 낮아, 시스템의 수명이 길고 포인팅 안정성이 탁월하며 펄스 간 노이즈 수준이 시중 제품 중에서 가장 낮습니다.

MATRIX UV BE 모델 (내장형 Beam Expander가 장착된 MATRIX UV)은 레이저 스캔 헤드에 직접 연결되도록 설계된 제품으로써 대부분의 마킹 응용분야에 적합하도록 손쉽게 통합할 수 있습니다.

MATRIX 레이저는 공정 품질을 저하시키지 않으면서도 높은 처리량이 필요하고 비용에 민감한 응용분야에 최적화되었습니다. MATRIX 제품군은 광학기기 구성품을 최적으로 조절하고 고정하는 특수 공정인 Coherent의 PermAlign™ 기술로 제조됩니다. 이 기술 덕분에 제품의 수명이 다할 때까지 광학적 정렬 상태와 안정도가 최상으로 유지됩니다.

FEATURES

- Superior optical performance
- Complete control over pulse energy and timing
- PermAlign solder-bonded optics technology
- Robot-assisted, cleanroom-built and hermetically sealed
- AAA pump diodes for unmatched lifetime
- Virtually no downtime, maintenance-free operation over thousands of hours

APPLICATIONS

- Marking of Complex Plastic Structures
- Laser Trimming of Embedded Passives with Diode-Pumped Solid-State Lasers
- Inside Glass Marking
- Laser Direct Patterning
- LED Package Marking
- Solar P1 to P3
- Thin-film Scribing
- Rapid Prototyping



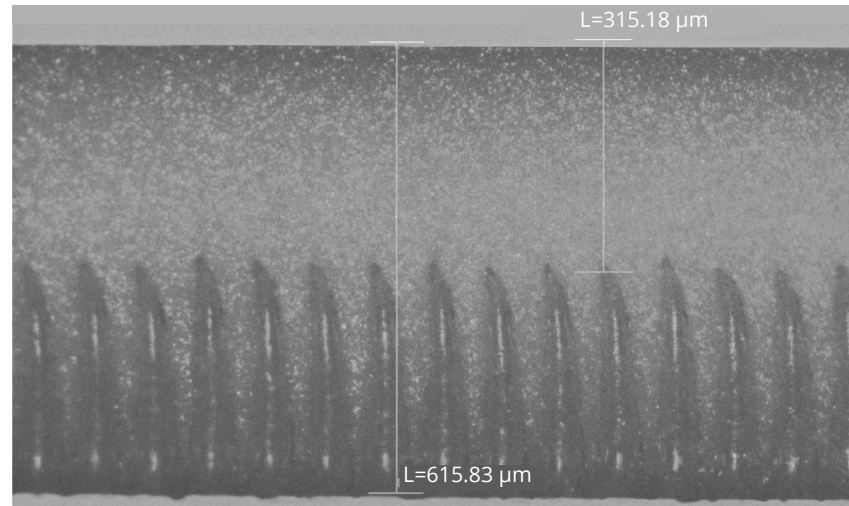
SPECIFICATIONS	MATRIX 355-M1	MATRIX 355-1-60	MATRIX 355-5-50	MATRIX 355-8-50	MATRIX 355-1-60-BE ¹
Average Power (W)	0.5 at 60 kHz	1 at 60 kHz	5 at 50 kHz	8 at 50 kHz	1 at 60 kHz
Recommended Power Range (%)	70 to 100	50 to 100	50 to 100	70 to 100	50 to 100
Pulse Repetition Rate (kHz)	up to 100	up to 100	up to 150	up to 150	up to 100
Pulse Duration ² (ns)	<30	<25	<30	<25	<25
Pulse-to-Pulse Stability ² (%) (rms)	<5	<2	<2	<2	<2
Beam Parameters (nominal)	0.23 mm and <2.8 mrad	0.23 mm and <2.8 mrad	0.23 mm and <2.8 mrad	0.23 mm and <2.8 mrad	2.2 mm and <0.5 mrad
Circularity (%)	>90	>90	>85	>85	>90
Spatial Mode	TEM ₀₀				
M ² (typical)	<1.1				
Output Power Stability (%) (8h/±3°)	<2				
Temperature Range (baseplate)	15°C to 50°C (59°F to 122°F)				
Maximum Heat Load (W)	<350	<350	<450	<450	<350
Static Alignment	±0.2 mm, ±2 mrad				
Maximum Warm-up Times from Cold Start from Warm Start	<20 minutes <5 minutes				
ENVIRONMENTAL SPECIFICATIONS					
Temperature Operating Non-operating	15°C to 40°C -20°C to 50°C	15°C to 40°C -20°C to 50°C	15°C to 35°C -20°C to 50°C	15°C to 30°C -20°C to 50°C	15°C to 40°C -20°C to 50°C
Altitude Operating Non-operating	0 to 10,000 ft. 0 to 45,000 ft.				
Relative Humidity (%) (non-condensing) Operating Non-operating	0 to 90 0 to 95				
Shock Operating Non-operating	±1g dynamic EN 60068-2-6 ±10g EN 60068-2-26				
POWER SUPPLY SPECIFICATIONS					
Power Supply Dimensions (H x W x D)	100 x 131 x 335 mm (3.9 x 5.2 x 13.2 in.) open-frame PCB; can be mounted in 3HE 19-in. rack mount				
External Control	RS-232 interface, TTL QS control				
Input Power Requirements Input Voltage (VAC) Input Power Power Supply (VA)	90 to 240, 50 to 60 Hz maximum typical 750 ≤350				

¹ AVIA Ultra 2000 compatible beam parameters through internal beam expander (BE).
² At specified rep. rate.

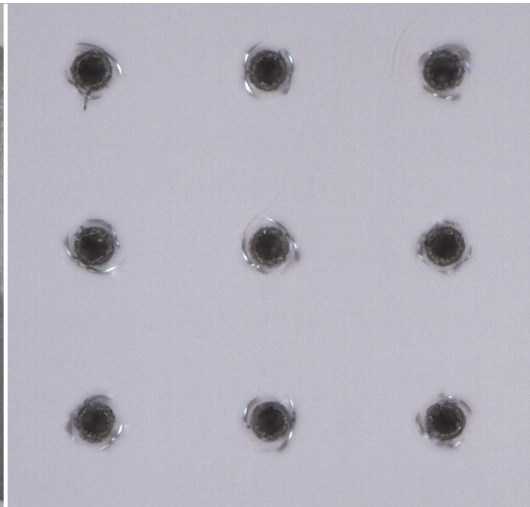
APPLICATION IMAGES PROCESSED BY CO/CO₂ LASERS

CO Lasers

Ceramic Scribing

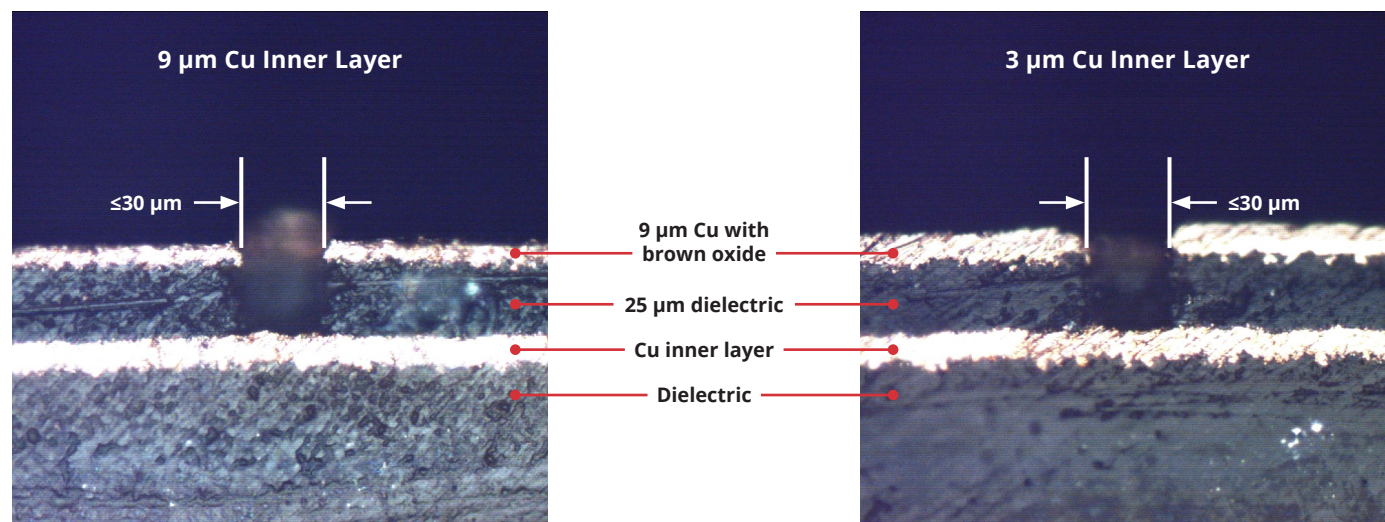


Borosilicate Glasses Drilling



CO Lasers

Micro Via PCB Drilling

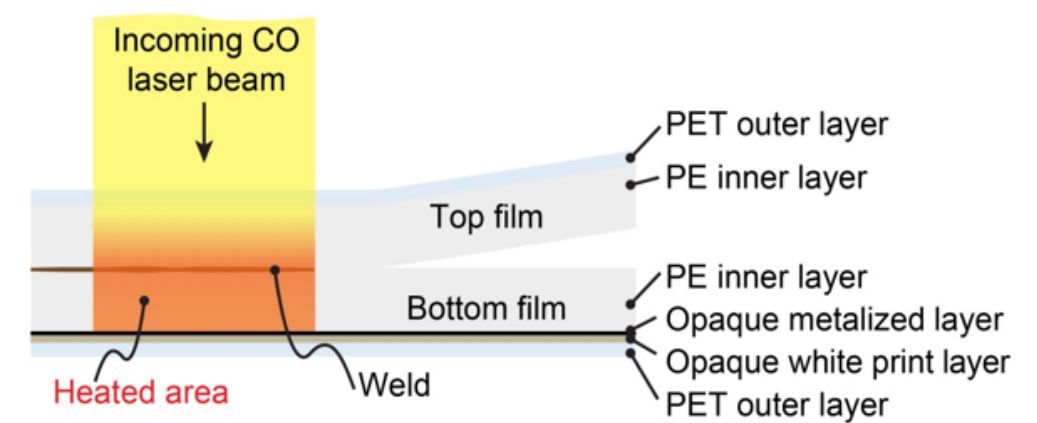


Cross sections of CO laser drilled vias in FR4. For the 9 μm Cu, pulse format was 1 kW peak power, 3 μsec FWHM pulse, followed by four 550 W peak, 0.5 μsec FWHM pulses. For the 3 μm Cu, pulse format was 950 kW peak power, 2 μsec FWHM pulse, followed by two 400 W peak, 0.4 μsec FWHM pulses.

APPLICATION IMAGES PROCESSED BY CO/CO₂ LASERS

CO Lasers

Multilayer Barrier Packaging Structures



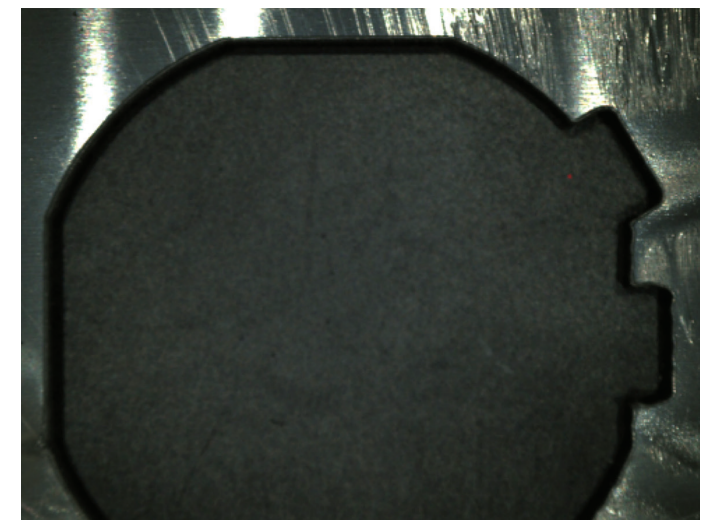
The CO laser readily passes through the outer PET layer and is well absorbed by the inner PE layers producing rapid melting and a strong, high quality seal.

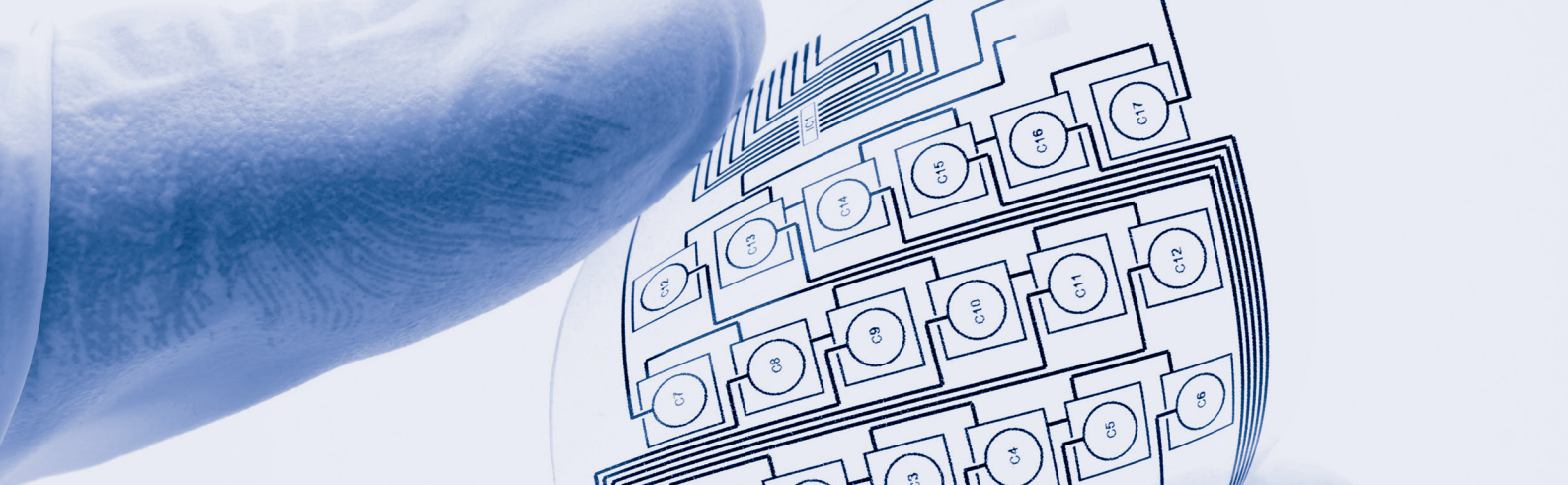
CO₂ Lasers

COP Film cut with Cx-LQS+



Cutting of Holes in Polypropylene (PP) for Automobile Bumper Covers with 100 W, 10.2 μm (top views)





DIAMOND J-3-5 CO Laser

Fully Sealed Carbon Monoxide Laser

코히런트가 출시한 CO 레이저는 유리, 세라믹, 필름 절단 및 드릴링, 의료 및 미용, 피부 재생에 이르기까지 다양한 응용분야에서 향상된 가공 특성을 보장합니다. CO 레이저는 수십 년 전에 처음으로 개발되었습니 다만 수명이 짧고 작동 특성에 한계가 있어서 낮은 출력이 요구되는 일부 연구실에서만 응용되어 왔습니다. 코히런트는 기술 혁신을 통해 시장의 높은 평가를 받고 있는 당사의 slab & waveguide CO₂ 레이저와 내구성, 신뢰성, 유지 보수 특성이 비슷한 새로운 고효율 CO 레이저 제품을 개발하여 다양한 사용 가능성을 열어주었습니다.

FEATURES & BENEFITS

- >250 W output power at 5 μ m (mid-IR)
- Stable pulsed and CW operation
- Beam focusability down to 25 μ m
- CO₂ Laser-like low cost of ownership

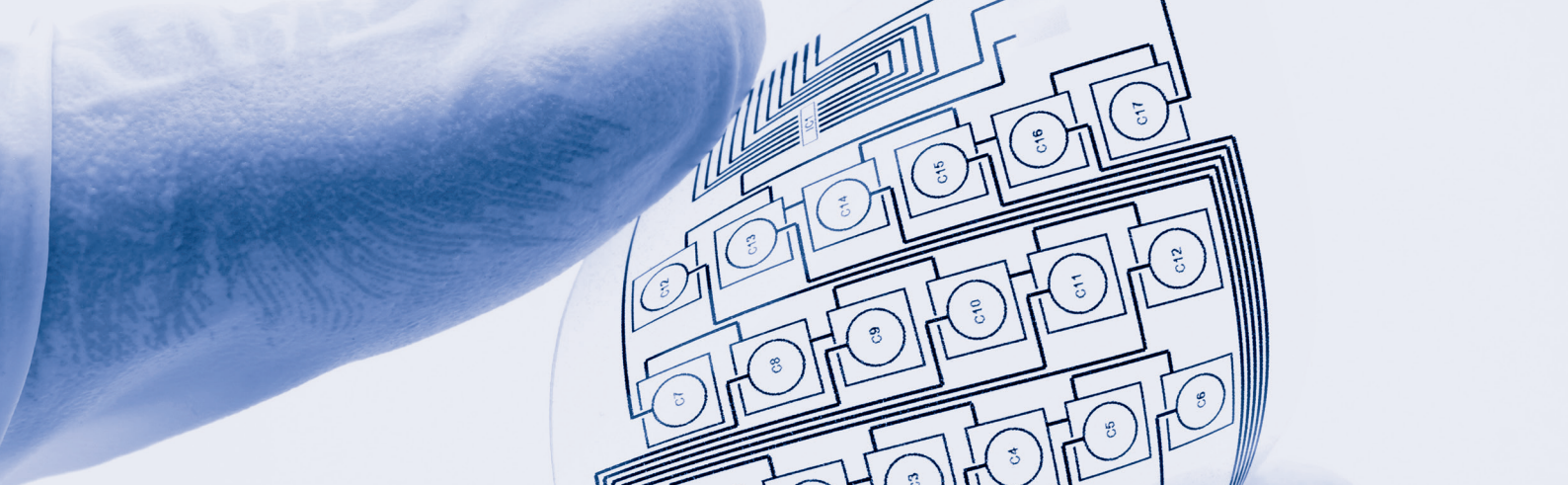
APPLICATIONS

- Glass Processing
- Film Cutting
- Micro Via Drilling
- Ceramic Processing
- Metal Processing
- Selective Laser Sintering
- Surgical – Tissue Cutting and Cauterization
- Aesthetics – Fractal Skin Resurfacing



SPECIFICATIONS ¹	DIAMOND J-3-5 CO Laser
Wavelength (μ m)	5.5 $\pm$ 0.25
Output Power ² (W)	>250
Power Range ³ (W)	10 to 250
Typical Peak Power ⁴ (W)	$\geq$ 750
Power Stability ^{2,5} (%)	$\pm$ 3
Mode Quality (M ²)	<1.2
Beam Waist Diameter ^{6,7} at 1/e ² (mm)	4.0 $\pm$ 1.013
Full-Angle Beam Divergence ⁷ (mrad)	$\leq$ 2.0
Polarization (parallel to baseplate) Linear	$\geq$ 100:1
Beam Ellipticity ^{6,7}	$\geq$ 0.83, $\leq$ 1.2
Pulse Frequency (kHz)	Single-shot to 200
RF Excitation Pulse Width Range (μ sec)	2 to 1000
Duty Cycle Limit (%)	$\leq$ 60
Fall Time ⁴ (μ s)	$\leq$ 140 ¹³
Weight	45 kg (99.2 lbs.)
Dimensions (L x W x H)	1064.1 x 198.1 x 227.6 mm (41.89 x 7.8 x 8.96 in.)
ELECTRICAL POWERY REQUIREMENTS	
DC Input Voltage (VDC)	48 $\pm$ 1.0%
Continuous DC Current ⁸ (A)	<100
Peak Current (A)	$\leq$ 200 for $\leq$ 6 ms
COOLANT	
Heat Load (kW)	$\leq$ 4.8
Dynamic Coolant Flow Rate (l/min.)	$\geq$ 5.7
Coolant Setpoint Temperature Range	21 to 25°C (69.8 to 77°F)
Coolant Temperature Stability (max.)	$\pm$ 1.0°C ($\pm$ 1.8°F)
Coolant ⁹	Anti-corrosion treated water
Coolant Differential Pressure ¹⁰ (kPa)	103 (15 psi) at 5.7 l/min. (1.5 gpm)
Coolant Maximum Static Pressure (kPa)	827 (120 psi)
ENVIRONMENTAL CONDITIONS	
Ambient Temperature	5 to 45°C (41 to 113°F)
Relative Humidity ¹¹ (non-condensing) (%)	$\leq$ 95
Altitude	$\leq$ 2000 m ($\leq$ 6500 ft.)
Dry Purge Gas Requirements ¹² (cfm)	>2

1 All specifications apply when the product is operated in accordance with the guidelines defined in the operators manual.
2 Measured at 1 kHz PRF, 60% duty cycle.
3 Output stability specification may not be met at lowest power or at acoustic resonances.
4 Measured for a 300 μ s pulse width at 1 kHz repetition frequency.
5 Measured as $\pm(P_{max} - P_{min})/2P_{max}$.
6 Measured at waist location ~1.0 m from the laser output.
7 Measured at 10 kHz PRF, 25% duty cycle.
8 At 10 kHz PRF, maximum duty cycle operation.
9 See manual for details.
10 This differential pressure is from system input to output and does not include the pressure drop from chiller fittings and the supply and return hose.
11 Do not operate at or below dew point.
12 Clean dry air or nitrogen are acceptable as purge gases. Coherent can recommend suitable commercial gas filter/dryers.
13 Measured at 1 kHz, 300 μ s RF pulse width.



Diamond C/Cx Series

Low Power CO₂ OEM Lasers for Marking and Engraving Applications

코히런트 DIAMOND C / Cx 시리즈는 탁월한 안정성, 일관된 성능, 긴 수명을 자랑하는 저출력 CO₂ 레이저(<150 W)입니다. 레이저 절단, Engraving, 스코어링, 마킹 등 폭넓은 용도에 사용할 수 있는 비용 효율적인 솔루션으로, 나무, 천, 가죽, 종이, 필름, 플라스틱, 다이보드, 유리 등 다양한 소재를 가공할 수 있습니다. DIAMOND 시리즈 레이저는 설치 후 별도의 작업 없이 24 시간 안정적인 성능을 제공합니다.

밀폐형 CO₂ 레이저 DIAMOND C / Cx 시리즈는 레이저 헤드 및 RF 전원 일체형으로 까다로운 환경에서도 안정적인 동작이 가능한 콤팩트하고 강력한 시스템입니다. 출력 빔 위치가 모두 동일하여 20W에서 120W로 쉽게 확장할 수 있습니다.

Cx-10 레이저는 안정성이 높고 유지보수가 간편한 모듈식으로 설계 되었고 120W의 정격 출력을 제공합니다. Cx-10은 다른 C 시리즈 레이저와 완벽하게 호환됩니다. 기본 Cx-10 레이저와 함께 Cx-10LDE+와 Cx-10LQS+ 고급 버전도 제공합니다. 이 레이저에는 광 변조기가 탑재되어 우수한 펄스 제어 기능과 매우 빠른 fall time을 실현하고 있습니다. Cx-10LDE +는 1 μs 미만의 fall time을, Cx-10LQS+는 200 ns의 피크 파워를 각각 제공합니다

FEATURES & BENEFITS

- Superior beam quality and power stability
- Low maintenance air-cooled design with rugged reliability
- Flexible, extremely compact and easy to install
- Economical, high quality laser processing on a wide range of materials
- Optimized performance at multiple wavelengths (9.3 μm or 10.6 μm)

APPLICATIONS

- Cut, slit, engrave, score, and mark a wide variety of materials, including wood, cloth, leather, paper, films, plastics, die boards, and even glass.

SPECIFICATIONS	DIAMOND C-20 (9.3 μm)	DIAMOND C-20 (10.2 μm)	DIAMOND C-20	DIAMOND C-20+ (9.3 μm)	DIAMOND C-20+ (10.2 μm)	DIAMOND C-20+			
Wavelength (μm)	9.24 to 9.35	10.11 to 10.31	10.55 to 10.63	9.24 to 9.35	10.11 to 10.31	10.55 to 10.63			
Optical Output Power ¹ (W)	13	20	20	13	20	20			
Power Stability ² (%)	±10	±10	±10	±8	±8	±8			
Mode Quality (M ²)	<1.2								
Beam Size (mm)	1.8 ±0.2								
Beam Divergence (mrad, full angle)	7.5 ±0.5								
Polarization	>100 to 1 (fixed linear, parallel to width)								
Operating Frequency and Duty Cycle	0 to 200 kHz, 0 to 100% DC								
Ingress Protection Rating (IP)	NA	NA	NA	IP 65	IP 65	IP 65			
CONFIGURATION & FACILITY REQUIREMENTS									
Weight	6.6 kg (14.5 lbs)								
Dimensions	395 x 93 x 155 mm (15.5 x 3.7 x 6.1 in.)			475 x 93 x 155 mm (18.7 x 3.7 x 6.1 in.)					
Input Power ³	48 VDC, 11.5 A								
Cooling	Liquid Available upon Request								
Heat Dissipation (W)	<575								
Maximum Case Temperature	<60°C (140°F)								
Operating Environment	5 to 45°C (41 to 113°F)								
Temperature							5 to 40°C (41 to 104°F)		
Altitude							<2000 m (6500 ft.)		
Humidity							Non-Condensing		
Shipping/Storage Environment	-10 to 60 C (14 to 140 F), Non-Condensing								

¹ Power measured at 25°C and derated by 1%/C for higher laser head temperatures.
² Power stability based on $\pm(P_{max} - P_{min})/(2 \cdot P_{max})$ average power measurement at constant duty cycle after 10-minute warm-up at operating condition.
³ Optional fans add 1A.



SPECIFICATIONS	DIAMOND C-30 (9.3 μm)	DIAMOND C-30 (10.2 μm)	DIAMOND C-30	DIAMOND C-30+ (9.3 μm)	DIAMOND C-30+ (10.2 μm)	DIAMOND C-30+
Wavelength (μm)	9.24 to 9.35	10.11 to 10.31	10.55 to 10.63	9.24 to 9.35	10.11 to 10.31	10.55 to 10.63
Optical Output Power ¹ (W)	17	30	30	17	30	30
Power Stability ² (%)	±5	±5	±5	±4	±4	±4
Mode Quality (M ²)	<1.2					
Beam Size (mm)	1.8 ±0.2					
Beam Divergence (mrad, full angle)	7.5 ±0.5					
Polarization	>100 to 1 (fixed linear, parallel to width)					
Operating Frequency and Duty Cycle	0 to 200 kHz, 0 to 100% DC					
Ingress Protection Rating (IP)	NA	NA	NA	IP 65	IP 65	IP 65
CONFIGURATION & FACILITY REQUIREMENTS						
Weight	6.6 kg (14.5 lbs)					
Dimensions	395 x 93 x 155 mm (15.5 x 3.7 x 6.1 in.)			475 x 93 x 155 mm (18.7 x 3.7 x 6.1 in.)		
Input Power ³	48 VDC, 11.5 A					
Cooling	Liquid Available upon Request					
Heat Dissipation (W)	<575					
Maximum Case Temperature	<60°C (140°F)					
Operating Environment	5 to 40°C (41 to 104°F)5 to 45°C (41 to 113°F)<2000 m (6500 ft.)Non-Condensing					
Temperature						
Altitude						
Humidity						
Shipping/Storage Environment	-10 to 60 C (14 to 140 F), Non-Condensing					

1 Power measured at 25°C and derated by 1%/C for higher laser head temperatures.
2 Power stability based on ±(Pmax - Pmin)/(2*Pmax) average power measurement at constant duty cycle after 10-minute warm-up at operating condition.
3 Optional fans add 1A.

SPECIFICATIONS	DIAMOND C-40A (10.2 μm)	DIAMOND C-40A	DIAMOND C-40L (10.2 μm)	DIAMOND C-40L
Wavelength (μm)	10.11 to 10.31	10.55 to 10.63	10.11 to 10.31	10.55 to 10.63
Optical Output Power ¹ (W)	40			
Power Stability ² (%)	±5			
Mode Quality (M ²)	<1.3			
Beam Size (mm)	3.6 ±0.5 at output aperture			
Beam Divergence (mrad, full angle)	<5			
Polarization	>100 to 1 (fixed linear, parallel to width dimension)			
Operating Frequency and Duty Cycle	0 to 100 kHz, 0 to 100% DC			
CONFIGURATION AND FACILITY REQUIREMENTS				
Weight	6.8 kg (15.0 lbs.)		6.4 kg (14.0 lbs.)	
Dimensions (L x W x H)	425 x 92.5 x 154.5 mm (16.73 x 3.64 x 6.08 in.)		460.8 x 92.5 x 104.1 mm (18.15 x 3.64 x 4.1 in.) ⁴	
Input Power ³	48 VDC, 20A			
Cooling	Air		Liquid	
Heat Dissipation (W)	<675			
Maximum Case Temperature	<60°C (140°F)			
Operating Environment	5 to 40°C (41 to 113°F) <2000 m (6500 ft.) Non-condensing			
Temperature				
Altitude				
Humidity				
Shipping/Storage Environment	-10 to 60°C (14 to 140°F), non-condensing			
Coolant	–		Distilled water with 25 to 35% Dow Frost*	
Coolant Flow Rate	–		>3.8 lpm (1.0 gpm)	
Maximum Coolant Pressure	–		6.9 kg/cm ² (100 psig)	
Max. Pressure Differential (at 1.0 gpm)	–		1.5 bar (22 psig)	
Coolant Temperature	–		15 to 30°C (59 to 86°F)	

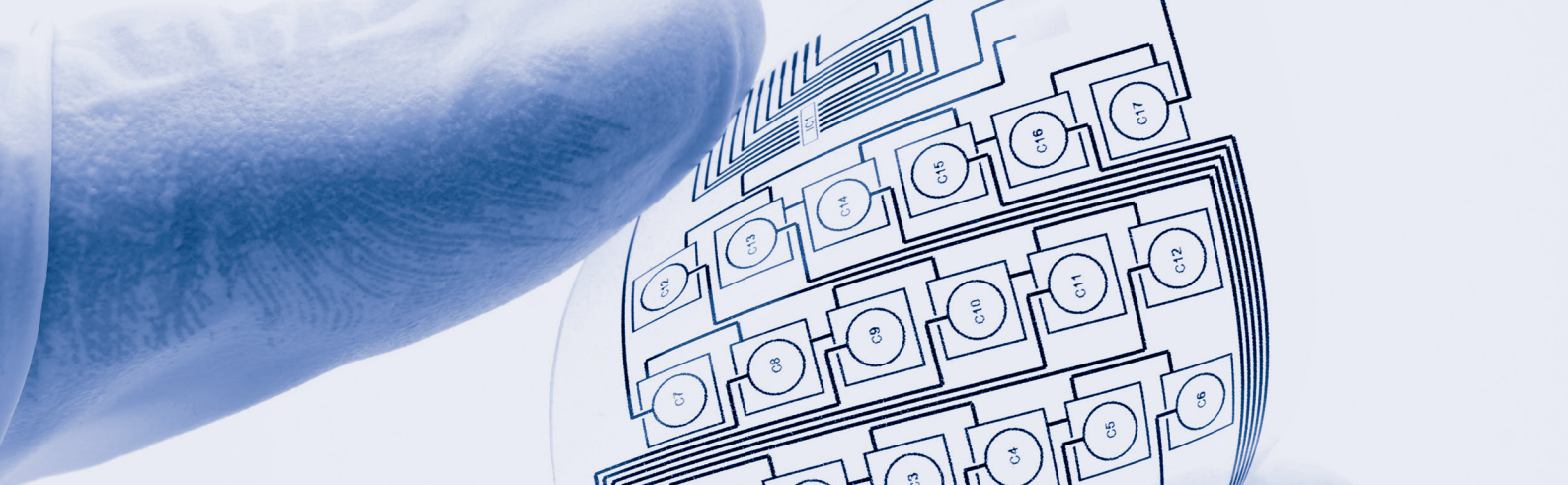
1 Power measured at 25°C and derated by 1%/C for higher laser head temperatures.
2 Power stability based on ±(Pmax - Pmin)/(2*Pmax) average power measurement at constant duty cycle after 10-minute warm-up at operating condition.
3 Optional fans add 1A.
4 The overall height dimension is taller for the Dual Chillplate version of this item.
* Dow Frost is a trademark of the Dow Chemical Company.

SPECIFICATIONS ¹	DIAMOND C-55A (9.3 μm)	DIAMOND C-55A (10.2 μm)	DIAMOND C-55A	DIAMOND C-55L (9.3 μm)	DIAMOND C-55L (10.2 μm)	DIAMOND C-55L
Wavelength (μm)	9.24 to 9.35	10.11 to 10.31	10.55 to 10.63	9.24 to 9.35	10.11 to 10.31	10.55 to 10.63
Optical Output Power ¹ (W)	40	55	55	40	55	55
Power Stability ² (%)	±5			±3		
Mode Quality (M ²)	<1.2					
Beam Size (mm)	1.8 ±0.2					
Beam Divergence (mrad, full angle)	7.5 ±0.5					
Polarization	>100 to 1 (fixed linear, parallel to width dimension)					
Operating Frequency and Duty Cycle	0 to 100 kHz, 0 to 100% DC					
CONFIGURATION AND FACILITY REQUIREMENTS						
Weight	10.0 kg (22.0 lbs.)			9.5 kg (21.0 lbs.)		
Dimensions (L x W x H)	538 x 92.5 x 154.5 mm (21.2 x 3.64 x 6.08 in.)			579.6 x 92.5 x 104.1 mm (22.82 x 3.64 x 4.1 in.) ⁴		
Input Power ³	48 VDC, 20A					
Cooling	Air			Liquid		
Heat Dissipation (W)	<1200					
Maximum Case Temperature	<60°C (140°F)					
Operating Environment Temperature Altitude Humidity	5 to 40°C (41 to 113°F) <2000 m (6500 ft.) Non-condensing					
Shipping/Storage Environment	-10 to 60°C (14 to 140°F), non-condensing					
Coolant	–			Distilled water with 25 to 35% Dow Frost*		
Coolant Flow Rate	–			>3.8 lpm (1.0 gpm)		
Maximum Coolant Pressure	–			7 kg/cm ² (100 psig)		
Max. Pressure Differential (at 1.0 gpm)	–			3.2 bar (46 psig)		
Coolant Temperature	–			15 to 30°C (59 to 86°F)		

1 Power measured at 25°C and derated by 1%/C for higher laser head temperatures.
2 Power stability based on $\pm(P_{\text{max}} - P_{\text{min}})/(2 \cdot P_{\text{max}})$ average power measurement at constant duty cycle after 10-minute warm-up at operating condition.
3 Optional fans add 1A.
4 The overall height dimension is taller for the Dual Chillplate version of this item.
* Dow Frost is a trademark of the Dow Chemical Company.

SPECIFICATIONS ¹	DIAMOND C-70A (10.2 μm)	DIAMOND C-70A	DIAMOND C-70L (10.2 μm)	DIAMOND C-70L
Wavelength (μm)	10.11 to 10.31	10.55 to 10.63	10.11 to 10.31	10.55 to 10.63
Optical Output Power ¹ (W)	70			
Power Stability ² (%)	±5		±3	
Mode Quality (M ²)	<1.3			
Beam Size (mm)	3.6 ±0.5 at output aperture			
Beam Divergence (mrad, full angle)	<5			
Polarization	>100 to 1 (fixed linear, parallel to width dimension)			
Operating Frequency and Duty Cycle	0 to 100 kHz, 0 to 100% DC			
CONFIGURATION AND FACILITY REQUIREMENTS				
Weight	10.2 kg (22.5 lbs.)		9.7 kg (21.5 lbs.)	
Dimensions (L x W x H)	604.9 x 92.5 x 154.5 mm (23.8 x 3.64 x 6.08 in.)		647.5 x 92.5 x 104.1 mm (25.5 x 3.64 x 4.1 in.)	
Input Power ³	48 VDC, 20A			
Cooling	Air		Liquid	
Heat Dissipation (W)	<1200			
Maximum Case Temperature	<60°C (140°F)			
Operating Environment Temperature Altitude Humidity	5 to 40°C (41 to 113°F) <2000 m (6500 ft.) Non-condensing			
Shipping/Storage Environment	-10 to 60°C (14 to 140°F), non-condensing			
Coolant Coolant Flow Rate Maximum Coolant Pressure Max. Pressure Differential (at 1.0 gpm) Coolant Temperature	Distilled water with 25 to 35% Dow Frost* >3.8 lpm (1.0 gpm) 7 kg/cm ² (100 psig) 3.2 bar (46 psig) 15 to 30°C (59 to 86°F)			

1 Power measured at 25°C and derated by 1%/C for higher laser head temperatures.
2 Power stability based on $\pm(P_{\text{max}} - P_{\text{min}})/(2 \cdot P_{\text{max}})$ average power measurement at constant duty cycle after 10-minute warm-up at operating condition.
3 Optional fans add 1A.
* Dow Frost is a trademark of the Dow Chemical Company.



DIAMOND Cx-10 Series

Sealed CO₂ Laser

코히런트 Diamond Cx-10시리즈 CO₂ 레이저는 고품질 마킹, 각인, 절단이 가능하고 유지 보수 비용과 운영 비용도 절감합니다. 크기 대비 최고의 출력 비율을 자랑하며, 높은 신뢰성을 제공하는 동시에 간단한 유지 보수가 가능하도록 설계되었습니다. 모듈형 설계로 레이저 헤드 어셈블리 또는 RF 모듈 어셈블리를 현장에서 저렴한 비용으로 교체할 수 있습니다.

Diamond Cx-10 레이저는 빔 품질이 우수하고 출력 안정도가 탁월하며 펄스 하강 시간 (fall time)이 빠르기 때문에 더욱 우수한 가공 결과를 얻을 수 있습니다. 이러한 요소들은 가공 효율성을 극대화하고 열 영향 영역 (HAZ)을 최소화합니다.

9.3 μm ~ 10.6 μm의 다양한 파장을 통해 재료의 고유한 흡수 특성에 맞춰 레이저 출력을 최적으로 조정할 수 있습니다.

FEATURES & BENEFITS

- 120 W CO₂ laser
- Compact design with the highest power/volume ratio in its class
- Superior beam quality, power stability, and reliability
- Available in four wavelengths: 9.3 μm, 9.6 μm, 10.2 μm, and 10.6 μm
- Field-serviceable modular design
- Global logistics ensure delivery of replacement parts within 48 h in most geographies

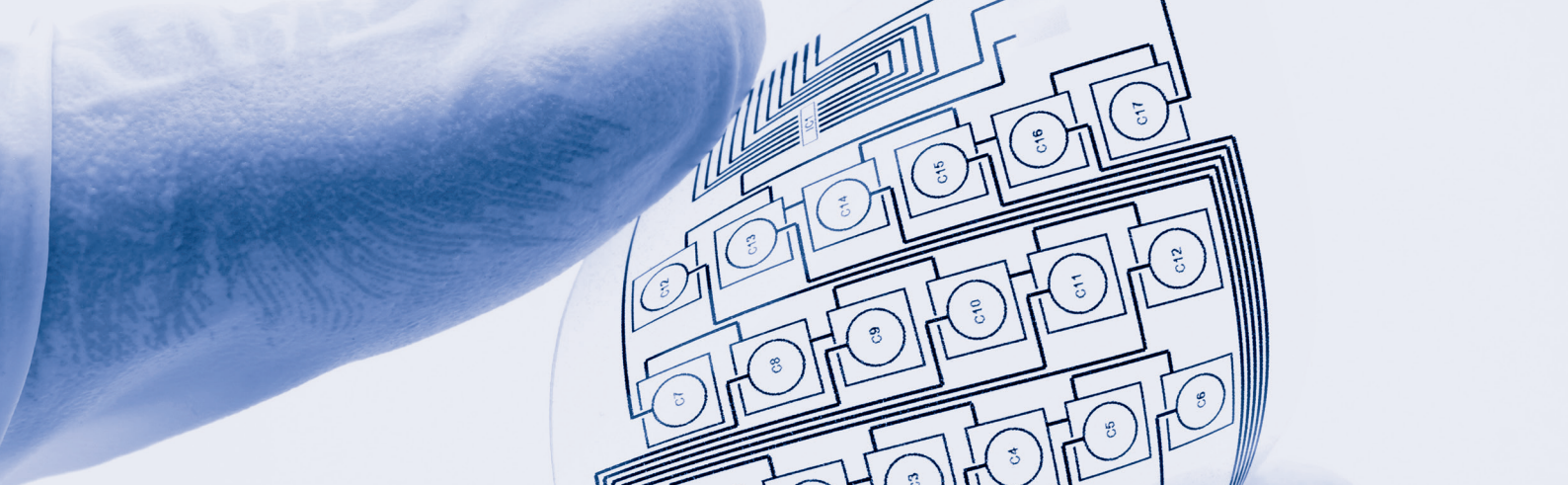
APPLICATIONS

- High volume marking, cutting, and engraving
- Film cutting and processing
- Process wide range of materials from acrylics, cardboard, ceramics, glass, polymer films, leather, paper, textiles, wood, and PCBs



SPECIFICATIONS	Cx-10L 10.6 μm	Cx-10L 10.2 μm	Cx-10L 9.6 μm	Cx-10L 9.3 μm
Wavelength (μm)	10.6 ± 0.03	10.2 ± 0.05	9.6 ± 0.05	9.3 ± 0.05
CW Rated Power ¹ (W)	≥120	≥100	≥80	
Typical Output Power ¹ (W)	>135		≥100	
Power/Volume ² (mW/cm ³)	≥15.23	≥12.69	≥10.16	
Cold Start Power Stability ³ (%)	±4			
Power Stability ⁴ (%)	±2			
Typical Pulse Fall Time ⁵ (μsec)	≤60			
Beam Quality (M ²)	≤1.2			
Beam Diameter (mm)	1.8 ± 0.2			
Beam Divergence (mrad) (full angle)	≤8.0			
Beam Ellipticity	≥0.83, ≤1.2			
Pointing Stability (% divergence/actual μrad)	±5/<250			
Polarization ⁶	Linear Horizontal ≥100:1			
Operating Frequency and Duty Cycle	0 to 100 kHz, 2% to 100% DC			
CONFIGURATION AND FACILITY REQUIREMENTS				
Weight (kg)	14.5 kg (32 lbs)			
Dimensions (L x W x H)	563 x 132 x 106 mm (22.2 x 5.2 x 4.2 in.)			
Input Power	48 VDC, 38A			
Heat Dissipation (W)	≤1700			
Maximum Case Temperature	<60°C (140°F)			
Operating Environment	Temperature 5°C to 45°C (41 to 113 °F) Altitude ≤2000 m (6500 ft) Humidity Non-condensing ≤95%			
Shipping/Storage Environment	-10°C to +60°C (14 to 140°F), Non-condensing			
Coolant	Distilled water with 25 to 35% Dow Frost*			
Coolant Flow Rate	≥5.7 l/min. (1.5 gpm)			
Maximum Coolant Pressure	827 kPa (120 psig)			
Max. Pressure Differential (at 1.5 gpm)	<206 kPa (30 psig)			
Coolant Temperature	15°C to 30°C (59 to 86°F)			

¹ Power measured at 25°C and derated by 1%/°C for higher laser head temperature.
² Power/volume defined as (CW rated power in mW)/(L*W*H in cm³).
³ Power stability based on ±(P_{max}-P_{min})/(2*P_{max}) measured from cold start for 5 minutes at 25 kHz 99% DC.
⁴ Power stability based on ±(P_{max}-P_{min})/(2*P_{max}) measured for 10 minutes at 25 kHz 99% DC.
⁵ 10% and 90% of peak power fall points measured at 1.5 kHz PRF, 350 μs pulse width, after 5 minutes.
⁶ Refer to Mechanical Specifications for beam polarization orientation.
* Dow Frost is a trademark of the Dow Chemical Company.



DIAMOND Cx-10LDE+

Sealed CO₂ Laser with Integrated AOM

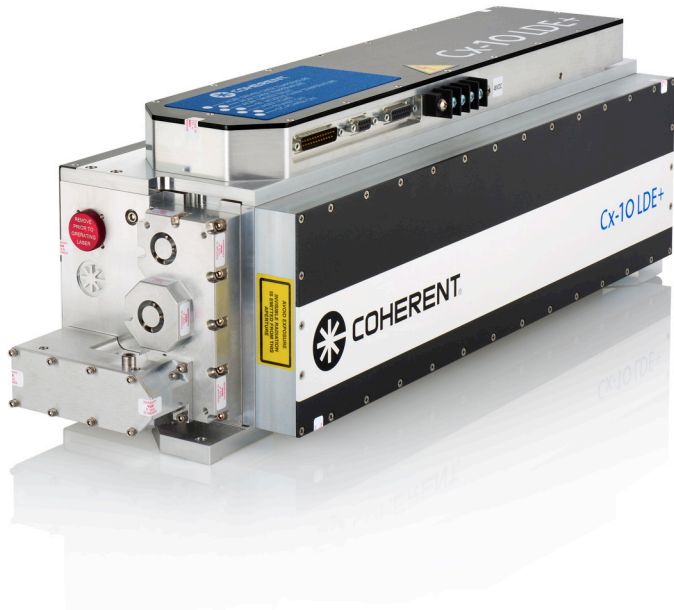
코히런트 C/Cx 시리즈에 속하는 Cx-10LDE+ CO₂ 레이저는 완벽히 통합된 광학변조기(AOM) 덕분에 우수한 펄스 제어력과 출력 안정도를 제공합니다. Cx-10 레이저 플랫폼을 기반으로 하는 Cx-10LDE+는 바로 생산에 투입할 수 있고 쉽게 통합시킬 수 있는 레이저로써 낮은 유지 보수 비용과 운영 비용으로 최고 품질의 레이저 가공이 가능합니다. AOM이 제공하는 극한의 펄스 제어력을 갖춘 Cx-10LDE+는 FPD 제조의 필름 절단, 고해상도 마킹, 진정한 ‘온/오프’ 펄스가 필요한 고정밀 응용분야에 특히 유용합니다.

FEATURES & BENEFITS

- Fully integrated AOM providing excellent pulse control.
- Superior power stability improves processing consistency and repeatability
- Modular RF board and AOM design allows for easy serviceability
- Small footprint for easy integration
- Pulse rise/fall times of <1 μs minimize heat effected zones and provide high precision process control

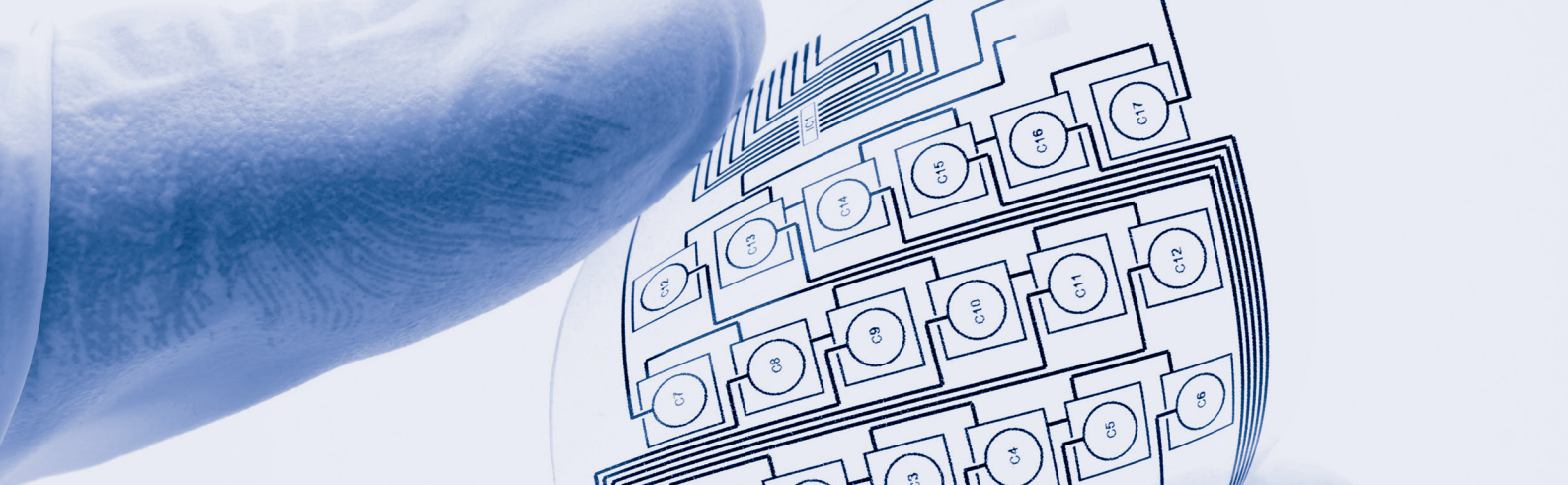
APPLICATIONS

- High volume marking, cutting, and engraving
- Film cutting and processing
- Process wide range of materials from acrylics, cardboard, ceramics, glass, polymer films, leather, paper, textiles, wood, and PCBs



SPECIFICATIONS	Cx-10LDE+ 10.6 μm	Cx-10LDE+ 10.2 μm	Cx-10LDE+ 9.6 μm	Cx-10LDE+ 9.3 μm
Wavelength (μm)	10.6 ± 0.03	10.2 ± 0.05	9.6 ± 0.05	9.3 ± 0.05
Laser Power at 50% Duty Cycle ^{1,2} (W)	≥45	≥40	≥30	≥30
Typical Peak Output Power (W)	>120	>120	≥85	≥85
Power Stability ^{1,2} (%)	±3 (±0.1 °C coolant stability after 10 minute warm-up)			
Pulse Rise and Fall Time (μsec)	≤1 (10% to 90%)			
Beam Quality (M ²)	≤1.2			
Beam Output Diameter (mm) (nominal)	5.5 ±1.5			
Beam Waist Diameter (mm) (nominal)	3.4 ±0.3	3.4 ±0.3	2.7 ±0.3	2.7 ±0.3
Beam Divergence (mrad) (full angle)	≤5.5			
Beam Ellipticity ³	≥0.83, ≤1.2			
Pointing Stability ⁴ (% divergence/actual μrad)	≤750 μrad			
Polarization ⁵	Vertical ≥100:1			
Operating Frequency and Duty Cycle ⁶	0 to 200 kHz, 1% to 100% DC			
CONFIGURATION AND FACILITY REQUIREMENTS				
Weight (kg)	23.0 kg (50.5 lbs)			
Dimensions (L x W x H)	670.8 x 176.5 x 186.9 mm (26.41 x 6.95 x 7.36 in.)			
Input Power	48 VDC, 45A			
Heat Dissipation (W)	≤2300			
Maximum Case Temperature	<60°C (140°F)			
Clean Dry Air Purge ⁷	> 5 slph (0.177 scfh)			
Operating Environment Temperature Altitude Humidity	5°C to 45°C (41 to 113 °F) ≤2000 m (6500 ft) Non-condensing ≤95%			
Shipping/Storage Environment	-10°C to +60°C (14 to 140°F), Non-condensing			
Coolant Coolant Flow Rate Maximum Coolant Pressure Max. Pressure Differential (at 1.5 gpm) Coolant Temperature	Distilled water with 25% to 35% Dow Frost* ≥5.7 l/min. (1.5 gpm) 700 kPa (101 psig) <400 kPa (58 psig) 20°C ± 1°C			

¹ All measurements, such as power made at 20°C ±0.5°C coolant temperature, AOM PRF 25 kHz.
² Power Stability based on $\pm(P_{max}-P_{min})/(2 \cdot P_{max})$ average power measurement under the following conditions: AOM PRF 25kHz; AOM duty cycle 50%; Cx-10 laser duty cycle 100%; and after 10 minute warm up period with 10 minute measurement duration.
³ Ratio based on far field divergence measurement, defined as the ratio of vertical to horizontal divergence.
⁴ Measured as the steady state angular beam centroid change between a 5% AOM duty cycle and a 95% AOM duty cycle. Steady state is defined as the angular beam centroid location after 1 minute of operation at the specific AOM duty cycle and with a 100% Cx-10 duty cycle after a 10 minute Cx-10 warm up period.
⁵ Refer to Mechanical Specifications for beam polarization orientation.
⁶ Operation at pulse repetition frequencies above 200 kHz may result in substantial side lobe power and reduced beam quality.
⁷ Dry Nitrogen is also acceptable as a purge gas.
* Dow Frost is a trademark of the Dow Chemical Company.



DIAMOND Cx-10LQS+

Q-Switched CO₂ Lasers

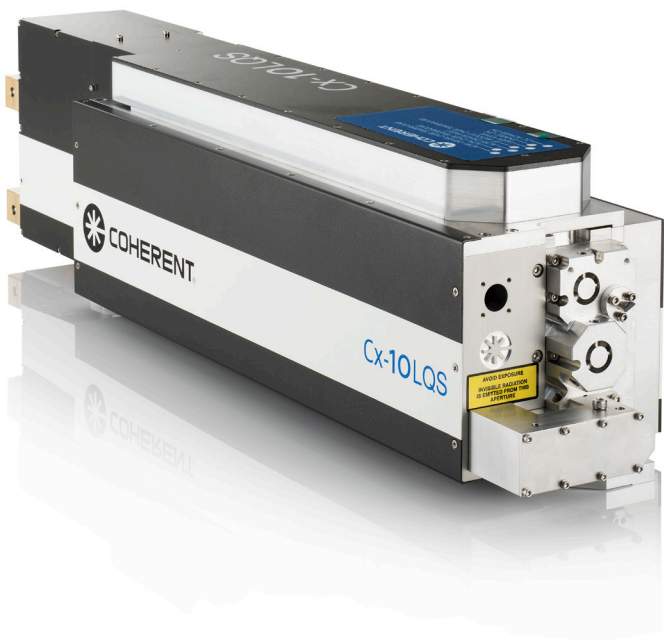
코히런트의 Cx-10LQS+ CO₂ 레이저는 단일 샷에서 100 kHz까지의 작동 범위에 걸쳐 2 kW ~ 5 kW의 높은 피크 전력으로 짧은 레이저 펄스를 제공합니다. Cx-10LQS+는 9.3 μm의 파장에서 작동하는 콤팩트한 레이저 시스템으로 인터 캐비티 광학변조기(AOM)가 완벽히 통합되어 있습니다. 성공적인 Cx-10 시리즈에 속하는 Cx-10LQS+는 바로 생산에 투입할 수 있고 손쉽게 통합할 수 있는 레이저 시스템으로써 낮은 유지 보수 비용과 운영 비용으로 최고 품질의 레이저 가공이 가능합니다. 인터 캐비티 AOM이 제공하는 극한의 펄스 제어력을 갖춘 Cx-10LQS+는 FPD 제조의 필름 절단, 고해상도 마킹, 진정한 ‘온/오프’ 펄스가 필요한 고정밀 응용분야에 특히 유용합니다.

FEATURES & BENEFITS

- Fully integrated AOM providing excellent Q-switch pulse control
- Superior power stability improves processing consistency and repeatability
- Modular RF board and AOM design allows for easy serviceability
- Small footprint for easy integration
- Pulse rise/fall times of <200 ns and high peak power minimize heat effected zones providing high precision process control

APPLICATIONS

- Film Cutting in Flat Panel Display manufacturing
- High Resolution Marking



SPECIFICATIONS	DIAMOND Cx-10LQS+
Wavelength (μm)	9.3 ±0.05
Laser Power at 50% Duty Cycle ¹ (W)	≥50
Pulse Energy ¹ (mJ)	>0.5
Power Stability ² (%)	±5 (±0.1 °C coolant stability after 10 minute warm-up)
Optical Pulse Width ³ (ns) (FWHM)	≤200 (10% to 90%)
Beam Quality (M ²)	≤1.2
Beam Output Diameter (mm)	9.0 ±1.0
Beam Divergence (mRad) (full angle)	≤6.5
Beam Ellipticity ⁴	≥0.9, ≤1.1
Polarization	Circular
Operating Frequency and Pulse Width	Single-Shot to 100 kHz, 0.5 – 5 μsec PW cmd
CONFIGURATION AND FACILITY REQUIREMENTS	
Weight ⁵ (kg)	24.3.0 kg (53.5 lbs)
Dimensions ⁶ (L x W x H)	662.8 x 155.8 x 187.0 mm (26.10 x 6.13 x 7.36 in.)
Input Power	48 VDC, 40A
Heat Dissipation (W)	≤2000
Clean Dry Air Purge ⁶	> 5 slph (0.177 scfh)
Ambient Temperature	5 to 45°C (41 to 113°F)
Altitude	≤2000 m (6500 ft)
Humidity (%)	Non-Condensing, ≤95
Shipping/Storage Environment	-10 to +60°C (14 to 140°F), Non-condensing
Coolant ⁷	Distilled water with 10% OptiShield+ ⁷
Coolant Flow Rate	≥5.7 l/min (1.5 gpm)
Maximum Coolant Pressure	414 kPa (60 psig)
Max. Pressure Differential (at 1.5 gpm)	<103 kPa (15 psig)
Coolant Temperature	20°C ±1°C (68°F ±1.8°F)

¹ All measurements, such as power and energy made at 20°C ±0.5°C coolant temperature, 80 kHz PRF, and 5 μsec PW command.
² Power Stability based on $\frac{+/- (P_{max}-P_{min})}{(2 \times P_{max})}$ average power measurement at constant duty cycle after 10-minute warmup at operating condition.
³ Pulse Width and Peak Power will vary depending on operating parameters, specifically Pulse Frequency and Duty Cycle.
⁴ Gaussian Correlation based on Spiricon Near Field Raw Beam measurement at 80 cm distance from laser output, 20°C, and steady state operation at 80 kHz PRF, and 5 μsec PW.
⁵ Ratio based on Far Field Divergence measurement at 20°C, 80 kHz PRF, and 5 μsec PW command.
⁶ Weight and Dimensions with Circular Polarizer or Isolator.
⁷ OptiShield+ is a trademark of the OptiTemp.



DIAMOND J-1000

Liquid-Cooled, RF-Excited OEM Industrial CO₂ Laser

Diamond J-1000 시리즈는 밀폐형 펄스 CO₂ 레이저로 최대 1 kW 출력을 제공하고 전원 공급 장치가 통합된 콤팩트한 패키지 제품입니다. RF 전원 공급 장치를 레이저 헤드에 통합하여 RF 배선을 완벽히 제거하고 레이저의 신뢰성을 높였으며 워크스테이션이나 로봇 톨에 간편하게 통합할 수 있습니다. 10.6 μ m와 9.4 μ m 파장이 제공되는 독특한 J-1000 시리즈 디자인에는 수많은 고성능 기능이 내장되어 있어 종이나 플라스틱 필름, 플라스틱, 유리, 탄소 복합재, 직물, 목재에서 금속 박판의 변환, 절단, 각인, 타공, 드릴링까지 공간에 민감한 응용분야에 특히 적합한 제품입니다. RF 전원 공급 장치는 탈착식이고, 온보드 진단기 (인터넷을 통해 접근 가능)가 내장되어 있어 사전 유지보수가 가능합니다.



FEATURES & BENEFITS

- Wide operating power range
- Typical peak power >3 kW
- Pulse frequency from single-shot to 200 kHz
- Fast rise/fall time
- Outstanding beam quality
- Excellent power stability
- Low-cost OEM configuration
- Integrated but detachable RF power supply
- Compact design
- Equipped with on-board internet-accessible diagnostics

APPLICATIONS

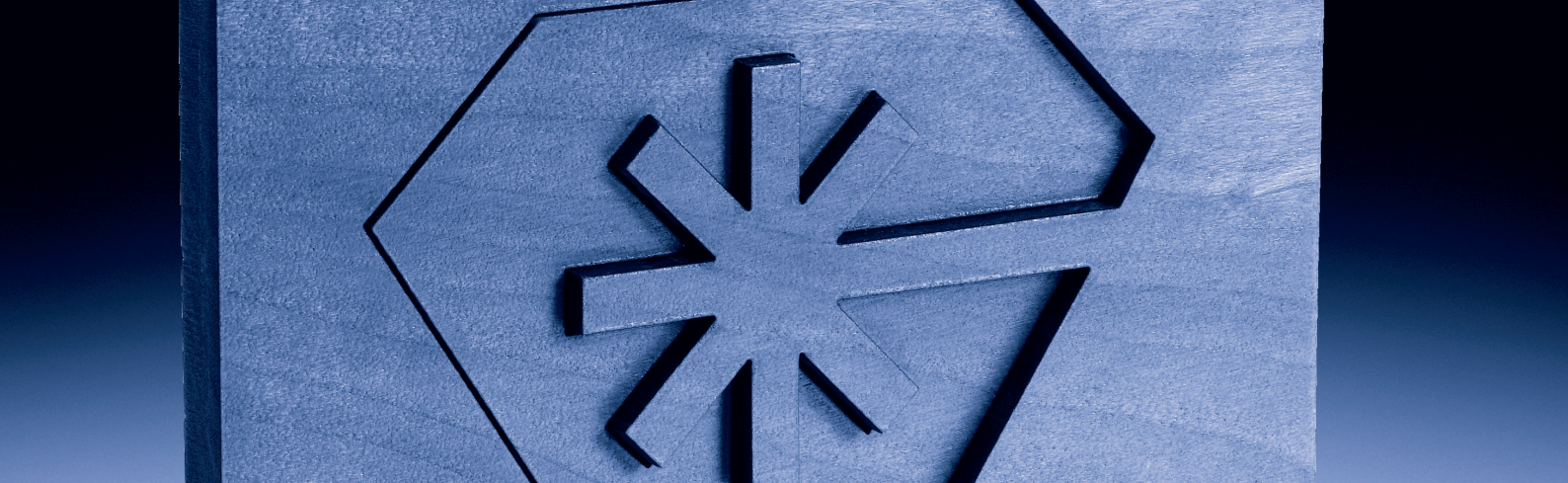
- High Speed Digital Converting
- Through-cutting, Kiss-cutting, and Perforation
- Engraving
- Die Board Cutting
- Glass Cutting and Thermal Processing
- Ceramic Drilling and Scribing
- Automotive
- 3D Printing
- Semiconductor Processing

CO/CO₂ Lasers **DIAMOND J-1000**



SPECIFICATIONS ¹	Diamond J-1000-10.6	Diamond J-1000-9.4
Wavelength (μm)	10.2 to 10.8	9.1 to 9.5
Output Power ² (W)	≥1000	
Power Range ³ (W)	100 to 1000	
Peak Effective Power ⁴ (W)	>2800	
Power Stability ⁵ (%)	±5	
Mode Quality (M ²)	<1.2	
Near Field Beam Diameter ⁶ at 1/e ² (mm)	12 ±1.5	
Beam Waist Diameter ⁷ at 1/e ² (mm)	10 ±1.5	
Full-Angle Beam Divergence ⁶ (mrad)	1.6 typical, 2.0 max.	
Polarization (perpendicular to baseplate)	Linear >100:1	
Beam Ellipticity	>0.83, <1.20	
Pulse Frequency (kHz)	Single-shot to 200	
RF Excitation Pulse Width Range (μsec)	2 to 1000	
Duty Cycle Limit (%)	≤60	
Fall Time ⁴ (μs)	<55	
Weight	173 kg (381 lbs.)	
Dimensions (L x W x H)	1497 x 384 x 471 mm (58.9 x 15.1 x 18.6 in.)	
ELECTRICAL POWER REQUIREMENTS		
CC Input Voltage (VDC)	48 ±1.0%	
Continuous DC Current (A)	≤425	
Peak Current (A)	<628 for up to 1 ms	
COOLANT		
Heat Load (kW)	<22	
Dynamic Coolant Flow Rate (l/min.)	>25 (6.5 gpm)	
Coolant Temperature Stability (max.)	±1.0°C (±1.8°F)	
Coolant Setpoint Temperature Range	21 to 25°C (69.8 to 77°F)	
Coolant ⁸	Anti-corrosion treated water	
Coolant Differential Pressure ⁹ (kPa)	344 (50 psi) at 25 l/min. (6.5 gpm)	
Coolant Maximum Static Pressure (kPa)	827 (120 psi)	
ENVIRONMENTAL CONDITIONS		
Ambient Temperature	5 to 45°C (41 to 113°F)	
Relative Humidity ¹⁰ (%)	<95 (non-condensing)	
Altitude	<2000 m (<6500 ft.)	

¹ All specifications apply when the product is operated in accordance with the guidelines defined in the operators manual.
² Measured at 60% duty and 10 kHz prf.
³ Output stability specification may not be met at lowest power or at acoustic resonances.
⁴ Measured at 10% duty cycle and 1 kHz prf.
⁵ Measured as $\pm(P_{\text{max}} - P_{\text{min}})/2P_{\text{max}}$.
⁶ Measured at approximately 0.5 m from the laser output.
⁷ Beam diameter at the waist location, located at approximately 5m from the laser output.
⁸ See manual for details.
⁹ This differential pressure is from system input to output and does not include the pressure drop from chiller fittings and the supply and return hose.
¹⁰ Do not operate at or below dew point.



DIAMOND J-2 Series

RF-Excited OEM Industrial CO₂ Laser

코히런트 Diamond J-2 시리즈는 밀폐형 펄스 CO₂ 레이저로 150 W 이상의 평균 출력을 제공하며 완벽히 통합된 콤팩트한 패키지 구조로 되어 있습니다. 평판(Slab) 방출 방식으로 설계되어 있어 펄싱 특성이 독특하며 (CW 변조 레이저와는 달리), 450 W를 훨씬 넘는 최대 출력에 도달합니다. J-2 시리즈는 10.6 μm, 10.2 μm, 9.4 μm로 제공되며 빠른 펄스 상승/하강 시간 (rising & fall time) 으로 최대 200 kHz의 펄스 반복률로 작동할 수 있습니다. 다양한 파장 선택, 높은 피크 파워, 빠른 상승/하강 시간, 필요에 따른 출력, 탁월한 빔 품질 등을 두루 갖춘 J 시리즈는 매우 다양한 재료 가공 응용분야에 이상적인 레이저입니다.

FEATURES & BENEFITS

- Wide operating power range
- Peak power >450 W
- Pulse frequency from single-shot to 200 kHz
- Fast rise-and-fall time
- Outstanding beam quality
- Excellent power stability
- Low-cost OEM configuration
- Integrated but removable RF power supply
- Compact design
- Equipped with on-board internet-accessible diagnostics

APPLICATIONS

- Converting
- Drilling
- Cutting
- Scribing
- Engraving
- Marking

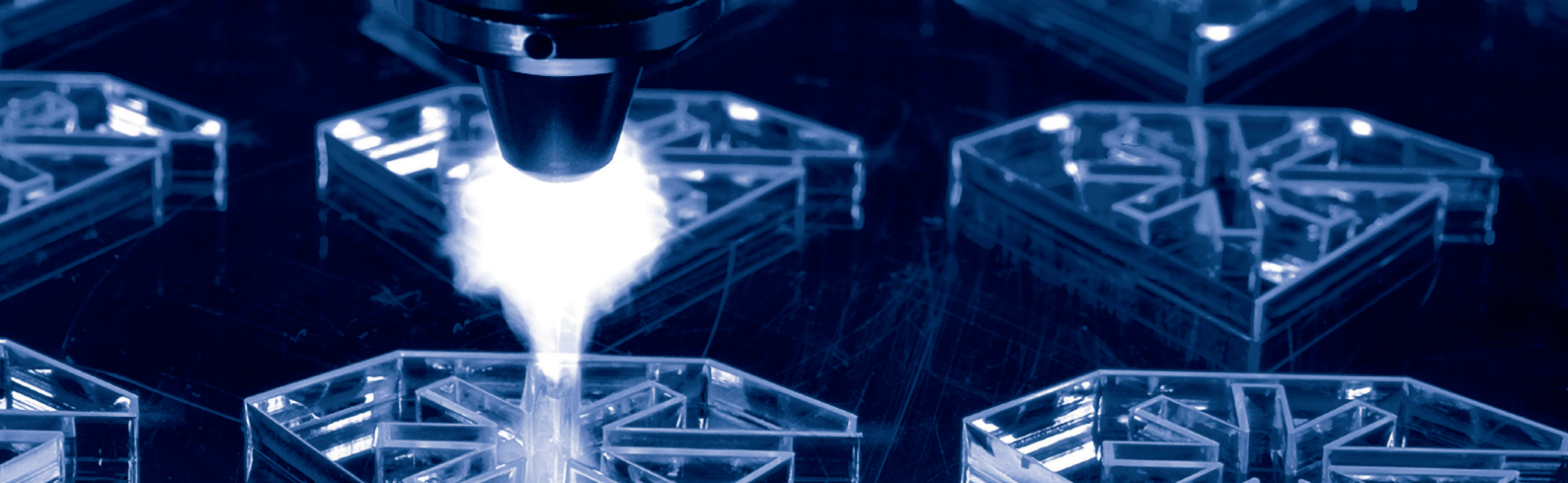


CO/CO₂ Lasers DIAMOND J-2 Series



SPECIFICATIONS ¹	DIAMOND J-2-9.4	DIAMOND J-2-10.2	DIAMOND J-2-10.6
Wavelength (μm)	9.36 ±0.4	10.25 ±0.1	10.6 ±0.4
Output Power ² (W)	≥160	≥150	≥180
Power Range ³ (W)	15 to 160	15 to 150	15 to 180
Typical Peak Power ⁴ (W)	≥450	≥400	≥450
Power Stability ^{2,5} (%)	±6		
Mode Quality (M ²)	<1.2		
Beam Waist Diameter ^{6,7} at 1/e ² (mm)	7.0 ±1.0	8.5 ±1.0	8.5 ±1.0
Full-Angle Beam Divergence ⁷ (mrad)	≤2.4	≤2.0	≤2.0
Polarization (parallel to baseplate)	Linear ≥100:1		
Beam Ellipticity ^{6,7}	≥0.83, ≤1.2		
Pulse Frequency (kHz)	Single-shot to 200		
RF Excitation Pulse Width Range (μsec)	2 to 1000		
Duty Cycle Limit (%)	≤70		
Fall Time ⁴ (μs)	≤60		
Weight	35 kg (77.2 lbs.)		
Dimensions (L x W x H)	830.5 x 198.1 x 227.6 mm (32.7 x 7.8 x 8.96 in.)		
ELECTRICAL POWER REQUIREMENTS			
DC Input Voltage (VDC)	48 ±1.0%		
Continuous DC Current ⁸ (A)	≤60		
Peak Current (A)	≤120 for ≤6 ms		
COOLANT			
Heat Load (kW)	≤2.5		
Dynamic Coolant Flow Rate (l/min.)	≥5.7		
Coolant Setpoint Temperature Range	21 to 25°C (69.8 to 77°F)		
Coolant Temperature Stability (max.)	±1.0°C (±1.8°F)		
Coolant ⁹	Anti-corrosion treated water		
Coolant Differential Pressure ¹⁰ (kPa)	103 (15 psi) at 5.7 l/min. (1.5 gpm)		
Coolant Maximum Static Pressure (kPa)	827 (120 psi)		
ENVIRONMENTAL CONDITIONS			
Ambient Temperature	5 to 45°C (41 to 113°F)		
Relative Humidity ¹¹ (non-condensing) (%)	≤95		
Altitude	≤2000 m (≤6500 ft.)		

¹ All specifications apply when the product is operated in accordance with the guidelines defined in the operators manual.
² Measured at 10 kHz PRF, 70% duty cycle.
³ Output stability specification may not be met at lowest power or at acoustic resonances.
⁴ Measured for a 100 μs pulse width at 1 kHz repetition frequency.
⁵ Measured as ±(P_{max}-P_{min})/2P_{max}.
⁶ Measured at waist location ~1.0 m from the laser output.
⁷ Measured at 10 kHz PRF, 28% duty cycle.
⁸ At 10 kHz PRF, maximum duty cycle operation.
⁹ See manual for details.
¹⁰ This differential pressure is from system input to output and does not include the pressure drop from chiller fittings and the supply and return hose.
¹¹ Do not operate at or below dew point.



DIAMOND J-3 Series

RF-Excited OEM Industrial CO₂ Laser

코히런트 Diamond J-3 시리즈는 밀폐형 펄스 CO₂ 레이저로 250 W 이상의 평균 출력을 제공하며 완벽히 통합된 콤팩트한 패키지 구조로 되어 있습니다. 평판(Slab) 방출 방식으로 설계되어 있어 펄싱 특성이 독특하며 (CW 변조 레이저와는 달리), 750 W를 훨씬 넘는 최대 출력에 도달합니다. J-3 시리즈는 10.6 μm , 10.2 μm , 9.4 μm 로 제공되며 빠른 펄스 상승/하강 시간 (rising & fall time) 으로 최대 200 kHz의 펄스 반복률로 작동할 수 있습니다. 다양한 파장 선택, 높은 피크 파워, 빠른 상승/하강 시간, 필요에 따른 출력, 탁월한 빔 품질 등을 두루 갖춘 J 시리즈는 매우 다양한 재료 가공 응용분야에 이상적인 레이저입니다.

J-3 시리즈는 출력 범위가 150 W~400 W이며 공통 기계 및 전기 인터페이스, 공통 광학 인터페이스 및 공통 소프트웨어를 사용하는 공통 플랫폼을 기반으로 합니다. 모든 J 시리즈 레이저는 현장에서 서비스 가능한 최고의 RF 전원 공급 장치와 현장에서 검증된 코히런트의 완벽한 온보드 진단기기를 통해 사전 유지 관리가 가능합니다.

FEATURES & BENEFITS

- Wide operating power range
- High peak power >750 W
- Pulse frequency from single-shot to 200 kHz
- Fast rise-and-fall time
- Outstanding beam quality
- Excellent power stability
- Low-cost OEM configuration
- Integrated but removable RF power supply
- Compact design
- Equipped with on-board internet-accessible diagnostics

APPLICATIONS

- Converting
- Drilling
- Cutting
- Scribing
- Engraving
- Marking

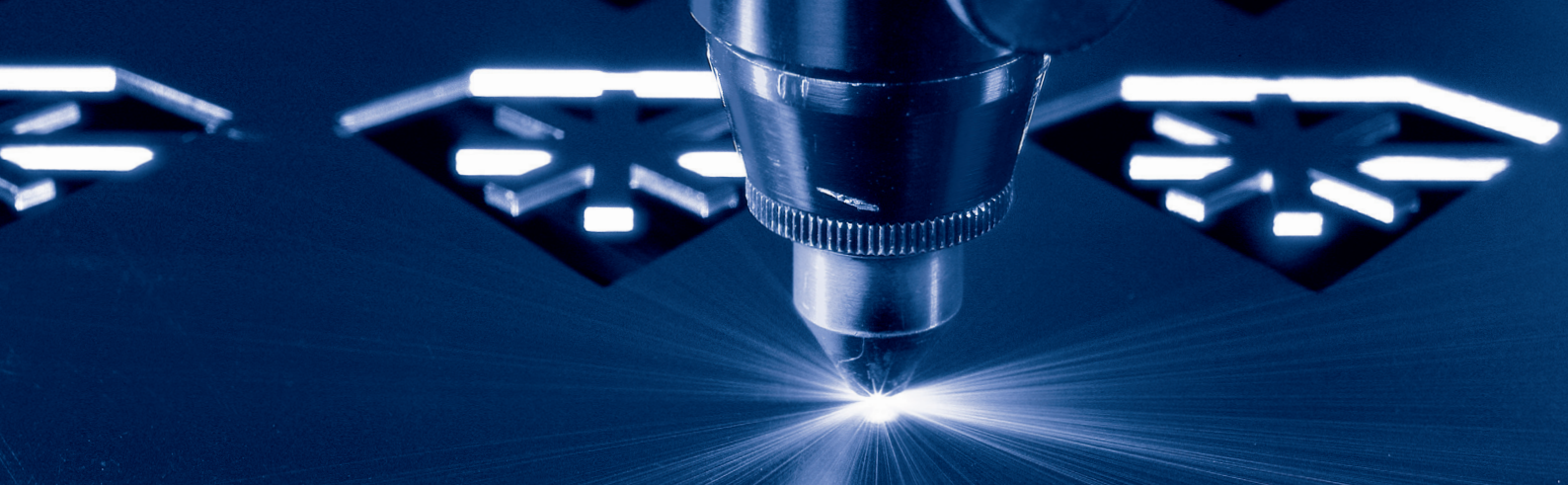


CO/CO₂ Lasers DIAMOND J-3 Series



SPECIFICATIONS ¹	DIAMOND J-3-9.4	DIAMOND J-3-10.2	DIAMOND J-3-10.6
Wavelength (μm)	9.36 ±0.5	10.25 ±0.1	10.6 ±0.4
Output Power ² (W)	≥250	≥225	≥250
Power Range ³ (W)	25 to 250	25 to 225	25 to 250
Typical Peak Power ⁴ (W)	750		
Power Stability ^{2,5} (%)	±6		
Mode Quality (M ²)	<1.2		
Beam Waist Diameter ^{6,7} at 1/e ² (mm)	7.0 ±1.0	8.5 ±1.0	8.5 ±1.0
Full-Angle Beam Divergence ⁷ (mrad)	≤2.4	≤2.0	≤2.0
Polarization (parallel to baseplate)	Linear ≥100:1		
Beam Ellipticity ^{6,7}	≥0.83, ≤1.2		
Pulse Frequency (kHz)	Single-shot to 200		
RF Excitation Pulse Width Range (μsec)	2 to 1000		
Duty Cycle Limit (%)	≤60		
Fall Time ⁴ (μs)	≤60		
Weight	45 kg (99.2 lbs.)		
Dimensions (L x W x H)	1064.1 x 198.1 x 227.6 mm (41.89 x 7.8 x 8.96 in.)		
ELECTRICAL POWER REQUIREMENTS			
DC Input Voltage (VDC)	48 ±1.0%		
Continuous DC Current ⁸ (A)	≤90		
Peak Current (A)	≤180 for ≤6 ms		
COOLANT			
Heat Load (kW)	≤4.5		
Dynamic Coolant Flow Rate (l/min.)	≥5.7		
Coolant Setpoint Temperature Range	21 to 25°C (69.8 to 77°F)		
Coolant Temperature Stability (max.)	±1.0°C (±1.8°F)		
Coolant ⁹	Anti-corrosion treated water		
Coolant Differential Pressure ¹⁰ (kPa)	103 (15 psi) at 5.7 l/min. (1.5 gpm)		
Coolant Maximum Static Pressure (kPa)	827 (120 psi)		
ENVIRONMENTAL CONDITIONS			
Ambient Temperature	5 to 45°C (41 to 113°F)		
Relative Humidity ¹¹ (non-condensing) (%)	≤95		
Altitude	≤2000 m (≤6500 ft.)		

¹ All specifications apply when the product is operated in accordance with the guidelines defined in the operators manual.
² Measured at 10 kHz PRF, 70% duty cycle.
³ Output stability specification may not be met at lowest power or at acoustic resonances.
⁴ Measured for a 100 μs pulse width at 1 kHz repetition frequency.
⁵ Measured as $\pm(P_{\text{max}}-P_{\text{min}})/2P_{\text{max}}$.
⁶ Measured at waist location ~1.0 m from the laser output.
⁷ Measured at 10 kHz PRF, 28% duty cycle.
⁸ At 10 kHz PRF, maximum duty cycle operation.
⁹ See manual for details.
¹⁰ This differential pressure is from system input to output and does not include the pressure drop from chiller fittings and the supply and return hose.
¹¹ Do not operate at or below dew point.



DIAMOND J-5 Series

RF-Excited OEM Industrial CO₂ Laser

코히런트 Diamond J-5 시리즈는 밀폐형 펄스 CO₂ 레이저로 400 W 이상의 평균 출력을 제공하며 완벽히 통합된 콤팩트한 패키지 구조로 되어 있습니다. 평판(Slab) 방출 방식으로 설계되어 있어 펄싱 특성이 독특하며 (CW 변조 레이저와는 달리), 1 kW를 훨씬 넘는 최대 출력에 도달합니다. J-5 시리즈는 10.6 μm, 10.2 μm, 9.4 μm로 제공되며 빠른 펄스 상승/하강 시간 (rising & fall time)으로 최대 200 kHz의 펄스 반복률로 작동할 수 있습니다. 다양한 파장 선택, 높은 피크 파워, 빠른 상승/하강(rising & fall time) 시간, 필요에 따른 출력, 탁월한 빔 품질 등을 두루 갖춘 J 시리즈는 매우 다양한 재료 가공 응용분야에 이상적인 레이저입니다.

J-5 시리즈는 출력 범위가 150 W~400 W이며 공통 기계 및 전기 인터페이스, 공통 광학 인터페이스 및 공통 소프트웨어를 사용하는 공통 플랫폼을 기반으로 합니다. 모든 J 시리즈 레이저는 현장에서 서비스 가능한 최고의 RF 전원 공급 장치와 현장에서 검증된 코히런트의 완벽한 온보드 진단기기를 통해 사전 유지 관리가 가능합니다.

FEATURES & BENEFITS

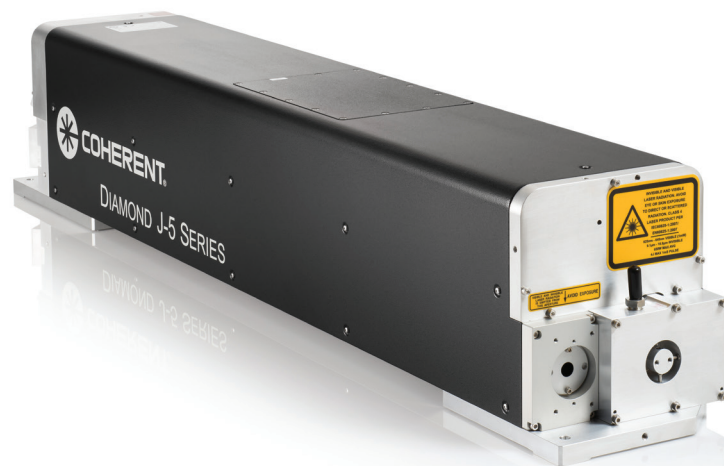
- Wide operating power range
- High peak power
- Pulse frequency from single-shot to 200 kHz
- Fast rise-and-fall time
- Outstanding beam quality
- Excellent power stability
- Low-cost OEM configuration
- Integrated but removable RF power supply
- Compact design
- Equipped with on-board internet-accessible diagnostics

APPLICATIONS

- Converting
- Drilling
- Cutting
- Scribing
- Engraving
- Marking

SPECIFICATIONS ¹	DIAMOND J-5-9.4	DIAMOND J-5-10.2	DIAMOND J-5-10.6	DIAMOND J-5-10.6NB
Wavelength (μm)	9.36 ±0.05	10.25 ±0.05	10.2 to 10.8	10.6 ±0.05
Output Power ² (W)	≥400	≥400	≥450	≥450
Power Range ³ (W)	40 to 400	40 to 400	45 to 450	45 to 450
Typical Peak Power ⁴ (W)	1700	1450	1800	1800
Power Stability ^{2,5} (%)	±6			
Mode Quality (M ²)	<1.2			
Beam Waist Diameter ^{6,7} at 1/e ² (mm)	7.0 ±1.0	8.5 ±1.0	8.5 ±1.0	8.5 ±1.0
Full-Angle Beam Divergence ⁷ (mrad)		≤2.2		
Polarization (parallel to baseplate)	Linear ≥100:1			
Beam Ellipticity ^{6,7}	≥0.83, ≤1.2			
Pulse Frequency (kHz)	Single-shot to 200			
RF Excitation Pulse Width Range (μsec)	2 to 800			
Duty Cycle Limit (%)	≤40			
Fall Time ⁴ (μs)	≤40			
Weight	58 kg (127 lbs.)			
Dimensions (L x W x H)	1225 x 198.1 x 227.6 mm (48.23 x 7.8 x 8.96 in.)			
Part Number				
No Shutter	1376188	1376182	1376186	1376184
Shutter	1376189	1376183	1376187	1376185
ELECTRICAL POWER REQUIREMENTS				
DC Input Voltage (VDC)	48 ±1.0%			
Continuous DC Current ⁸ (A)	≤190			
Peak Current (A)	≤380 for ≤6 ms			
COOLANT				
Heat Load (kW)	≤9			
Dynamic Coolant Flow Rate (l/min.)	≥9.5			
Coolant Setpoint Temperature Range	21 to 25°C (69.8 to 77°F)			
Coolant Temperature Stability (max.)	±1.0°C (±1.8°F)			
Coolant ⁹	Anti-corrosion treated water			
Coolant Differential Pressure ¹⁰ (kPa)	241 (35 psi) at 9.5 l/min. (2.5 gpm)			
Coolant Maximum Static Pressure (kPa)	827 (120 psi)			
ENVIRONMENTAL CONDITIONS				
Ambient Temperature	5 to 45°C (41 to 113°F)			
Relative Humidity ¹¹ (non-condensing) (%)	≤95			
Altitude	≤2000 m (≤6500 ft.)			

1 All specifications apply when the product is operated in accordance with the guidelines defined in the operators manual.
2 Measured at 10 kHz PRF, max. duty cycle.
3 Output stability specification may not be met at lowest power or at acoustic resonances.
4 Measured for a 100 μs pulse width at 1 kHz repetition frequency.
5 Measured as $\pm(P_{max}-P_{min})/2P_{max}$.
6 Measured at waist location ~1.0 m from the laser output.
7 Measured at 10 kHz PRF, 18% duty cycle.
8 At 10 kHz PRF, maximum duty cycle operation.
9 See manual for details.
10 This differential pressure is from system input to output and does not include the pressure drop from chiller fittings and the supply and return hose.
11 Do not operate at or below dew point.



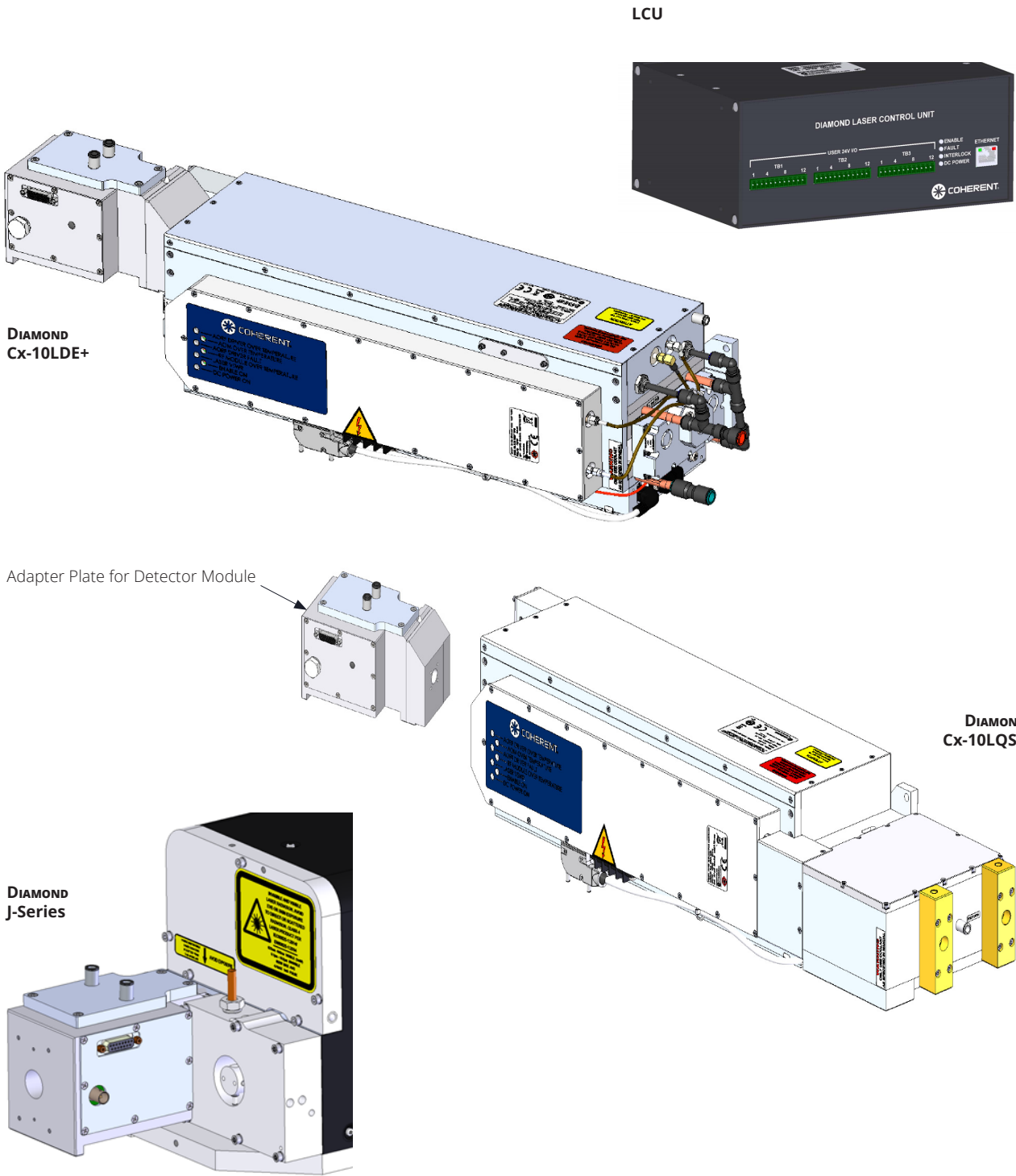
LOW POWER CO₂ PRODUCTS FOR DISPLAY FILM CUTTING APPLICATIONS

SPECIFICATIONS ¹	DIAMOND J Series (J2/J3/J5 Models)	DIAMOND Cx-10L	DIAMOND Cx-10LDE+	DIAMOND M-P1	DIAMOND Cx-10LQS+
Maximum Average Output Power (W)	160 to 500	100	85	120	90
Operation Mode	CW/Modulated	CW/Modulated	CW/Modulated	CW/Modulated	Pulsed
Peak Power (kW) (Pulsed)	0.5-1.7 kW	–	–	–	5
Rise & Fall Time (µs)	<60	<60	<1	<1	–
Modulation/Pulse Frequency Range	Single-shot to 200 kHz	0 to 100 kHz 2 to 100% DC	0 to 200 kHz 1 to 100% DC	0 to 200 kHz 1 to 100% DC	Single-shot to 100 kHz 0.5 to 5 µs PW command
Pulse Width	Adjustable with PRF & Duty Cycle	Adjustable with PRF & Duty Cycle	Adjustable with PRF & Duty Cycle	Adjustable with PRF & Duty Cycle	<200 ns

¹ Peak Power, Pulse Energy, and Output Power dependent on PRF, Duty Cycle, etc.

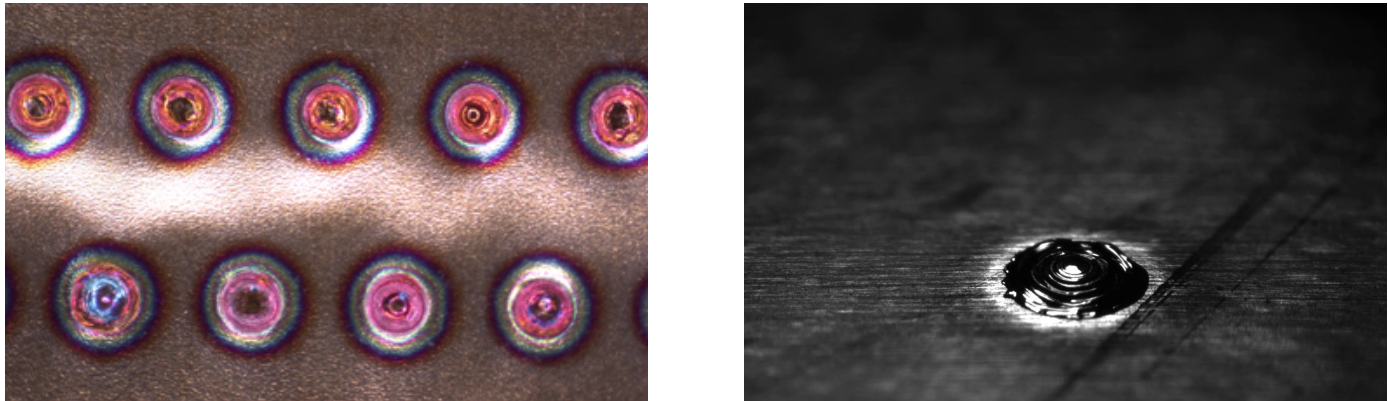
NEXT GENERATION CLOSED-LOOP MODULE IMPROVES POWER STABILITY

- Externally mounted module with separate controller
 - Modular design: one module for all wavelengths with user adjustable settings
- Closed-Loop Module is compatible with both J-series and Cx-series lasers

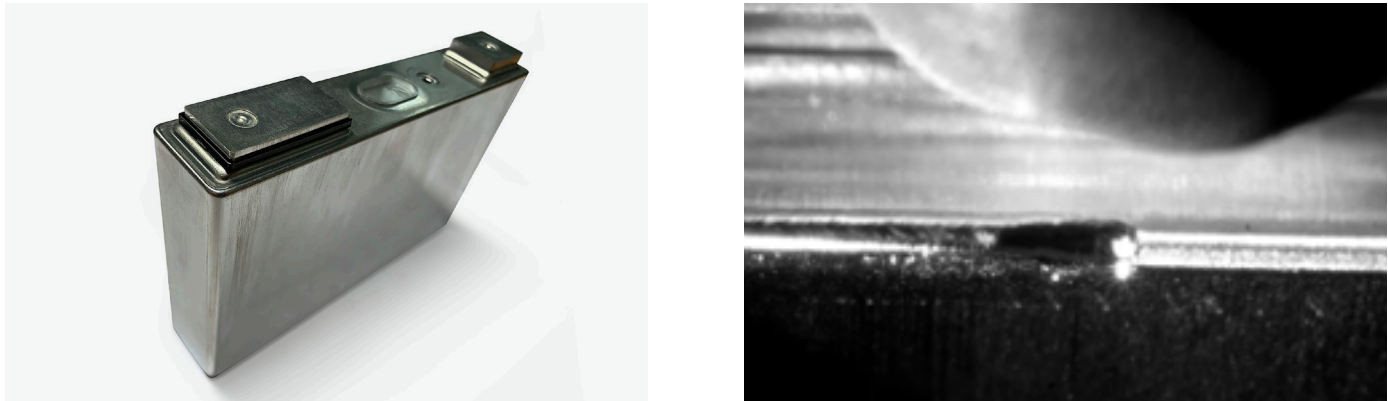


APPLICATION IMAGES PROCESSED BY FIBER LASERS

Battery, Foil to Tap Welding



Battery Lid Welding



CleanWeld Powertrain Coupling Element

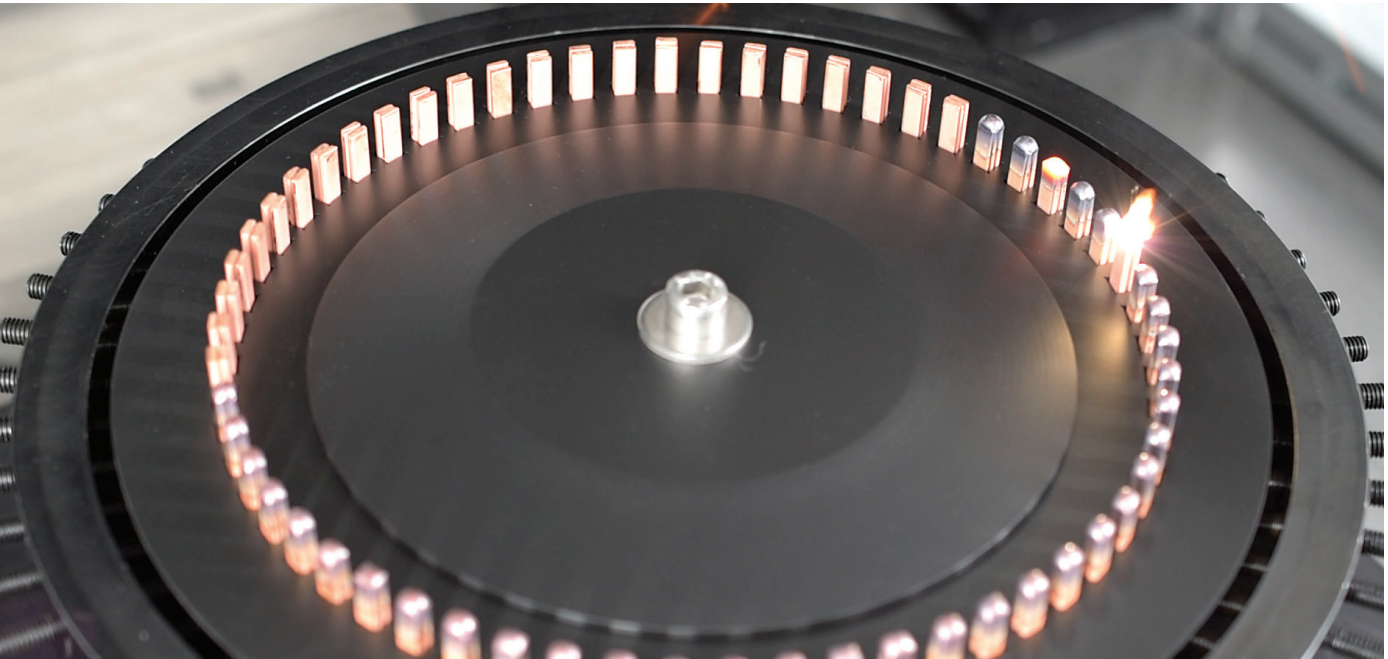


Busbar Welding



APPLICATION IMAGES PROCESSED BY FIBER LASERS

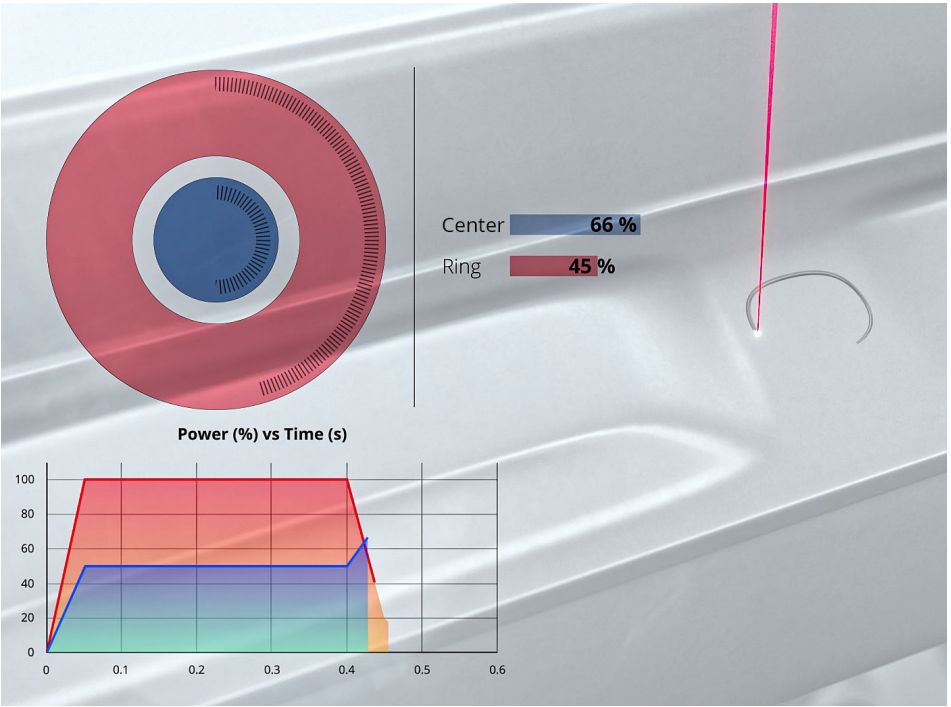
Hairpin Welding



Welded Copper Hairpin



ARM Principle, BiW Welding



HighLight FL-ARM

High-Power Adjustable Ring Mode (ARM) Fiber Lasers with Beam Management

HighLight™ FL-ARM 시리즈 산업용 멀티 킬로와트 파이버 레이저는 빔 관리 기능이 포함되어 있어 까다로운 다양한 용접 작업에서 탁월한 결과를 제공합니다.

ARM 기술은 단일 파이버에서 독립적으로 제어할 수 있는 2개의 동축 빔을 적용하여 아연도금 강판의 제로 갭 용접과 같은 응용 분야에 새로운 수준의 가능성을 제공합니다. 또한 용접 스파터를 최소화하고 Crack을 발생시키지 않으며, 필러 와이어 없이 알루미늄을 용접할 수 있습니다. 센터와 링 주변의 출력을 서로 독립적으로 조정할 수 있습니다. 그 결과 고속으로 스파터 없이 대량 용접이 가능해지고 후 처리가 거의 필요 없게 되어 전체 생산 비용을 절감할 수 있습니다.

HighLight FL-ARM 제품에는 Fiber-Fiber-Switch(FFS) 또는 Fiber-Fiber-Coupler(FFC)가 장착되어 있어 운영의 유연성을 더욱 극대화할 수 있습니다.

FEATURES

- Output power: 2000 to 10,000 Watts
- Adjustable Ring Mode (ARM)
- Fiber-Fiber-Switch (FFS) or Fiber-Fiber-Coupler (FFC)
- Excellent stability over the entire power range (1% to 100%)
- Inherently back reflection safe
- Industry-leading closed loop power control for high process consistency
- Optimized power profile programming tool for welding processes
- CleanWeld™ technology to optimize welding results



BENEFITS

- Reliable and fast welding process with high efficiency
- Superior welding seam quality with minimal heat affected zones
- Maximized freedom for welding geometries
- Highest welded part quality with minimum reject rates
- Minimized operating costs

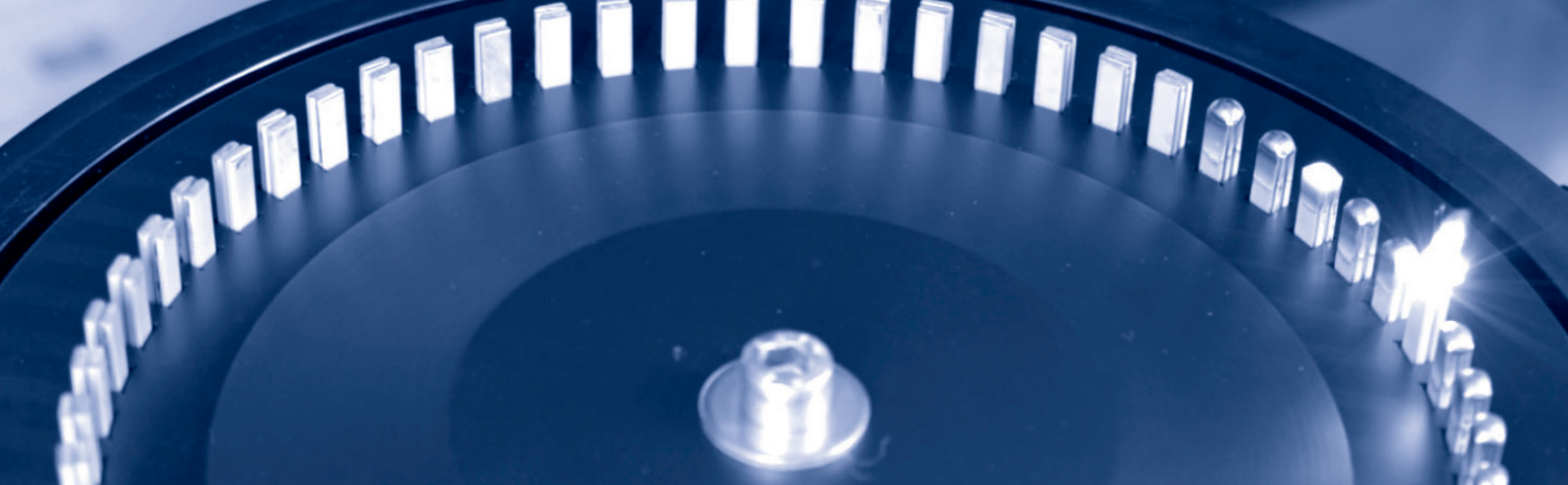
APPLICATIONS

- High-quality welding of challenging materials like high-strength steel, aluminum, or copper
- Cutting



SPECIFICATIONS	HighLight FL2000-ARM	HighLight FL4000-ARM
Nominal Power (W)	2000	4000
Power Range (%)	1 to 100	
Laser Beam Quality (BPP) at Collimator (mm x mrad)	For 100/290 μm + FFC/FFS: Center ≤4, Ring ≤14 For 50/200 μm + FFC: Center ≤2.5, Ring ≤10	
Power Stability (%)	±1	
Pulse Frequency Range (kHz)	CW - 10	
Wavelength (nm)	1070 ±10	
ELECTRICAL RATINGS		
Voltage (VAC)	400/440/480 ±10%	
Connected Load (kVA)	9.8	13.9
Effective Power at Nominal Power (kW)	9.6	13.7
Max. Current Consumption at 400 V (A)	13.8	19.8
Fuses Type NH (A)	32	
COOLING		
Recommended Cooling Capacity Laser (kW)	4.4	8.9
Recommended Cooling Capacity FFC/FFS and QBH/QD (kW)	FFS2: 1.0 FFC: 1.0	
Flow Rate Laser (l/min)	43	
Flow Rate for FFS/FFC and QBH/QD (l/min)	FFS2: 8.0 FFC: 6.0	
Temperature Laser (°C)	25 ±1	
Temperature for FFS/FFC and QBH/QD (°C)	For 100/290 μm +FFC/FFS: 24 to 40 For 50/200 μm +FFC: 24 to 35	
Max. Pressure Laser (MPa)	0.5	
Max. Pressure FFS/FFC and QBH/QD (MPa)	0.4	
Typical Pressure Drop Laser (MPa)	0.25	
FIBER DELIVERY SYSTEM		
Interface	QBH/QD	
Diameter (μm)	Center D 100, Ring OD 290 or Center D 50, Ring OD 200	
Length (m)	20, 30 (other lengths on request)	
DIMENSIONS & WEIGHTS		
Laser Dimension (L x W x H) (mm) (without signal tower)	Midi: 794 x 1040 x 1067	
Laser Weight (kg)	FFC: <460, FFS: <520	
ENVIRONMENTAL CONDITIONS		
Ambient Temperature (°C)	5 to 40	
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QBH/QD and optics must be avoided during the operation, storage and transport.	
CUSTOMER INTERFACE		
Digital Signals (V DC)	24	
Power Control (V DC)	0 to 10	
Trigger Control (V)	24, rise/fall time <30 μs	
OPTIONS LASER		
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface	

SPECIFICATIONS	HighLight FL6000-ARM	HighLight FL7500-ARM	HighLight FL800-ARM	HighLight FL10000-ARM
Nominal Power (W)	6000	7500	8000	10,000
Power Range (%)	1 to 100			
Laser Beam Quality (BPP) at Collimator (mm x mrad)	For 100/290 μm + FFC/FFS: Center ≤4, Ring ≤14 For 50/200 μm + FFC: Center ≤2.5, Ring ≤10			
Power Stability (%)	±1			
Pulse Frequency Range (kHz)	CW - 10			
Wavelength (nm)	1070 ±10			
ELECTRICAL RATINGS				
Voltage (VAC)	400/440/480 ±10%			
Connected Load (kVA)	20.8	24.4	27.6	36.2
Effective Power at Nominal Power (kW)	20.6	24.2	27.4	36
Max. Current Consumption at 400 V (A)	29.7	35	39.6	52
Fuses Type NH (A)	63			
COOLING				
Recommended Cooling Capacity Laser (kW)	13.3	16.7	17.8	22.2
Recommended Cooling Capacity FFC/FFS and QHB/QD (kW)	FFS2: 1.0 FFC: 1.0			
Flow Rate Laser (l/min)	65		84	
Flow Rate for FFS/FFC and QBH/QD (l/min)	FFS2: 8.0 FFC: 6.0			
Temperature Laser (°C)	25 ±1			
Temperature for FFS/FFC and QBH/QD (°C)	For 100/290 μm + FFC/FFS: 24 to 40 For 50/200 μm +FFC: 24 to 35			
Max. Pressure Laser (MPa)	0.5			
Max. Pressure FFS/FFC and QBH/QD (MPa)	0.4			
Typical Pressure Drop Laser (MPa)	0.25			
FIBER DELIVERY SYSTEM				
Interface	QBH/QD			
Diameter (μm)	Center D 100, Ring OD 290 or Center D 50, Ring OD 200			
Length (m)	20, 30 (other lengths on request)			
DIMENSIONS & WEIGHTS				
Laser Dimension (L x W x H) (mm) (without signal tower)	Maxi: 794 x 1040 x 1565			
Laser Weight (kg)	FFC: <530, FFS: <590	FFC: <560, FFS: <620		
ENVIRONMENTAL CONDITIONS				
Ambient Temperature (°C)	5 to 40			
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport.			
CUSTOMER INTERFACE				
Digital Signals (V DC)	24			
Power Control (V DC)	0 to 10			
Trigger Control (V)	24, rise/fall time <30 μs			
OPTIONS LASER				
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface			



HighLight FL-ARM Compact

High-Power Adjustable Ring Mode (ARM) Fiber Lasers

“HighLight™ FL-ARM Compact 시리즈 산업용 멀티 킬로와트 파이버 레이저는 까다로운 용접 작업에서 탁월한 결과를 제공합니다. 독립제어가 가능한 링 모드는 이 레이저의 고유한 출력 빔을 의미하며, 단일 전달 파이버에서 독립적으로 제어 가능한 2개의 동축 빔으로 구성됩니다.

HighLight™ FL-ARM Compact 레이저는 두 가지 구성으로 제공됩니다. 멀티 모드 버전 (센터 지점은 멀티 가로 모드)은 간격이 크거나 고르지 않은 부품을 결합하는 동시에 접합 강도를 향상시키고, 열 영향 부 (HAZ)를 줄입니다. 또한 고속 및 높은 처리량, 스패터 없는 처리를 제공하고 후 처리의 필요성을 크게 제거하여 전체 생산 비용을 줄입니다. 필러 와이어를 사용하지 않고 알루미늄을 균열 없이 용접하며 아연 코팅된 강철의 제로 갭 랩 용접과 같은 응용 분야에 특히 유용합니다.

코어 직경이 22 μm이고 파이버 길이가 15 m인 뛰어난 밝기 (1.5 kW 센터 + 2.5 kW 링)의 레이저 버전도 사용 가능합니다.



FEATURES

- Output power: 2000 to 10,000 Watts
- Adjustable Ring Mode (ARM)
- Excellent stability over the entire power range (1% to 100%)
- Inherently back reflection safe
- Industry-leading closed loop power control for high process consistency
- Optimized power profile programming tool for welding processes
- CleanWeld™ technology to optimize welding results



BENEFITS

- Reliable and fast welding process with high efficiency
- Superior welding seam quality with minimal heat affected zones
- Maximized freedom for welding geometries
- Highest welded part quality with minimum reject rates
- Minimized operating costs

APPLICATIONS

- High-quality welding of challenging materials like high-strength steel, aluminum, or copper
- Cutting

SPECIFICATIONS	HighLight FL2000C-ARM	HighLight FL4000C-ARM	HighLight FL5000C-ARM
Nominal Power (W)	2000	4000	5000
Power Range (%)	1 to 100		
Laser Beam Quality (BPP) at Collimator (mm x mrad)	For 70/180 µm Center <2.5, Ring <9 For 50/140 µm Center <2.5, Ring <6.5		
Power Stability (%)	±1		
Pulse Frequency Range (kHz)	CW - 10		
Wavelength (nm)	1070 ±10		
ELECTRICAL RATINGS			
Voltage (VAC)	400/440/480 ±10%		
Connected Load (kVA)	8.9	12.7	17.5
Effective Power at Nominal Power (kW)	8.7	12.5	17.3
Max. Current Consumption at 400 V (A)	12.5	18	25
Fuses Type NH (A)	32		
COOLING			
Recommended Cooling Capacity Laser and QBH/QD (kW)	4.4	8.9	11.1
Flow Rate Laser (l/min)	43		
Flow Rate QBH/QD (l/min)	2		
Temperature Laser (°C)	25 ± 1		
Temperature for QBH/QD (°C)	24 - 45		
Max. Pressure Laser (MPa)	0.5		
Max. Pressure QBH/QD (MPa)	0.4		
Typical Pressure Drop Laser (MPa)	0.25		
FIBER DELIVERY SYSTEM			
Interface	QBH/QD		
Diameter (µm)	Center D 70, Ring OD 180 / Center D 50, Ring OD 140		
Length (m)	20 (other lengths on request)		
DIMENSIONS & WEIGHTS			
Laser Dimension L x W x H (mm) without signal tower	Midi: 794 x 916 x 824		
Laser Weight (kg)	<350		
ENVIRONMENTAL CONDITIONS			
Ambient Temperature (°C)	5 to 40		
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QBH/QD and optics must be avoided during the operation, storage, and transport.		
CUSTOMER INTERFACE			
Digital Signals (V DC)	24		
Power Control (V DC)	0 to 10		
Gate Control (V DC)	24, rise/fall time <30 µs		
OPTIONS LASER			
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface		

SPECIFICATIONS	HighLight FL6000C-ARM	HighLight FL7500C-ARM	HighLight FL8000C-ARM	HighLight FL10000C-ARM
Nominal Power (W)	6000	7500	8000	10,000
Power Range (%)	1 to 100			
Laser Beam Quality (BPP) at Collimator (mm x mrad)	For 70/180 µm Center <2.5, Ring <9 For 50/140 µm Center <2.5, Ring <6.5			
Power Stability (%)	±1			
Pulse Frequency Range (kHz)	CW - 10			
Wavelength (nm)	1070 ±10			
ELECTRICAL RATINGS				
Voltage (VAC)	400/440/480 ±10%			
Connected Load (kVA)	18.9	24.4	25.1	34.8
Effective Power at Nominal Power (kW)	18.7	24.2	24.9	34.6
Max. Current Consumption at 400 V (A)	27	35	36	50
Fuses Type NH (A)	63			
COOLING				
Recommended Cooling Capacity Laser and QBH/QD (kW)	13.3	16.7	17.8	22.2
Flow Rate Laser (l/min)	65		84	
Flow Rate QBH/QD (l/min)	2			
Temperature Laser (°C)	25 ±1			
Temperature for QBH/QD (°C)	24 to 45			
Max. Pressure Laser (MPa)	0.5			
Max. Pressure QBH/QD (MPa)	0.4			
Typical Pressure Drop Laser (MPa)	0.25			
FIBER DELIVERY SYSTEM				
Interface	QBH/QD			
Diameter (µm)	Center D 70 µm, Ring OD 180 µm / Center D 50 µm, Ring OD 140 µm			
Length (m)	20 m (other lengths on request)			
DIMENSIONS & WEIGHTS				
Laser Dimension L x W x H (mm) without signal tower)	Maxi: 794 x 916 x 1322			
Laser Weight (kg)	<490		<540	
ENVIRONMENTAL CONDITIONS				
Ambient Temperature (°C)	5 to 40			
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QBH/QD and optics must be avoided during the operation, storage, and transport			
CUSTOMER INTERFACE				
Digital Signals (V DC)	24			
Power Control (V DC)	0 to 10			
Gate Control (V DC)	24, rise/fall time <30 µs			
OPTIONS LASER				
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface			

HighLight FL4000CSM-ARM Compact

Fiber Laser with Superior Brightness Center Beam and Adjustable Ring Mode (ARM)

“HighLight™ FL-ARM Compact 시리즈 산업용 멀티 킬로와트 파이버 레이저는 까다로운 용접 작업에서 탁월한 결과를 제공합니다. 조정 가능한 링 모드는 이 레이저의 고유한 출력 빔을 의미하며, 단일 전달 파이버에서 독립적으로 제어 가능한 2개의 동축 빔으로 구성됩니다.

HighLight™ FL4000CSM-ARM은 4 kW (1.5 kW 센터 + 2.5 kW 링) 출력에서 사용할 수 있습니다. 센터 파이버는 싱글 모드 출력을 생성하여 작은 초점을 가능하게 합니다. 이 레이저는 표준 싱글 모드 파이버 레이저보다 용접 응용 영역을 확장하여 과거에는 처리하기 어렵거나 불가능했던 “난이도 높은” 재료를 용접 할 수 있습니다. 여기에는 높은 입열을 견디지 못하는 얇은 (예: 10 분의 1 mm) 기판 (예 : 호일 대 탭 용접)과 두께와 용점이 크게 다른 혼합 재료가 포함됩니다.



FEATURES

- Output power: 4000 Watts
- Adjustable Ring Mode (ARM)
- Single mode center beam
- Excellent stability over the entire power range (1% to 100%)
- Inherently back reflection safe
- Industry-leading closed loop power control for high process consistency
- Optimized power profile programming tool for welding processes

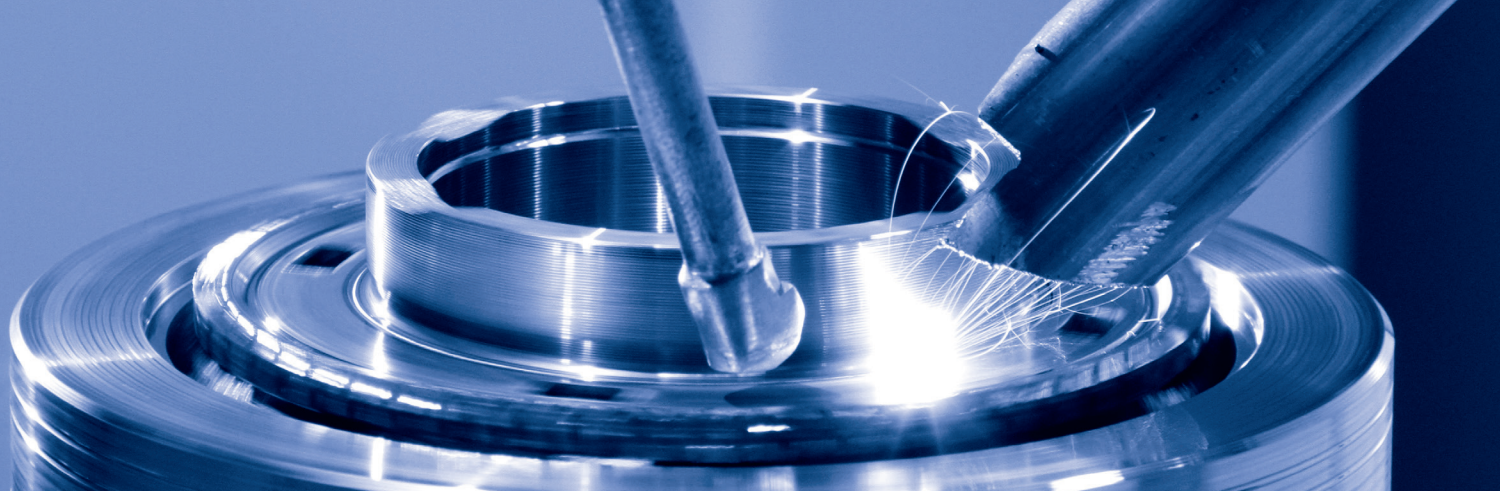
BENEFITS

- Reliable and fast welding process with high efficiency
- Superior welding seam quality with minimal heat affected zones
- Highest part quality with minimum reject rates
- Minimized operating costs

APPLICATIONS

- Welding of dissimilar materials such as copper and aluminum
- Welding of foil stacks with precise control
- Cutting

SPECIFICATIONS	HighLight FL4000CSM-ARM
Nominal Power (W)	4000 Center 1500 / Ring 2500
Power Range (%)	1 to 100
Typical Laser Beam Quality (BPP) at Collimator (mm x mrad)	Center ≤0.6 Ring ≤8
Power Stability (%)	±1
Pulse Frequency Range (kHz)	CW - 10
Wavelength (nm)	1070 ±10
ELECTRICAL RATINGS	
Voltage (VAC)	400/440/480 ±10%
Connected Load (kVA)	12.7
Effective Power at Nominal Power (kW)	12.5
Max. Current Consumption at 400 V (A)	18
Fuses Type NH (A)	32
COOLING	
Recommended Cooling Capacity Laser and QBH/QD (kW)	8.9
Flow Rate Laser (l/min)	43
Flow Rate QHB/QD (l/min)	2
Temperature Laser (°C)	25 ±1
Temperature for QHB/QD (°C)	24 to 45
Max. Pressure Laser (MPa)	0.5
Max. Pressure QBH/QD (MPa)	0.4
Typical Pressure Drop Laser (MPa)	0.25
FIBER DELIVERY SYSTEM	
Interface	QBH/QD
Diameter (µm)	Center D 22, Ring OD 170
Length (m)	15
DIMENSIONS & WEIGHTS	
Laser Dimension L x W x H (mm) without signal tower	Midi: 794 x 916 x 824
Laser Weight (kg)	<350
ENVIRONMENTAL CONDITIONS	
Ambient Temperature (°C)	5 to 40
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage, and transport.
CUSTOMER INTERFACE	
Digital Signals (V DC)	24
Power Control (V DC)	0 to 10
Gate Control (V DC)	24, rise/fall time <30 µs
OPTIONS LASER	
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface



HighLight FL

High-Power Multi-Mode Fiber Lasers with Beam Management

“HighLight™ FL 시리즈 산업용 멀티 킬로와트 파이버 레이저는 많은 일반적인 용접 작업에 비용 효율적인 솔루션을 제공합니다. 이 레이저는 코히런트가 자체 개발한 다단계 후면 반사면역 시스템을 갖추고 있어 신뢰성과 수명을 향상시키고 고도의 안전한 가공을 가능하게 합니다. 황동, 구리 및 알루미늄 등의 반사율이 높은 재료를 안전하게 가공할 수 있습니다.

운영 유연성을 극대화하기 위해 HighLight FL 제품에는 FFS (Fiber-Fiber-Switch) 또는 FFC (Fiber-Fiber-Coupler)가 장착되어 있습니다. FFS를 사용하면 최대 4개의 개별 공정 파이버간에 레이저 출력을 빠르게 전환할 수 있기 때문에 하나의 레이저를 사용하여 4개의 워크 스테이션간에 시간을 절약하거나 에너지를 공유할 수 있습니다. FFC를 사용하면 현장에서 파이버를 쉽게 교환할 수 있습니다.

FEATURES & BENEFITS

- Output power: 1000 to 10,000 Watts
- Fiber-Fiber-Switch (FFS) or Fiber-Fiber-Coupler (FFC)
- Excellent stability over the entire power range (1% to 100%)
- Inherently back reflection safe
- Versatile production tool due to wide range of beam qualities
- Industry-leading closed loop power control for high process consistency
- Optimized power profile programming tool for welding processes
- CleanWeld™ technology to optimize welding results



BENEFITS

- Reliable and fast welding process
- High welding seam and welded part quality
- Minimized operating costs

APPLICATIONS

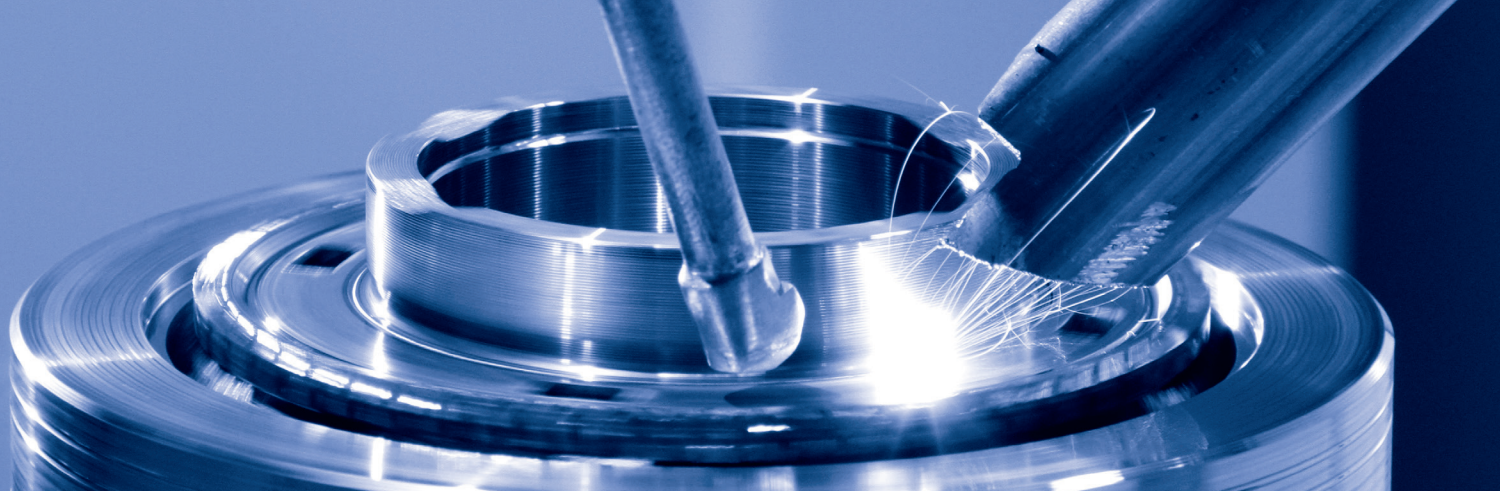
- Welding
- Cutting



SPECIFICATIONS	HighLight FL1000	HighLight FL2000
Nominal Power (W)	1000	2000
Power Range (%)	1 to 100	
Laser Beam Quality (BPP) at Collimator (mm x mrad)	50 μm: ≤2.5; 100 μm: ≤4; 150 μm: ≤6 200 μm: ≤8; 300 μm: ≤12; 400 μm: ≤16	
Power Stability (%)	±1	
Pulse Frequency Range (kHz)	CW - 10	
Wavelength (nm)	1070 ±10	
ELECTRICAL RATINGS		
Voltage (VAC)	400/440/480 ±10%	
Max. Connected Load (kVA)	4.4	7.1
Max. Effective Power at Nominal Laser Power at 400 V (kW)	4.2	6.9
Max. Current Consumption at 400 V (A)	6.1	9.9
Fuses Type NH (A)	16	32
COOLING		
Recommended Cooling Capacity Laser (kW)	2.2	4.4
Recommended Cooling Capacity FFS/FFC and QHB/QD (kW)	FFS2: 1.0; FFS4: 1.5; FFC: 1.0	
Flow Rate Laser (l/min)	21	
Flow Rate for FFS/FFC and QBH/QD (l/min)	FFS2: 8.0; FFS4: 12.0; FFC: 6.0	
Temperature Laser (°C)	25 ±1	
Temperature for FFS/FFC and QBH/QD (°C)	24 to 40	
Max. Pressure Laser (MPa)	0.5	
Max. Pressure for FFS/FFC and QBH/QD (MPa)	0.4	
Typical Pressure Drop Laser (MPa)	0.25	
FIBER DELIVERY SYSTEM		
Interface	QBH/QD	
Diameter (μm)	50 to 400	
Length (m)	10, 15, 20, 30, 35 (other lengths on request)	
DIMENSIONS & WEIGHTS		
Laser Dimension L x W x H (mm) without signal tower	Midi: 794 x 1040 x 1067	
Laser Weight (kg)	FFC: <400, FFS: <450	
ENVIRONMENTAL CONDITIONS		
Ambient Temperature (°C)	5 to 40	
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport.	
CUSTOMER INTERFACE		
Digital Signals (V DC)	24	
Power Control (V DC)	0 to 10	
Gate Control (V DC)	24, rise/fall time <30 μs	
OPTIONS LASER		
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface	

SPECIFICATIONS	HighLight FL4000	HighLight FL5000	HighLight FL6000
Nominal Power (W)	4000	5000	6000
Power Range (%)	1 to 100		
Laser Beam Quality (BPP) at Collimator (mm x mrad)	100 μm: ≤4; 150 μm: ≤6; 200 μm: ≤8 300 μm: ≤12; 400 μm: ≤16		
Power Stability (%)	±1		
Pulse Frequency Range (kHz)	CW - 10		
Wavelength (nm)	1070 ±10		
ELECTRICAL RATINGS			
Voltage (VAC)	400/440/480 ±10%		
Max. Connected Load (kVA)	13.9	19.3	20.8
Max. Effective Power at Nominal Laser Power at 400 V (kW)	13.7	19.1	20.6
Max. Current Consumption at 400 V (A)	19.8	27.5	29.7
Fuses Type NH (A)	32		63
COOLING			
Recommended Cooling Capacity Laser (kW)	8.9	11.1	13.3
Recommended Cooling Capacity FFS/FFC and QHB/QD (kW)	FFS2: 1.0; FFS4: 1.5; FFC: 1.0		
Flow Rate Laser (l/min)	43		65
Flow Rate for FFS/FFC and QBH/QD (l/min)	FFS2: 8.0; FFS4: 12.0; FFC: 6.0		
Temperature Laser (°C)	25 ±1		
Temperature for FFS/FFC and QBH/QD (°C)	24 to 40		
Max. Pressure Laser (MPa)	0.5		
Max. Pressure for FFS/FFC and QBH/QD (MPa)	0.4		
Typical Pressure Drop Laser (MPa)	0.25		
FIBER DELIVERY SYSTEM			
Interface	QBH/QD		
Diameter (μm)	100 to 400		
Length (m)	10, 15, 20, 30, 35 (other lengths on request)		
DIMENSIONS & WEIGHTS			
Laser Dimension L x W x H (mm) without signal tower	Midi: 794 x 1040 x 1067		
Laser Weight (kg)	FFC: <460, FFS: <520		
ENVIRONMENTAL CONDITIONS			
Ambient Temperature (°C)	5 to 40		
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport.		
CUSTOMER INTERFACE			
Digital Signals (V DC)	24		
Power Control (V DC)	0 to 10		
Gate Control (V DC)	24, rise/fall time <30 μs		
OPTIONS LASER			
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface		

SPECIFICATIONS	HighLight FL7500	HighLight FL8000	HighLight FL10000
Nominal Power (W)	7500	8000	10,000
Power Range (%)	1 to 100		
Laser Beam Quality (BPP) at Collimator (mm x mrad)	100 μm: ≤4; 150 μm: ≤6; 200 μm: ≤8 300 μm: ≤12; 400 μm: ≤16		
Power Stability (%)	±1		
Pulse Frequency Range (kHz)	CW - 10		
Wavelength (nm)	1070 ±10		
ELECTRICAL RATINGS			
Voltage (VAC)	400/440/480 ±10%		
Max. Connected Load (kVA)	24.4	27.6	36.2
Max. Effective Power at Nominal Laser Power at 400 V (kW)	24.2	27.4	36
Max. Current Consumption at 400 V (A)	35	39.6	52
Fuses Type NH (A)	63		
COOLING			
Recommended Cooling Capacity Laser (kW)	16.7	17.8	22.2
Recommended Cooling Capacity FFS/FFC and QHB/QD (kW)	FFS2: 1.0; FFS4: 1.5; FFC: 1.0		
Flow Rate Laser (l/min)	65	84	
Flow Rate for FFS/FFC and QBH/QD (l/min)	FFS2: 8.0; FFS4: 12.0; FFC: 6.0		
Temperature Laser (°C)	25 ±1		
Temperature for FFS/FFC and QBH/QD (°C)	24 to 40		
Max. Pressure Laser (MPa)	0.5		
Max. Pressure for FFS/FFC and QBH/QD (MPa)	0.4		
Typical Pressure Drop Laser (MPa)	0.25		
FIBER DELIVERY SYSTEM			
Interface	QBH/QD		
Diameter (μm)	100 to 400		
Length (m)	10, 15, 20, 30, 35 (other lengths on request)		
DIMENSIONS & WEIGHTS			
Laser Dimension L x W x H (mm) without signal tower	Maxi: 794 x 1040 x 1565		
Laser Weight (kg)	FFC: <530, FFS: <590		
ENVIRONMENTAL CONDITIONS			
Ambient Temperature (°C)	5 to 40		
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport.		
CUSTOMER INTERFACE			
Digital Signals (V DC)	24		
Power Control (V DC)	0 to 10		
Gate Control (V DC)	24, rise/fall time <30 μs		
OPTIONS LASER			
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface		



HighLight FL Compact

High-Power Single- and Multi-Mode Fiber Lasers

“HighLight™ FL Compact 시리즈 산업용 멀티 킬로와트 파이버 레이저는 일반적인 용접 작업에 비용 효율적인 솔루션을 제공합니다. 이 레이저는 코히런트가 자체 개발한 다단계 후면 반사 면역 시스템을 갖추고 있어 신뢰성과 수명을 향상시키고 고도의 안전한 가공을 가능하게 합니다. 황동, 구리 및 알루미늄 등의 반사율이 높은 재료를 안전하게 가공할 수 있습니다. HighLight FL Compact 레이저는 싱글 또는 멀티 모드 레이저로 제공됩니다.

싱글 모드 Compact Lasers는 1 ~ 2.5 kW의 출력을 제공합니다. 작은 크기의 초점 스폿과 고출력 밀도의 조합으로 특히 높은 빔 품질이 필요한 응용 분야에 적합합니다. 여기에는 원격 용접 및 기타 스캐너 기반 구성, 빔 Wobble 사용한 용접, 얇은 판금의 고속 절단 또는 이중 재료의 전도성 용접이 포함됩니다.

멀티 모드 컴팩트 레이저는 1 ~ 10 kW의 출력 파워와 광범위한 가공 파이버로 제공되어 다양한 요구 사항을 충족시킬 수 있습니다.

FEATURES

- Output power: 1000 to 10,000 Watts, 2.5 kW out of one fiber laser module
- Single- or multi-mode
- Excellent stability over the entire power range (1% to 100%)
- Inherently back reflection safe
- Industry-leading closed loop power control for high process consistency
- Optimized power profile programming tool for welding processes
- CleanWeld™ technology to optimize welding results



BENEFITS

- Reliable and fast welding process
- High welding seam and welded part quality
- Minimized operating costs

APPLICATIONS

- Welding
- Cutting
- Surface treatment



SPECIFICATIONS	HighLight FL1000CSM	HighLight FL1500CSM	HighLight FL2000CSM	HighLight FL2500CSM
Nominal Power (W)	1000	1500	2000	2500
Power Range (%)	1 to 100			
Laser Beam Quality (BPP) at Collimator (mm x mrad)	≤0.4			
Power Stability (%)	±1			
Pulse Frequency Range (kHz)	CW - 10			
Wavelength (nm)	1070 ±10			
ELECTRICAL RATINGS				
Voltage (VAC)	400/440/480 ±10%			
Max. Connected Load (kVA)	4.0	5.7	6.4	8.9
Max. Effective Power at Nominal Laser Power at 400 V (kW)	3.8	5.5	6.2	8.7
Max. Current Consumption at 400 V (A)	5.5	8	9	12.5
Fuses Type NH (A)	16		32	
COOLING				
Recommended Cooling Capacity Laser & QHB/ QD (kW)	2.2	3.3	4.4	5.6
Flow Rate Laser (l/min)	24			
Flow Rate QHB/QD (l/min)	2			
Laser Temperature (°C)	25 ±1			
Temperature for QBH/QD (°C)	24 to 45			
Max. Pressure Laser (MPa)	0.5			
Max. pressure QBH/QD (MPa)	0.4			
Typical Pressure Drop Laser (MPa)	0.25			
FIBER DELIVERY SYSTEM				
Interface	QBH, QD			
Diameter (µm)	20			
Length (m)	15, 20	15, 10	10	5
DIMENSIONS & WEIGHTS				
Laser Dimension L x W x H (mm) without signal tower	Mini: 794 x 916 x 557			
Laser Weight (kg)	<200			
ENVIRONMENTAL CONDITIONS				
Ambient Temperature (°C)	5 to 40			
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport.			
CUSTOMER INTERFACE				
Digital Signals (V DC)	24			
Power Control (V DC)	0 to 10			
Gate Control (V DC)	24, rise/fall time <30 µs			
OPTIONS LASER				
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface			

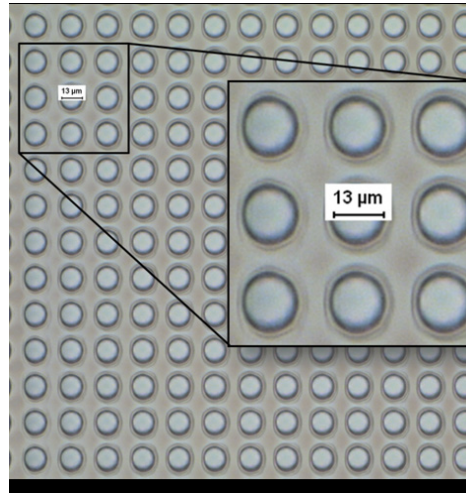
SPECIFICATIONS	HighLight FL1000C	HighLight FL2000C	HighLight FL4000C	HighLight FL5000C
Nominal Power (W)	1000	2000	4000	5000
Power Range (%)	1 to 100			
Laser Beam Quality (BPP) at Collimator (mm x mrad)	50 μm: ≤2.5 100 μm: ≤4 150 μm: ≤6			
Power Stability (%)	±1			
Pulse Frequency Range (kHz)	CW - 10			
Wavelength (nm)	1070 ±10			
ELECTRICAL RATINGS				
Voltage (VAC)	400/440/480 ±10%			
Connected Load (kVA)	4.0	6.4	12.7	17.5
Effective Power at Nominal Power* (kW)	3.8	6.2	12.5	17.3
Max. Current Consumption at 400 V (A)	5.5	9	18	18.9
Fuses Type NH (A)	16	32	32	32
COOLING				
Recommended Cooling Capacity Laser and QHB/QD (kW)	2.2	4.4	8.9	11.1
Flow Rate Laser (l/min)	24		43	
Flow Rate QHB/QD (l/min)	2			
Laser Temperature (°C)	25 ±1			
Temperature for QBH/QD (°C)	24 to 45			
Max. Pressure Laser (MPa)	0.5			
Max. pressure QBH/QD (MPa)	0.4			
Typical Pressure Drop Laser (MPa)	0.25			
FIBER DELIVERY SYSTEM				
Interface	QBH/QD			
Diameter (μm)	50 to 150			
Length	15, 20			
DIMENSIONS & WEIGHTS				
Laser Dimension L x W x H (mm) without signal tower	Mini: 794 x 916 x 557		Midi: 794 x 916 x 824	
Laser Weight (kg)	<200		<350	
ENVIRONMENTAL CONDITIONS				
Ambient Temperature (°C)	5 to 40			
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport.			
CUSTOMER INTERFACE				
Digital Signals (V DC)	24			
Power Control (V DC)	0 to 10			
Gate Control (V DC)	24, rise/fall time <30 μs			
OPTIONS LASER				
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface			

SPECIFICATIONS	HighLight FL6000C	HighLight FL7500C	HighLight FL8000C	HighLight FL10000C
Nominal Power (W)	6000	7500	8000	10,000
Power Range (%)	1 to 100			
Laser Beam Quality (BPP) at Collimator (mm x mrad)	50 μm: ≤2.5 100 μm: ≤4 150 μm: ≤6		100 μm: ≤4 150 μm: ≤6	
Power Stability (%)	±1			
Pulse Frequency Range (kHz)	CW - 10			
Wavelength (nm)	1070 ±10			
ELECTRICAL RATINGS				
Voltage (VAC)	400/440/480 ±10%			
Connected Load (kVA)	18.9	24.4	25.1	34.8
Effective Power at Nominal Power* (kW)	18.7	24.2	24.9	34.6
Max. Current Consumption at 400 V (A)	27	35	36	50
Fuses Type NH (A)	63			
COOLING				
Recommended Cooling Capacity Laser and QHB/QD (kW)	13.3	16.7	17.8	22.2
Flow Rate Laser (l/min)	65		84	
Flow Rate QHB/QD (l/min)	2			
Laser Temperature (°C)	25 ±1			
Temperature for QBH/QD (°C)	24 to 45			
Max. Pressure Laser (MPa)	0.5			
Max. pressure QBH/QD (MPa)	0.4			
Typical Pressure Drop Laser (MPa)	0.25			
FIBER DELIVERY SYSTEM				
Interface	QBH/QD			
Diameter (μm)	50 to 150		100, 150	
Length	15, 20	5 (50 um), 15, 20	15, 20	15, 20
DIMENSIONS & WEIGHTS				
Laser Dimension L x W x H (mm) without signal tower	Maxi: 794 x 951 x 1322			
Laser Weight (kg)	<490		<540	
ENVIRONMENTAL CONDITIONS				
Ambient Temperature (°C)	5 to 40			
Humidity (°C)	Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport.			
CUSTOMER INTERFACE				
Digital Signals (V DC)	24			
Power Control (V DC)	0 to 10			
Gate Control (V DC)	24, rise/fall time <30 μs			
OPTIONS LASER				
	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface			

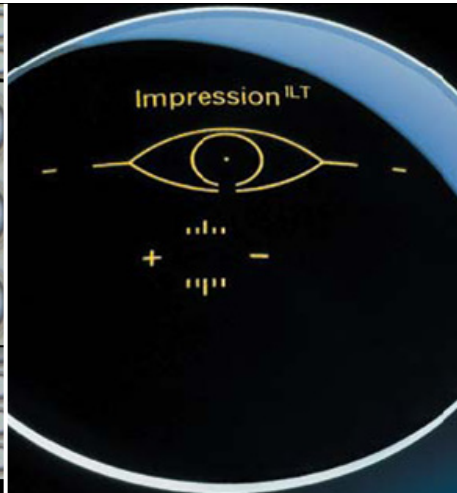
APPLICATION IMAGES PROCESSED BY EXCIMER LASERS

193 nm

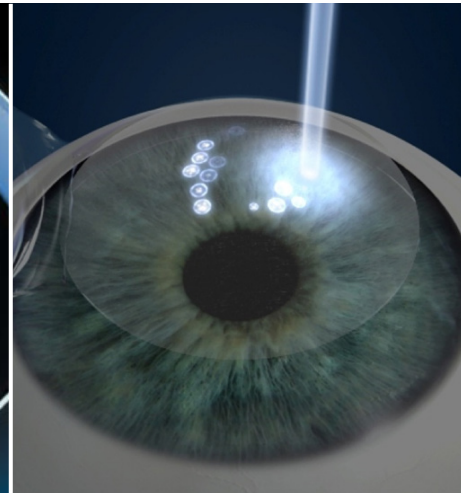
Micro Via Drilling
in Thin Glass



Eye Glass
Marking



LASIK

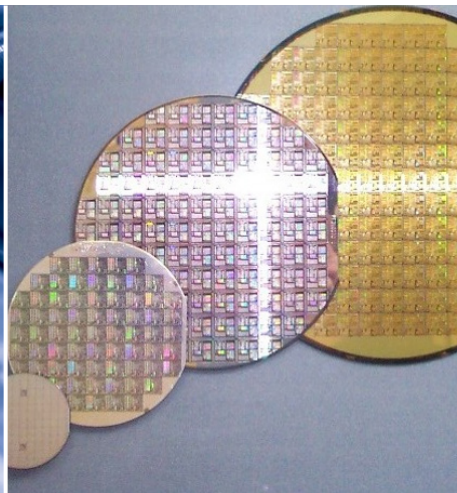


248 nm

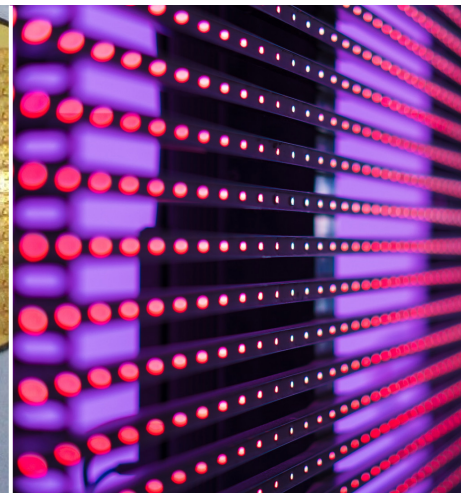
CFRP
Cleaning



GaN LED
Lift-Off



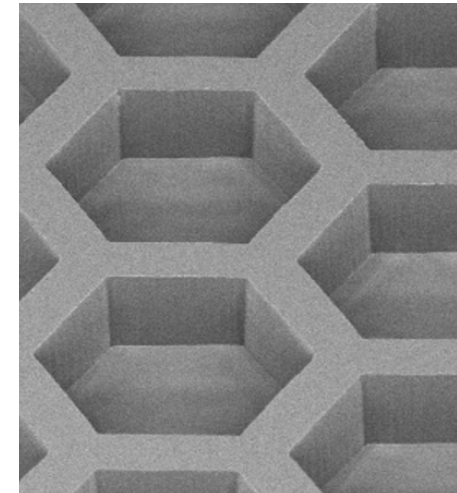
MicroLED Lift-Off
and Mass Transfer



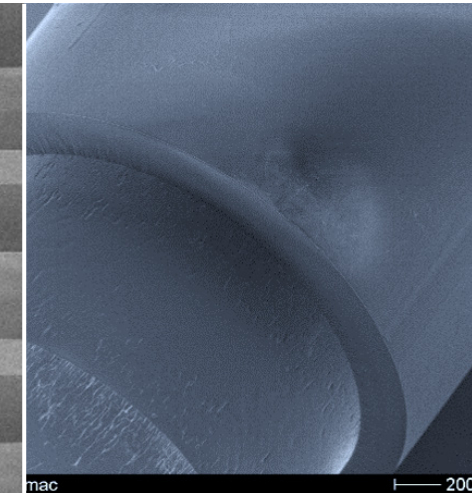
APPLICATION IMAGES PROCESSED BY EXCIMER LASERS

248 nm

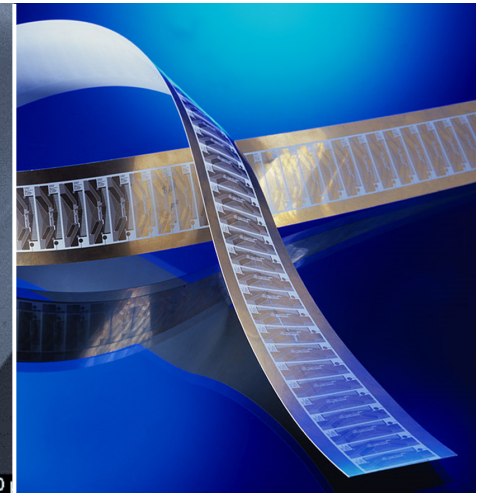
Polycarbonate
Micromachining



Stripped Isolation from 1 mm
Diameter Copper Wire

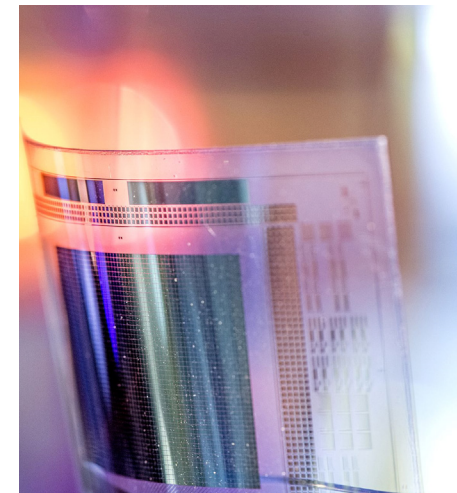


Thin Film
Structuring

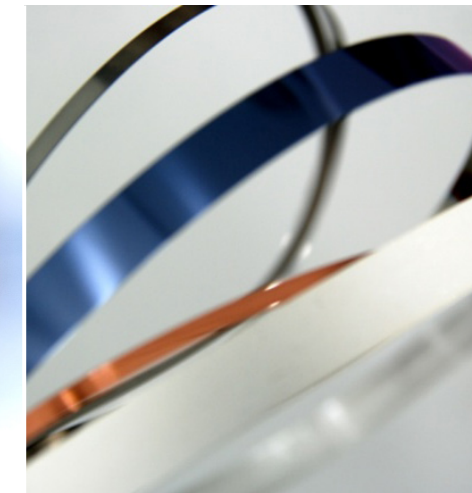


308 nm

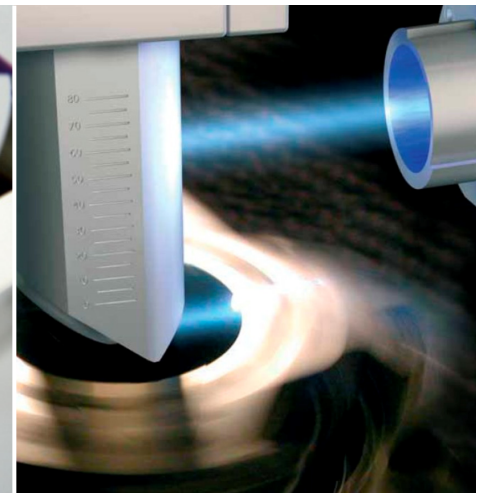
Flexible OLED Display
Lift-Off

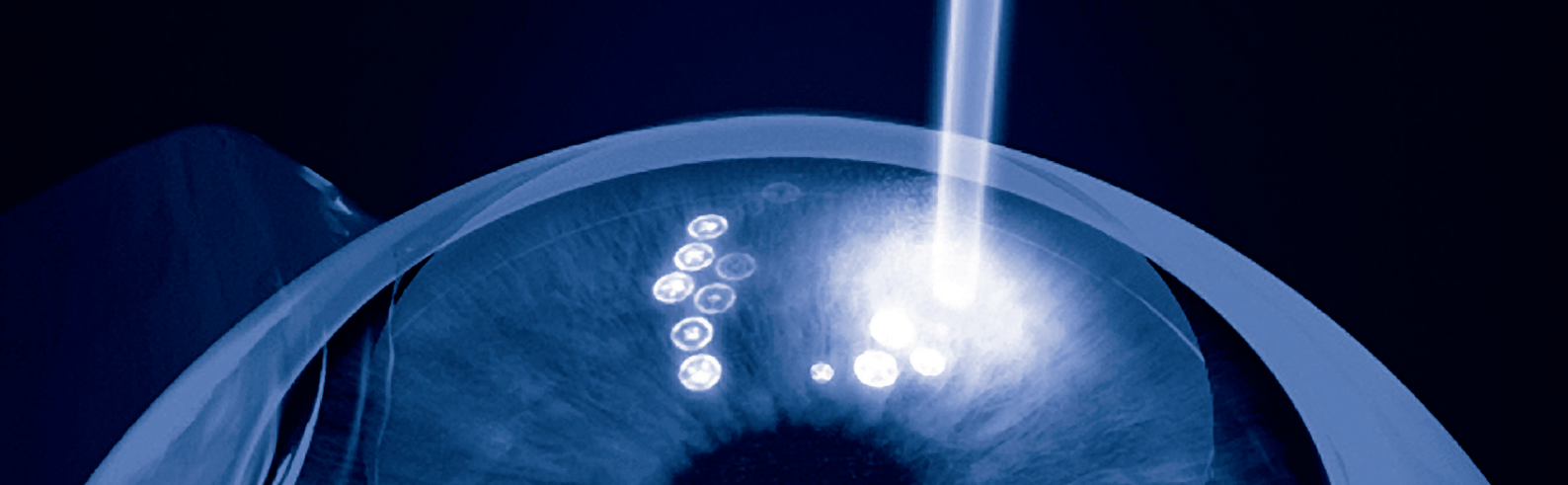


Pulsed Laser Deposition
of HTS-Tapes



Cylinder
Surface Treatment





ExciStar

Compact, High Repetition Rate Excimer Laser

ExciStar 엑시머 레이저는 간편한 시스템 통합에 적합하게 디자인된 테이블 거치용 레이저입니다. 검증된 ALMETA 튜브 디자인이 적용되어 산업용 등급의 성능과 내구성을 보장합니다. 이미 수천 대의 ExciStar 레이저가 각막 절제, 처방용 렌즈 마킹, 광학 센서 제조 등 다양하고 섬세한 작업에 활용되고 있습니다.

FEATURES & BENEFITS

- Ultrashort 193 nm and 248 nm wavelengths for superior ablation and marking
- High repetition rate to enable fast and flexible processing
- Ultimate pulse control to ensure effective use of photons
- ALMETA tube with integrated heating device to ensure reproducible results
- Air-cooled, single-phase design, premix gas supply and CE-declaration compliance for easy integration

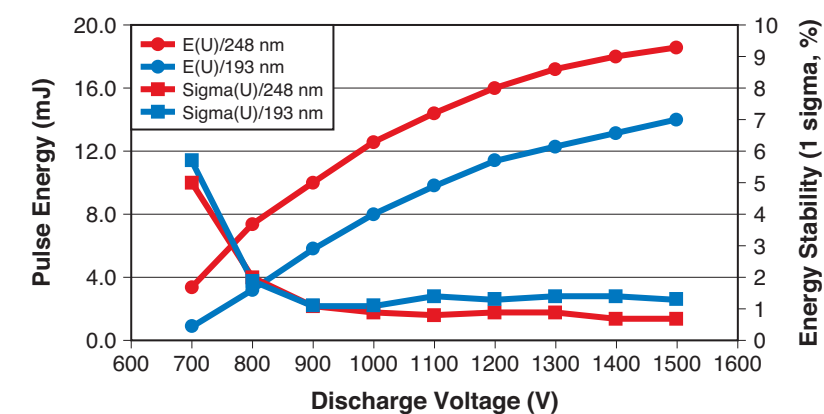
APPLICATIONS

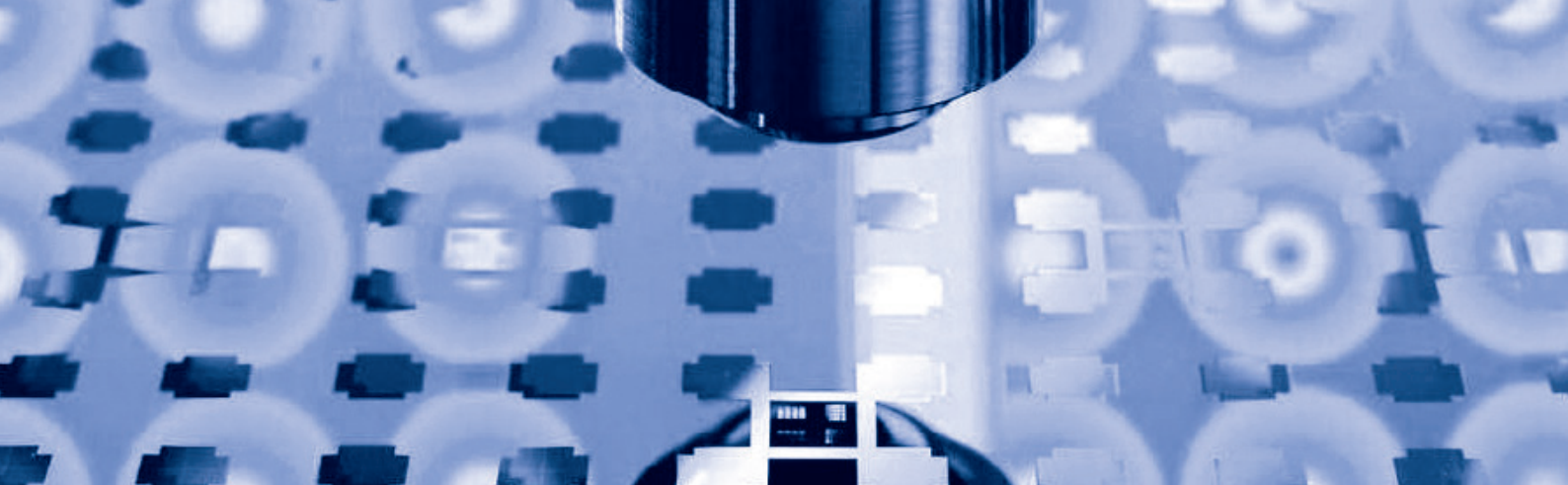
- LASIK Vision Correction
- UV Precision Marking
- LA-ICP-MS Analysis
- FBG Writing



SPECIFICATIONS	ExciStar 200		ExciStar 500		ExciStar 1000	
Wavelength (nm)	193	248	193	248	193	248
Max. Repetition Rate (Hz)	200	200	500	500	1000	1000
Stabilized Pulse Energy (mJ)	5	10	5	10	5	10
Max. Pulse Energy (mJ)	12	16	12	16	12	16
Stabilized Power (W)	1	2	2.5	5	5	10
Beam Dimension (FWHM, mm, V x H)	(5.8 ±0.5) x (2.6 ±0.5)	(5.6 ±0.5) x (2.6 ±0.5)	(5.8 ±0.5) x (2.6 ±0.5)	(5.6 ±0.5) x (2.6 ±0.5)	(5.8 ±0.5) x (2.6 ±0.5)	(5.6 ±0.5) x (2.6 ±0.5)
Energy Stability (sigma, %)	<2 (valid for >5 mJ/193 nm and >10 mJ/248 nm)					
Beam Divergence (FWHM, mrad, V x H)	<3.0 x 1.5					
Pulse Duration (FWHM, ns)	7 ±2					
Cooling	Air					
Weight	66 kg (145.5 lbs.)					
Laser Dimensions (L x W x H)	650 x 300 x 400 mm (25.6 x 11.8 x 15.75 in.)					
Electrical	230 V, 50/60 Hz, single phase					

ExciStar Performance at 193 nm and 248 nm/500 Hz





IndyStar

Fast Pulse, High Precision Processing

IndyStar는 2,000 Hz에 이르는 고속 펄스 주파수 응용분야용으로 디자인된 강력한 엑시머 레이저입니다. 검증된 ALMETA 튜브 기술을 기반으로 하며 Semi-S2 인증을 받은 IndyStar는 아주 짧은 193 nm 및 248 nm 파장의 펄스 수십억 개에 걸쳐 작동합니다. IndyStar 시리즈는 산업용 레이저의 모든 면에서 가장 높은 수준의 수요를 충족하도록 고안된 제품입니다.

FEATURES & BENEFITS

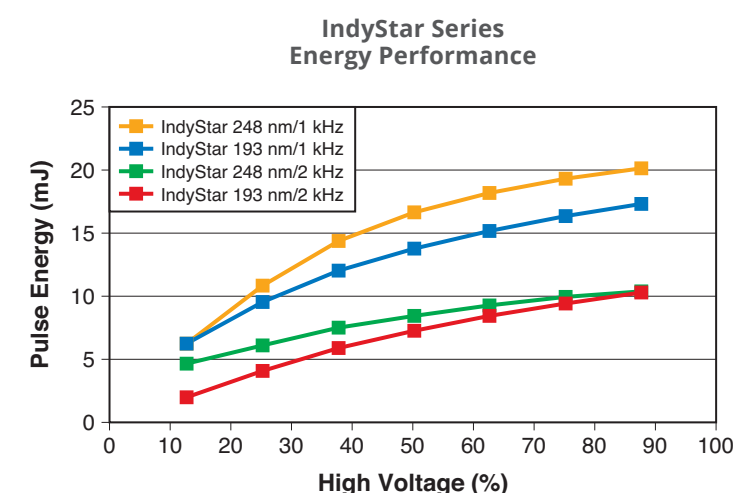
- Repetition rate of 1 and 2 kHz for fast processing
- TimeLok and PowerLok functionalities for ultimate pulse control
- ALMETA tube design to ensure most efficient processing
- Semi-S2 compliance and premix gas supply to facilitate production floor integration

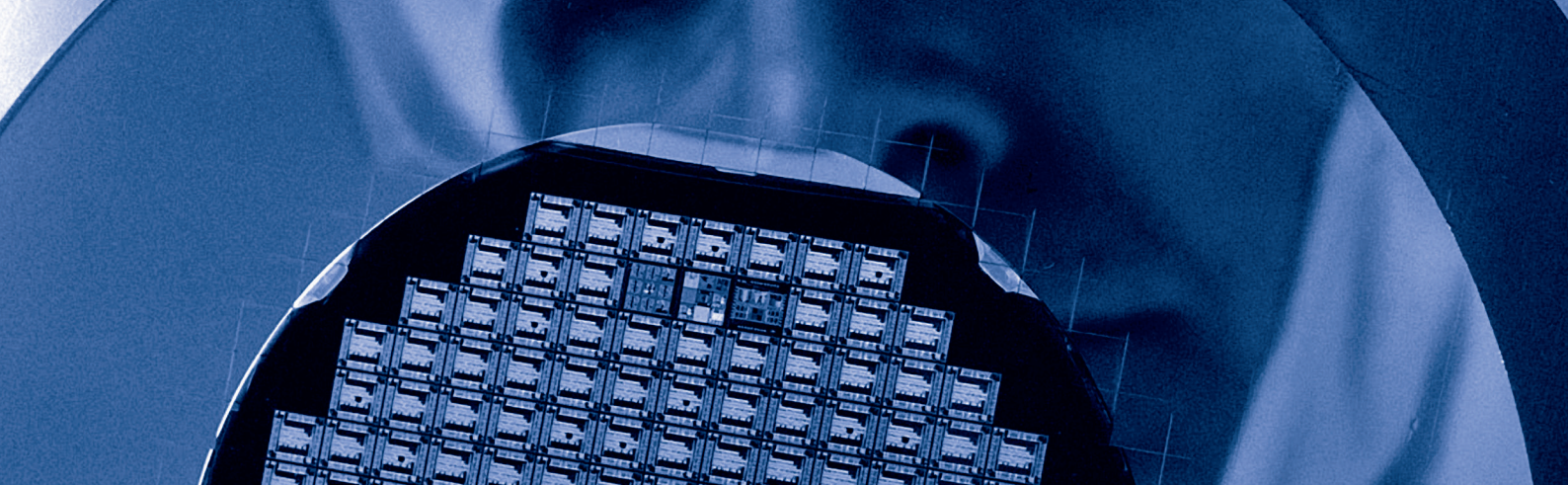
APPLICATIONS

- Photomask Inspection
- Inkjet Nozzle Drilling
- Optics Testing



SPECIFICATIONS	IndyStar 193 1 kHz	IndyStar 193 2 kHz	IndyStar 248 1 kHz	IndyStar 248 2 kHz
Wavelength (nm)	193	193	248	248
Recommended Stabilized Pulse Energy (mJ)	8	4	12	6
Recommended Stabilized Pulse Power (W)	8	8	12	12
Energy Stability (sigma, %)	<2	<2	<2	<2
Max. Repetition Rate (Hz)	1000	2000	1000	2000
Beam Dimension (FWHM, mm, V x H)	(5.7 ±0.5) x (2.5 ±0.5)	(5.5 ±0.5) x (2.3 ±0.5)	(5.7 ±0.5) x (2.7 ±0.5)	(5.5 ±0.5) x (2.6 ±0.5)
Beam Divergence (FWHM, mrad, V x H)	(2.25 ±0.5) x (1.0 ±0.5)	(2.75 ±0.5) x (1.0 ±0.5)	(2.4 ±0.5) x (1.6 ±0.5)	(2.5 ±0.5) x (1.5 ±0.5)
Pulse Duration (FWHM, ns)	5 ±2	4 ±1	6 ±2	4 ±1
Cooling	Air/Water	Water	Air/Water	Water
Weight	135 kg (297 lbs.)			
Laser Dimensions	974 x 381 x 838 mm (48.23 x 7.8 x 8.96 in.)			
Electrical	230 V (1-phase) / 208 V (2-phase), 50/60 Hz, 2100 VA			





COMPex

Market Leading UV-Technology

COMPex 엑시머 레이저는 매우 효과적인 광원으로써 콤팩트한 디자인, 간편한 설치와 작동을 자랑하는 제품입니다. 이러한 레이저 제품은 고체 샘플링 시스템(LA-ICPMS), 재료 연구(PLD), 정밀 재료 가공 등 까다로운 응용 분야에서 우수한 결과를 제공합니다. 세라믹 자동 이온화 기능이 있는 COMPex 제품군은 수백 mJ 수준의 출력을 제공하고 펄스 간 안정성이 탁월합니다. COMPex는 또한 개선된 가스 프로세서가 함께 제공되어 가스와 광학기기의 수명을 연장해 줍니다.

FEATURES & BENEFITS

- Selection of 193 nm, 248 nm, 308 nm, and 351 nm wavelengths for full material flexibility
- Superior pulse energy of up to 750 mJ to enable effective ablation at large field size
- Unrivalled pulse stability of 0.75%, rms to ensure high fluence control
- Ultimate pulse control and system parameter logging to deliver smart and reproducible thin films

APPLICATIONS

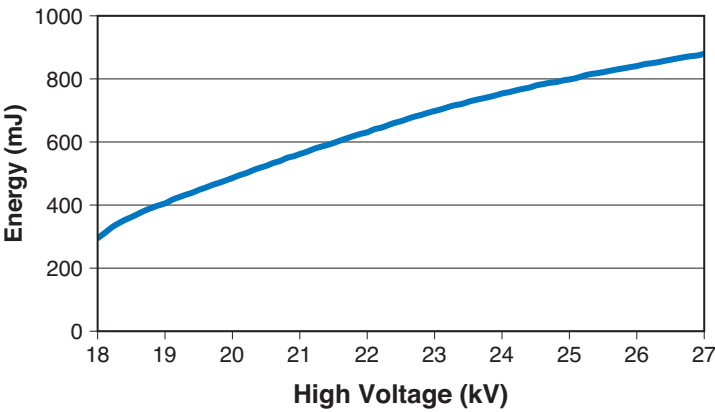
- PLD – Pulsed Laser Deposition
- Thin Wafer Processing
- Laser Lift-Off/Debonding
- LA-ICP-MS



SPECIFICATIONS		COMPex FBG	COMPex 50	COMPex 102	COMPex 110	COMPex 201	COMPex 205
Wavelength (nm)							
Pulse Energy ¹ (mJ)	193	-	100	240	240	400	400
	248	140	150	400	400	750	750
	308	-	-	250	250	500	500
	351	-	-	200	200	300	300
Max. Rep. Rate (Hz)		100	50	20	100	10	50
Average Power ² (W)	193	-	4	4.8	12	4	15
	248	12	7	8	30	7.5	33
	308	-	-	5	16	5	20
	351	-	-	4	12	3	15
Energy Stability ³ (1 sigma) (%)		≤0.75					
Pulse Duration (FWHM) (ns) (typ.)		20					
Beam Dimensions (V x H, FWHM) (mm ²) (typ.)		12 x 4.5	14 x 5	24 x 10	24 x 10	24 x 10	24 x 10
Beam Divergence ³ (V x H, FWHM) (mrad ²)		≤0.3 x 0.2	≤2 x 1	≤3 x 1	≤3 x 1	≤3 x 1	≤3 x 1
Beam Pointing Stability ⁴ (1 sigma) (μrad)		≤50					
Spatial Coherence (FWHM) (μm) Horizontal (typ.)		800	-	-	-	-	-
Electrical		200 to 240V AC, 16A, 50/60 Hz switchable, 1-phase 100 to 120V AC, 25A, 50/60 Hz switchable, 1-phase					
Water Cooling ⁵		2 to 5 l/min. (0.5 to 1.3 gal./min.), 10 to 20°C, connection: 1/2"					
Weight		280 kg (617 lbs.)				325 kg (717 lbs.)	
Dimensions (L x W x H)		1258 x 375 x 813 mm ³ 50 x 15 x 32 in. ³				1682 x 375 x 813 mm ³ 66 x 15 x 32 in. ³	

¹ Measured at low repetition rate.
² Measured at maximum repetition rate.
³ Specified at 248 nm.
⁴ At shutter plane over 2000 pulses.
⁵ Only required above 20 Hz, delivered as standard.

COMPex 205 Pulse Energy
over Dynamic Operating Range



CO/CO₂ LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
C-40, C-55 C-70, J-2	10.6, 9.4	FieldMaxII-TO	PM150
J-3-5 CO Laser	5	FieldMaxII-TO	PM300, PM300F
E-150, GEM-100, G-100, G-150, G-100i	10.6, 9.4	FieldMaxII-TO	PM150
E-250, E250i, J-3	10.6, 9.4	FieldMaxII-TO	PM300F-19
E-400, E-400i, E-1000, J-5, K-500	10.6	FieldMaxII-TO	PM1K
K-250, K-225i, K-300 (discontinued 2014)	10.6, 9.4	FieldMaxII-TO	PM300F-19
GEM Select 50, 100 (discontinued 2010)	9.2 to 10.8	FieldMaxII-TO	PM150
EOM-10 (discontinued 2010)	10.6	FieldMaxII-TO	PM10
MID-IR-2 (discontinued 2010)	4.6 to 5.4	FieldMaxII-TO	PM10
SIFIR (discontinued 2010)	40 to 1020	FieldMaxII-TO	PS10

INDUSTRIAL FIBER & DIODE LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
HighLight FL Series	-	FieldMaxII-TO	PM5K
HighLight FL 1000P	1064	FieldMaxII-TO	PM5K
HighLight D-Series	975	FieldMaxII-TO	PM5K
DF Series	-	FieldMaxII-TO	PM5K
CORELASE	-	FieldMaxII-TO	PM5K
QFS w FLBK SC	1055 to 1070	FieldMaxII-TO	PM150-50
SLS	1064	FieldMaxII-TO	PM150-50, PM5K
NA	1064	FieldMaxII-TO	PM150-50
KLS	1064	FieldMaxII-TO	PM150-50
FLS CL	1064	FieldMaxII-TO	PM5K
FLS A	1064	FieldMaxII-TO	PM5K
QFS 50	1055 to 1070	FieldMaxII-TO	PM150-50

CW SOLID-STATE LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
Genesis Lasers	355 to 577	FieldMaxII-TO	PM10
Sapphire Lasers	458 to 594	FieldMaxII-TO	PS10
OBIS Lasers	355 to 785	FieldMaxII-TO	PS10
Verdi Lasers	532	FieldMaxII-TO	PM10, PM30
Diode Lasers			PM5K
CUBE	375 to 785	FieldMaxII-TO	PS10
OBIS	355 to 785	FieldMaxII-TO	PS10
Radius	375 to 635	FieldMaxII-TO	PS10
All Laser Diode Modules		FieldMaxII-TO	PS10
FAP	780 to 840	LabMax-TOP	LM-150FS + SMA adaptor
Duo FAP	785 to 820	LabMax-TOP	LM-150FS + SMA adaptor
Quattro FAP	790 to 980	LabMax-TOP	LM-150FS + SMA adaptor
HighLight FAP	800 to 820	LabMax-TOP	LM-150FS + SMA adaptor
HighLight 1000FL	1100	FieldMaxII-TO	PM1K
HighLight 4000L (discontinued 2013)	808	FieldMaxII-TO	PM5K-100
HighLight D-Series	975	Call Factory	Call Factory

DIODE-PUMPED SOLID-STATE (CW) LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
Azure	266	FieldMaxII-TO	PM10X or PS10*
Compass 1064 (discontinued 2010)	1064	FieldMaxII-TO	PM10
Compass 115M, 215M, 315M	532	FieldMaxII-TO	PS10
Compass 561 (discontinued 2014)	561	FieldMaxII-TO	PS10
MBD 200	455 to 1070	FieldMaxII-TO	PS10
MBD 266	266	FieldMaxII-TO	PM10X or PS10*
Mephisto, Mephisoto S	1064, 1319	FieldMaxII-TO	PM10
Mephisto MOPA (<30 W)	1064	FieldMaxII-TO	PM30
Mephisto MOPA (>30 W)	1064	FieldMaxII-TO	PM150
Paladin 355 (<10 W)	355	FieldMaxII-TO	PM10X
Paladin 355 (>10 W)	1355	FieldMaxII-TO	PM30X
Paladin 532	532	FieldMaxII-TO	PM30
Prometheus, Iodine Frequency Stabilization	532, 1064	FieldMaxII-TO	PM10 or PS10*
Sapphire 458 to 594	458 to 594	FieldMaxII-TO	PS10
Sapphire 488 HP	488	FieldMaxII-TO	PM10 or PS10*
Verdi V-Series, G-Series (<10 W)	532	FieldMaxII-TO	PM10
Verdi V-Series, G-Series (>10 W)	532	FieldMaxII-TO	PM30
Verdi IR	1064	FieldMaxII-TO	PM30

DIODE-PUMPED SOLID-STATE (PULSED) LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor	Energy Meter	Energy Sensor
AVIA (<10 W)	266, 355	FieldMaxII-TO	PM10X		
AVIA (10 to 30 W)	355, 532	FieldMaxII-TO	PM30X		
AVIA NX (>30 W)	355, 532	FieldMaxII-TO	PM150		
Daytona (discontinued 2014)	355	FieldMaxII-TO	PM30X		
Flare	355, 532, 1064			LabMax-TOP	J-10MB-HE
Helios	532, 1064	FieldMaxII-TO	PM10		
HYPER RAPID 25	355, 532, 1064	FieldMaxII-TO	PM30		
HYPER RAPID 50	355, 532, 1064	FieldMaxII-TO	PM150		
Indigo-DUV (discontinued 2010)	193	FieldMaxII-TO	PS10	LabMax-TOP	J-10MT-10KHZ
Indigo-S (discontinued 2010)	193 to 900	FieldMaxII-TO	PS10	LabMax-TOP	J-10MT-10KHZ
Mamba Green, IR	532, 1064	FieldMaxII-TO	PM1K		
MATRIX 532, 1064	532, 1064	FieldMaxII-TO	PM30		
MATRIX 355	355	FieldMaxII-TO	PM10X		
Mephisto Q	1064	FieldMaxII-TO	PM10 or PS10*	LabMax-TOP	J-10MT-10KHZ
PRISMA (<10 W) (discontinued 2011)	532, 1064	FieldMaxII-TO	PM10		
PRISMA (>10 W) (discontinued 2011)	532, 1064	FieldMaxII-TO	PM30		
RAPID, RAPID 10	355, 532, 1064	FieldMaxII-TO	PM10		
Staccato	1030	FieldMaxII-TO	PM10		
SUPER RAPID-HE	355, 532, 1064	FieldMaxII-TO	PM10		
Talisker	355, 532, 1064	FieldMaxII-TO	PM30		
Vector (discontinued 2010)	532, 1064	FieldMaxII-TO	PM10		

* The PS10 is recommended when making higher resolution or low power measurements.

OPTICALLY PUMPED SEMICONDUCTOR LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
Genesis 355	355	FieldMaxII-TO	PS10
Genesis	460 to 639	FieldMaxII-TO	PM10

ION LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
Innova (<1 W)	200 to 1100	FieldMaxII-TO	PS10
Innova (>1 W)	200 to 1100	FieldMaxII-TO	PM10
Innova 300C	229 to 529	FieldMaxII-TO	PM10 or PS10*
Innova 70C	400 to 800	FieldMaxII-TO	PM10 or PS10*
Innova 90C	330 to 1090	FieldMaxII-TO	PM10 or PS10*

PULSED/DYE LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
ScanMatePro (discontinued 2007)	320 to 860	FieldMaxII-TO	PM10

TUNABLE LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
MBR Ring	700 to 1030	FieldMaxII-TO	PM10
MBR Ring Series	700 to 1030	FieldMaxII-TO	PM30
MBD-200	455 to 1080	FieldMaxII-TO	PM10 or PS10*

ULTRAFAST LASERS FOR SCIENCE

LASER	Wavelength (µm)	Power Meter	Power Sensor	Energy Meter	Energy Sensor
Fidelity-2	1070 nm	FieldMaxII-TO	PM10		
Mira OPO	500 to 1600 nm	FieldMaxII-TO	PS10		
OPerA Solo	240 nm to 20 µm	FieldMaxII-TO	PS10	LabMax-TOP	J-10MT-10KHZ
TOPAS	240 nm to 20 µm	FieldMaxII-TO	PS10	LabMax-TOP	J-10MT-10KHZ
OPA 9400, 9800	480 to 2400 nm	FieldMaxII-TO	PS10	LabMax-TOP	J-10MB-HE
ULTRAFAST AMPLIFIER	Wavelength (µm)	Power Meter	Power Sensor	Energy Meter	Energy Sensor
Astrella	800 nm	FieldMaxII-TO	PM10	LabMax-TOP	J-25MT-10KHZ
Evolution-15, -30	527 nm	FieldMaxII-TO	PM30	LabMax-TOP	J-25MT-10KHZ + med heat sink
Evolution-45, -HE	527 nm	FieldMaxII-TO	PM150		
Hidra	800 nm	FieldMaxII-TO	PM10V1	FieldMaxII-TOP	J-50MB-YAG
Legend Elite (all configurations)	770 to 845 nm	FieldMaxII-TO	PM10	LabMax-TOP	J-25MT-10KHZ + med heat sink
Legend Elite Cryo PA	800 nm	FieldMaxII-TO	PM30	LabMax-TOP	J-25MT-10KHZ + med heat sink
Libra (all configurations)	800 nm	FieldMaxII-TO	PM10	LabMax-TOP	J-25MT-10KHZ
RegA	480 nm to 10 µm	FieldMaxII-TO	PS10		

* The PS10 is recommended when making higher resolution or low power measurements.

ULTRAFAST LASERS FOR SCIENCE (CONTINUED)

ULTRAFAST OSCILLATOR	Wavelength (µm)	Power Meter	Power Sensor
Mantis	800	FieldMaxII-TO	PM10 or PS10*
Micra	750 to 860	FieldMaxII-TO	PM10 or PS10*
Mira	700 to 980	FieldMaxII-TO	PM10
Mira 900	700 to 980	FieldMaxII-TO	PM10
Mira HP	700 to 980	FieldMaxII-TO	PM10
Vitara	755 to 860	FieldMaxII-TO	PM10 or PS10*
Vitesse	800	FieldMaxII-TO	PM10 or PS10*
Chameleon	680 to 1600	FieldMaxII-TO	PM10
Fidelity-2	1070	FieldMaxII-TO	PM10

EXCIMER LASERS & UV BEAM DELIVERY

LASER	Wavelength (µm)	Power Meter	Power Sensor	Energy Meter	Energy Sensor
BraggStar S (discontinued 2013)	193, 248	FieldMaxII-TO	PM10X	LabMax-TOP	J-25MT-10KHZ
BraggStar M	248	FieldMaxII-TO	PM30X	LabMax-TOP	J-50MUV-248
COMPexPro F2 (discontinued 2008)	157	FieldMaxII-TO	PM10X	FieldMaxII-TOP	J-25MUV-193
COMPexPro 50, 102, 110, 201, 205	193	FieldMaxII-TO	PM150-50XC	FieldMaxII-TOP	J-50MUV-193
COMPexPro 50, 102, 110, 201, 205	248	FieldMaxII-TO	PM150X	FieldMaxII-TOP	J-50MUV-248
					+ lg heat sink
COMPexPro 102, 110, 201, 205	308, 351	FieldMaxII-TO	PM150X	FieldMaxII-TOP	J-50MB-YAG
ExciStar XS 200	157, 193	FieldMaxII-TO	PM10X	FieldMaxII-TOP	J-25MUV-193
ExciStar XS 200	248, 351	FieldMaxII-TO	PM10X	FieldMaxII-TOP	J-25MUV-248
ExciStar XS 500	157, 193, 248, 351	FieldMaxII-TO	PM10X	LabMax-TOP	J-25MT-10KHZ
ExciStar S	157, 193	FieldMaxII-TO	PM10X	LabMax-TOP	J-25MT-10KHZ
ExciStar S	248	FieldMaxII-TO	PM30X	LabMax-TOP	J-25MT-10KHZ
					+ sm heat sink
ExciStar S	308	FieldMaxII-TO	PM10X	LabMax-TOP	J-25MT-10KHZ
IndyStar	193, 248	FieldMaxII-TO	PM30X	LabMax-TOP	J-25MT-10KHZ
					+ sm heat sink
LEAP	248, 308	FieldMaxII-TO	PM150X		
LPFPro 205, 220	157	FieldMaxII-TO	PM150-50XC	FieldMaxII-TOP	J-50MUV-193
LPXPro 210, 220, 305	193, 248, 308, 351	FieldMaxII-TO	PM150X		
Xantos XS (discontinued 2013)	157, 193, 248, 351	FieldMaxII-TO	PM10X	LabMax-TOP	J-25MT-10KHZ
Lambda SX-Series (<300 W)	248, 308	FieldMaxII-TO	PM300F-50X		
Lambda SX-Series (>300 W)	308	FieldMaxII-TO	PM1KX		
VYPER	308	FieldMaxII-TO	PM1KX		

OPTICALLY PUMPED SEMICONDUCTOR LASERS

LASER	Wavelength (µm)	Power Meter	Power Sensor
StingRay and BioRay Lasers	405 to 830	FieldMaxII-TO	PS10
Mini Laser	635 to 830	FieldMaxII-TOP	OP-2VIS

* The PS10 is recommended when making higher resolution or low power measurements.

INDUSTRIAL SHORT-PULSE LASERS (DIODE-PUMPED SOLID-STATE/FEMTOSECOND)

LASER	Wavelength (µm)	Power Meter	Power Sensor
Rapid FX	1030	FieldMaxII-TO	PM150-50C
Monaco fs (20 to 60W)	517, 1035	FieldMaxII-TO	PM150-50C
Fidelity HP	1040	FieldMaxII-TO	PM30, PM150-50C
Fidelity-2	1070	FieldMaxII-TO	PM10
OPerA Solo Ultrafast	1140 to 1600	FieldMaxII-TO	PM10 or PS10*
OPerA-F	650 to 900	FieldMaxII-TO	PM30

INDUSTRIAL LASER MACHINES & SYSTEMS

LASER CUTTING SYSTEMS	Wavelength (µm)	Power Meter	Power Sensor
META 1.5C, 2C		FieldMaxII-TO	PM1K
META 10C, 4C		FieldMaxII-TO	PM3K
MPS Family	see laser type		
StarCut Tube	see laser type		
UW1200, 150RT	see laser type	FieldMaxII-TO	PM10 or PS10*
LASER MARKING SYSTEMS	Wavelength (µm)	Power Meter	Power Sensor
CombiLine	see laser type		
LabelMarker	see laser type		
EasyMark F20, F30	1064, 1070 nm	FieldMaxII-TO	PM30
EasyMark F50	1070 nm	FieldMaxII-TO	PM150-50C
LASER WELDING SYSTEMS	Wavelength (µm)	Power Meter	Power Sensor
Desktop		SSIM	PMP HP
XE-Power		SSIM	PMP HP
MULTI-PURPOSE LASER SYSTEMS	Wavelength (µm)	Power Meter	Power Sensor
MPS Family	see laser type		
ELA			
VYPER Series	308 nm	LabMax-TO	PM1KX-100

* The PS10 is recommended when making higher resolution or low power measurements.

POWER SENSOR SUMMARY OF SPECIFICATIONS

Part Number	Description	Wave-length Range (µm)	Power			Long-Pulse Energy Range (J)	Detector Diameter (mm)	Detector Coating	Detector Type	Calibration Wavelength (nm)	Calibration Uncertainty (±%) (k=2)	Connector
			Min.	Max.	Resolu-tion							

HIGH-SENSITIVITY SEMICONDUCTOR SENSORS (TO 50 mW)

1098401	OP-2 UV	0.25 to 0.4	10 nW	30 mW	1 nW	–	6.0	–	Silicon	–	8	OP DB-25
1098313	OP-2 VIS	0.4 to 1.1	10 nW	30 mW	1 nW	–	7.9	–	Silicon	–	5	OP DB-25
1098416	OP-2 IR	0.8 to 1.8	10 nW	10 mW	1 nW	–	5.0	–	Germanium	–	4.5	OP DB-25
1098390	LM-2 UV	0.25 to 0.4	10 nW	30 mW	1 nW	–	6.0	–	Silicon	–	8	LM DB-25
1098298	LM-2 VIS	0.4 to 1.064	10 nW	30 mW	1 nW	–	7.9	–	Silicon	–	5	LM DB-25
1098342	LM-2 IR	0.8 to 1.55	10 nW	10 mW	1 nW	–	5.0	–	Germanium	–	4.5	LM DB-25

HIGH-SENSITIVITY THERMOPILE SENSORS (TO 2 W)

1098350	PS10	0.19 to 11.0	100 µW	1W	10 µW	0.001 to 1	10	Black	–	514	1	PM DB-25
1098400	PS10Q	0.3 to 2.0	100 µW	1W	10 µW	0.001 to 1	10	Black	–	514	1	PM DB-25
1098413	PS19	0.19 to 11.0	100 µW	1W	10 µW	0.001 to 1	19	Black	–	514	1	PM DB-25
1098341	PS19Q	0.3 to 2.0	100 µW	1W	10 µW	0.001 to 1	19	Black	–	514	1	PM DB-25
1098336	PM3	0.19 to 11.0	500 µW	2W	50 µW	–	19	Black	–	514	1	PM DB-25
1098419	PM3Q	0.3 to 2.0	500 µW	2W	50 µW	–	10	Black	–	514	1	PM DB-25

AIR-COOLED THERMOPILE SENSORS (TO 150 W)

1098329	PM2	0.25 to 11.0	10 mW	2W	1 mW	0.5 to 2	19	Broadband	–	514	1	PM DB-25
1098457	PM2X	0.15 to 1.0	10 mW	2W	1 mW	0.5 to 2	19	UV	–	514	1	PM DB-25
1097901	PM10	0.25 to 11.0	10 mW	10W	1 mW	0.5 to 10	19	Broadband	–	514	1	PM DB-25
1098423	PM10X	0.15 to 1.0	10 mW	10W	1 mW	0.5 to 10	19	UV	–	514	1	PM DB-25
1098314	PM30	0.25 to 11.0	100 mW	30W	10 mW	0.5 to 50	19	Broadband	–	514	1	PM DB-25
1098498	PM30X	0.15 to 1.0	100 mW	30W	10 mW	0.5 to 50	19	UV	–	514	1	PM DB-25
1098483	PM100-19C	0.25 to 11.0	300 mW	100W	30 mW	1 to 100	19	Broadband	–	514	1	PM DB-25
1098407	PM150	0.25 to 11.0	300 mW	150W	30 mW	1 to 150	19	Broadband	–	514	1	PM DB-25
1098398	PM150-50	0.25 to 11.0	300 mW	150W	30 mW	1 to 150	50	Broadband	–	514	1	PM DB-25
1098455	PM150X	0.15 to 1.0	300 mW	150W	30 mW	1 to 150	50	UV	–	514	1	PM DB-25

WATER-COOLED THERMOPILE SENSORS (TO 300 W)

1098397	PM10-19C	0.25 to 11.0	10 mW	10W	1 mW	0.5 to 10	19	Broadband	–	514	1	PM DB-25
1098444	PM150-19C	0.25 to 11.0	300 mW	150W	30 mW	1 to 150	19	Broadband	–	514	1	PM DB-25
1098412	PM150-50C	0.25 to 11.0	300 mW	150W	30 mW	1 to 150	50	Broadband	–	514	1	PM DB-25
1098443	PM150-50XC	0.15 to 1.0	300 mW	150W	30 mW	1 to 150	50	UV	–	514	1	PM DB-25
1141474	PM300	0.25 to 11.0	1W	300W	0.1W	–	19	Broadband	–	514	1	PM DB-25

FAN-COOLED THERMOPILE SENSORS (TO 300 W)

1098480	PM200F-19	0.25 to 11.0	1W	200W	100 mW	1 to 200	19	Broadband	–	514	1	PM DB-25
1098472	PM200F-50	0.25 to 11.0	1W	200W	100 mW	1 to 200	50	Broadband	–	514	1	PM DB-25
1113493	PM200F-50X	0.15 to 1.0	1W	200W	100 mW	1 to 200	50	UV	–	514	1	PM DB-25
1098509	PM300F-19	0.25 to 11.0	1W	300W	100 mW	1 to 300	19	Broadband	–	514	1	PM DB-25
1098417	PM300F-50	0.25 to 11.0	1W	300W	100 mW	1 to 300	50	Broadband	–	514	1	PM DB-25
1098481	PM300F-50X	0.15 to 1.0	1W	300W	100 mW	1 to 300	50	UV	–	514	1	PM DB-25

POWER SENSOR SUMMARY OF SPECIFICATIONS

Part Number	Description	Wavelength Range (μm)	Power			Long-Pulse Energy Range (J)	Detector Diameter (mm)	Detector Coating	Calibration Wavelength (nm)	Calibration Uncertainty (±%) (k=2)	Connector
			Min.	Max.	Resolution						

HIGH POWER WATER-COOLED THERMOPILE SENSORS (TO 5 kW)

1098392	PM1K	0.25 to 11.0	100 W	1000 W	1 W	-	50	Broadband	1064	3	PM DB-25
1098462	PM3K	0.25 to 11.0	100 W	3000 W	1 W	-	50	Broadband	1064	3	PM DB-25
1098454	PM5K	0.25 to 11.0	100 W	5000 W	1 W	-	50	Broadband	1064	3	PM DB-25

LARGE AREA HIGH POWER WATER-COOLED THERMOPILE SENSORS (TO 5 kW)

1098490	PM1K-100	0.25 to 11.0	100 W	1000 W	1 W	–	100	Broadband	1064	3	PM DB-25
1098506	PM3K-100	0.25 to 11.0	100 W	3000 W	1 W	–	100	Broadband	1064	3	PM DB-25
1098461	PM5K-100	0.25 to 11.0	100 W	5000 W	1 W	–	100	Broadband	1064	3	PM DB-25
1098505	PM5K-200	0.25 to 11.0	100 W	5000 W	1 W	–	200	Broadband	1064	3	PM DB-25

POSITION-SENSING AIR-COOLED THERMOPILE SENSORS (TO 200 W)

1098328	LM-3	0.25 to 10.6	10 mW	3 W	1 mW	0.5 to 10	19	HTD	10600	2	LM DB-25
1098304	LM-10	0.25 to 10.6	10 mW	10 W	1 mW	0.5 to 10	16	HTD	10600	2	LM DB-25
1098456	LM-20	0.25 to 10.6	100 mW	20 W	10 mW	0.5 to 10	19	HTD	10600	2	LM DB-25
1098320	LM-45	0.25 to 10.6	100 mW	45 W	10 mW	0.5 to 10	19	HTD	10600	2	LM DB-25
1098346	LM-100	0.25 to 10.6	100 mW	100 W	10 mW	0.5 to 10	19	HTD	10600	2	LM DB-25
1098394	LM-150 FS	0.25 to 10.6	100 mW	150 W	10 mW	0.5 to 10	19	HTD	10600	5	LM DB-25
1098452	LM-150 LS	0.25 to 10.6	100 mW	150 W	10 mW	0.5 to 10	19	HTD	10600	5	LM DB-25
1098450	LM-200 220V	0.25 to 10.6	100 mW	200 W	10 mW	0.5 to 100	19	HTD	10600	5	LM DB-25
1098440	LM-200 110V	0.25 to 10.6	100 mW	200 W	10 mW	0.5 to 100	19	HTD	10600	5	LM DB-25

POSITION-SENSING WATER-COOLED THERMOPILE SENSORS (TO 5 kW)

1098409	LM-1000	0.25 to 10.6	100 W	1000 W	1 W	-	38	Broadband	10600	5	LM DB-25
1098437	LM-2500	0.25 to 10.6	100 W	2500 W	1 W	-	55	Broadband	10600	5	LM DB-25
1098421	LM-5000	0.25 to 10.6	100 W	5000 W	1 W	-	55	Broadband	10600	5	LM DB-25

HIGH PEAK POWER THERMOPILE SENSORS (TO 30 W)

1098338	PM10V1	0.25 to 3.0	10 mW	10 W	1 mW	-	19	Volume Absorber	514	1	PM DB-25
1098429	PM30V1	0.25 to 3.0	100 mW	30 W	10 mW	-	19	Volume Absorber	514	1	PM DB-25

OFF-THE-SHELF OEM POWER SENSORS (TO 1 kW)

1098334	PM10-19A	0.19 to 11.0	10 mW	10 W	1 mW	–	19	Broadband	514	1	4-pin connector
1098343	PM10-19B	0.19 to 11.0	10 mW	10 W	1 mW	–	19	Broadband	514	1	BNC-terminated
1098418	PM150-19A	0.19 to 11.0	300 mW	150 W	30 mW	–	19	Broadband	514	1	4-pin connector
1098321	PM150-19B	0.19 to 11.0	300 mW	150 W	30 mW	–	19	Broadband	514	1	BNC-terminated
1098510	PM150-50A	0.19 to 11.0	300 mW	150 W	30 mW	–	50	Broadband	514	1	4-pin connector
1098415	PM150-50B	0.19 to 11.0	300 mW	150 W	30 mW	–	50	Broadband	514	1	BNC-terminated
1098441	PM150-50XB	0.15 to 1.0	300 mW	150 W	30 mW	–	50	UV	514	1	BNC-terminated
1098333	PM1K-36B	0.19 to 11.0	100 W	1000 W	1 W	–	36	Broadband	1064	3	BNC-terminated
1098427	BeamFinder	0.25 to 10.6	100 W	1000 W	1 W	–	35	Broadband	10600	5	LM DB-25

Notes