



Excimer Lasers & UV Optical Systems

2016 Product Catalog



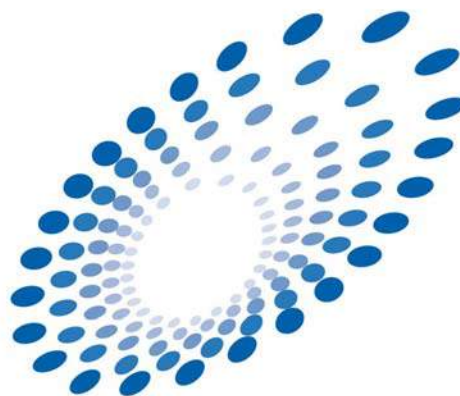
Superior Reliability & Performance

Award Winning Excimer Laser Technology

Innovation at Work



2012 Finalist



DEUTSCHER ZUKUNFTSPREIS

Preis des Bundespräsidenten
für Technik und Innovation

Nominee 2013

Excimer Lasers and UV Optical Systems

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Laser Selection Guide

Excimer Lasers

	Wavelength (nm)	Max. Energy (mJ)	Max. Repetition Rate (Hz)	
ExciStar XS	157	2	500	
	193	10	500	
	248	12	500	
	351	5	500	
IndyStar ¹	193	8	1000	
	193	4	2000	
	248	12	1000	
	248	6	2000	
COMPexPro	COMPexPro 50	193	100	50
		248	150	50
	COMPexPro 100	193	200	100
		248	400	100
		308	250	100
		351	150	100
	COMPexPro 200	193	400	50
		248	700	50
		308	500	50
		351	300	50
BraggStar M	248	140	100	

¹ Max. energy (mJ) is stabilized energy.

Laser Selection Guide

Excimer Lasers

LPXpro Series	Wavelength (nm)	Max. Energy (mJ)	Max. Repetition Rate (Hz)
LPFpro 205	157	50	50
LPFpro 220	157	40	200
LPXpro 210	193	300	100
	248	700	100
	308	450	100
	351	200	100
LPXpro 220	193	250	200
	248	400	200
	308	275	200
LPXpro 240	193	80	300
	248	160	400
LPXpro 305	193	400	50
	248	800	50
	308	600	50
	351	300	50

LEAP

LEAP 130K	248	650	200
LEAP 130C	308	650	200

LAMBDA SX

LAMBDA SX C-Series	308	1000	600
LAMBDA SX K-Series	248	1000	300
LAMBDA SX E-Series	308	1000	500

VYPER

VYPER	308	2000	600
TwinVYPER	308	4000	600

Laser Selection Guide

Applications

Excimer Lasers

UV Optical Systems

Customer Support

LMC Accessories

Applications Matrix

	Excistar XS	BraggStar M	IndyStar	COMPexPro	LPXpro Series	LEAP	LAMBDA SX	VYPER
Marking								
Polymer, Teflon Marking	•		•	•	•			
Visible and Invisible Marking (Eyeglass Marking, etc.)	•		•	•	•			
Diamond and Jewel Marking	•							
Material Processing								
Polymer Drilling (Inkjet Nozzle, Filter)			•		•	•	•	
Hard and Brittle Drilling			•	•	•	•	•	
FBG Writing	•	•			•			
Thin Film Structuring (TCO, ITO, ZnO, FiNx, etc.)				•	•	•		
Laser Lift-Off (LLO)				•	•	•	•	•
Surface Treatment								
Excimer Laser Annealing (ELA/SLS)							•	•
Cylinder Honing							•	•
Pulsed Laser Deposition (PLD)				•	•	•	•	•
Laser Direct Synthesis (LDS)				•	•	•		
Laser Direct Patterning (LDP)					•	•	•	•
Laser-Induced Forward Transfer (LIFT)				•	•	•	•	•
Ion Implantation/Doping/Implant Activation				•	•	•	•	•
Surface Cleaning	•		•	•	•	•	•	•
Measurement								
Combustion Analysis	•			•				
Optics/Coating Testing	•		•		•			
Mask Inspection	•		•					
Spectroscopy, LIDAR	•			•	•	•		
Laser-Induced Fluorescence (LIF)	•			•	•	•		
Medical Procedures								
Psoriasis/Vitiligo Treatment	•			•				
Refractive Eye Surgery (Lasik*)	•			•				

¹ This matrix shows only a sampling of many possible applications for our lasers. Please contact us regarding your specific application.

Applications

Examples

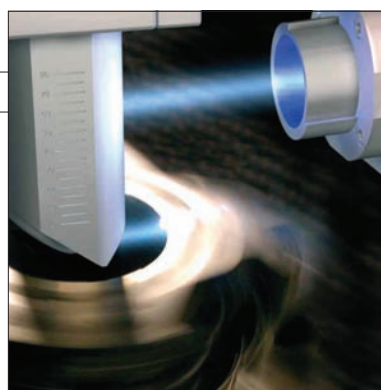
Glass Marking

Laser Model ExciStar XS



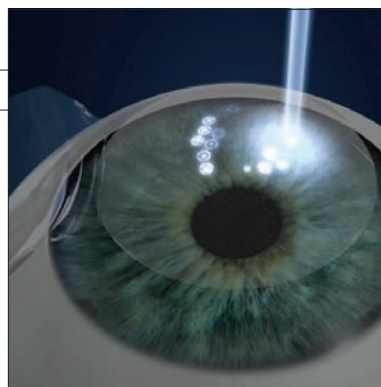
Cylinder Honing

Laser Model LAMBDA SX



LASIK Vision Correction

Laser Model ExciStar OEM



Laser Lift-Off processing of wafers and panels

Laser Model LEAP, LAMBDA SX, UVblade



Laser Selection Guide

Applications

Excimer Lasers

UV Optical Systems

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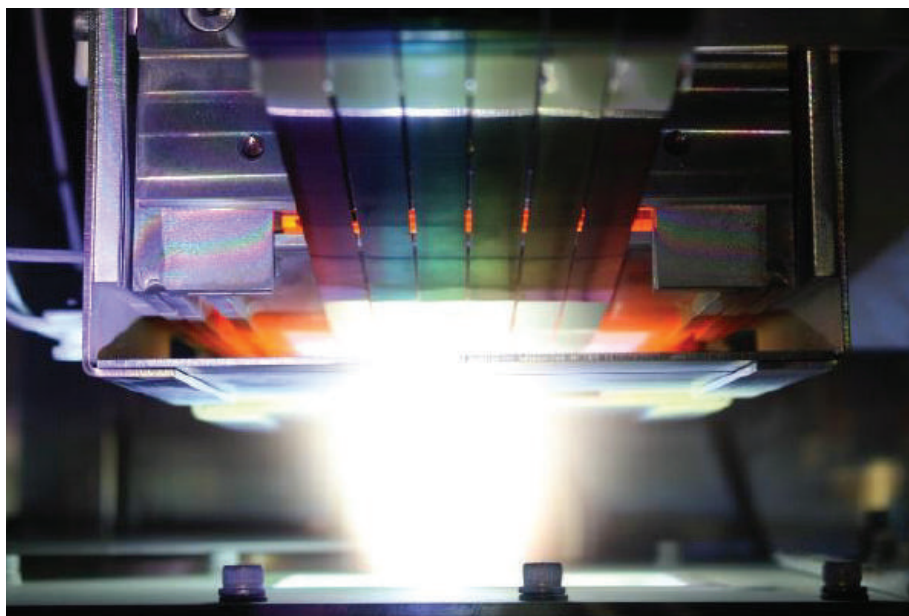
LMC Accessories

Applications

Examples

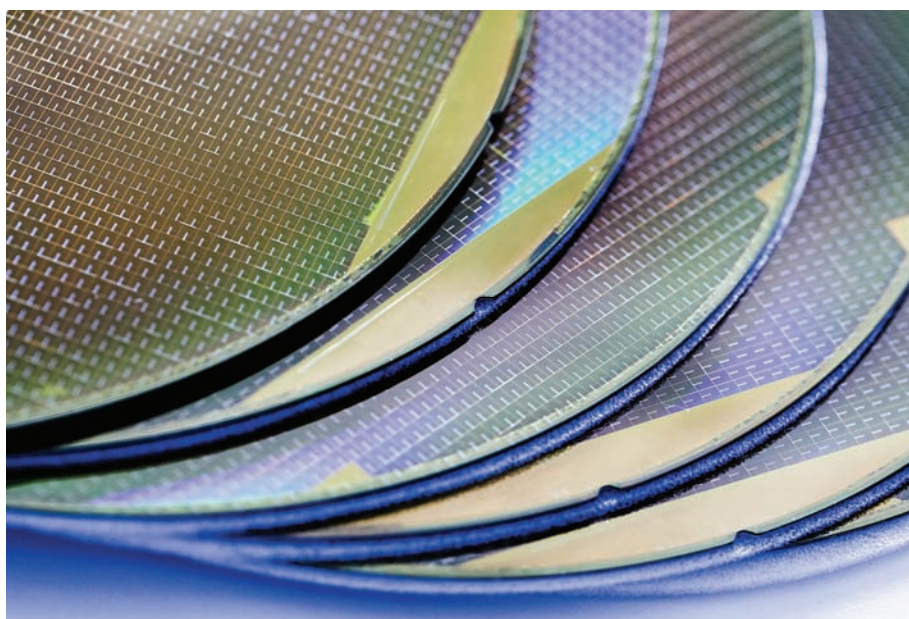
Laser CVD and PLD generated thin films (courtesy of SuperOx Japan LLC)

Laser Model	COMPexPro, LPXpro, LEAP, LAMBDA SX
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Excimer laser debonding of thinned wafers for advanced packaging

Laser Model	COMPexPro, LPXpro, LEAP, LAMBDA SX
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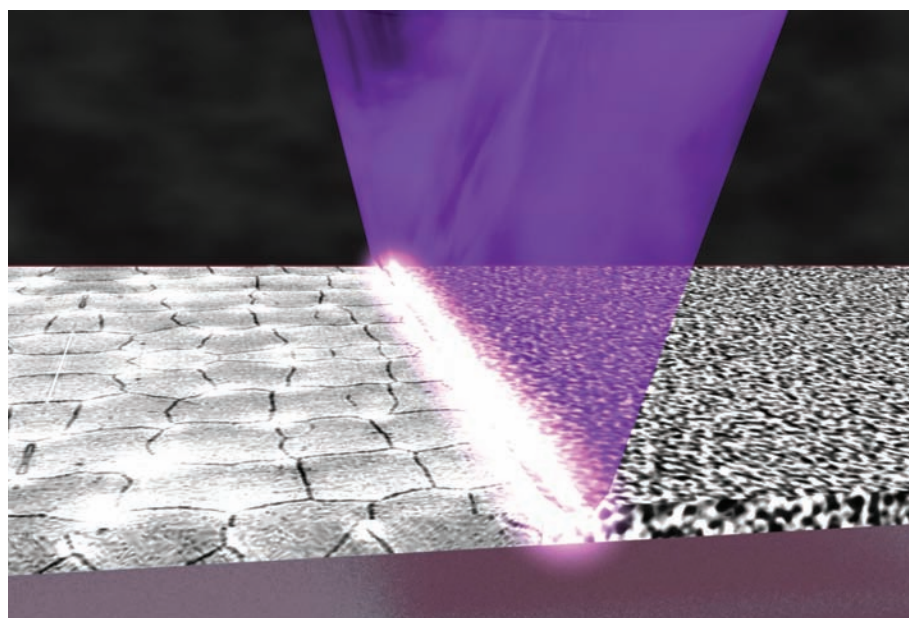


Applications

Examples

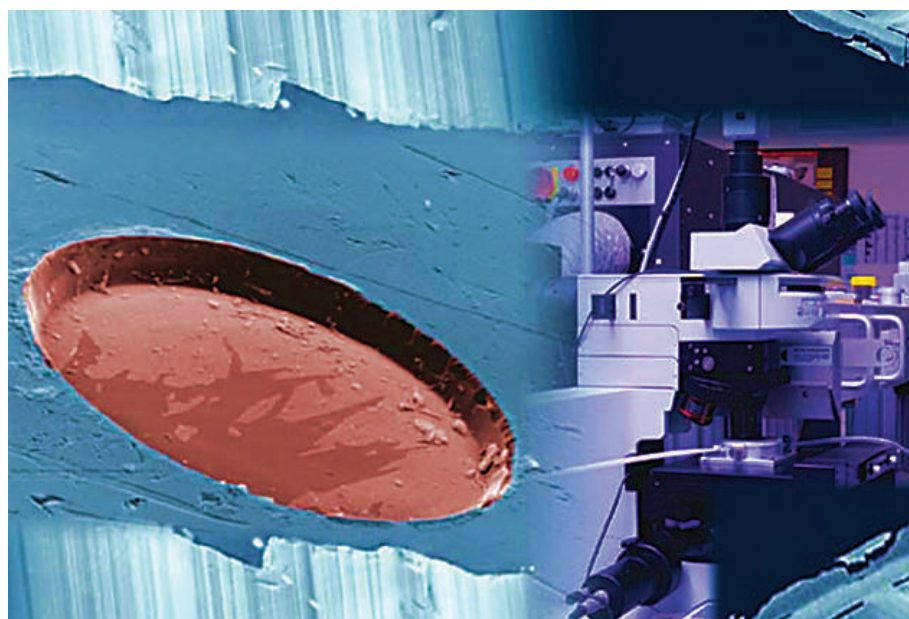
Laser Annealing of Low Temperature Polysilicon

Laser Model	LAMBDA SX, VYPER, LineBeam
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Laser ablation-ICP-MS analysis of trace elements in earth sciences and process control

Laser Model	GeoLasHD, ExciStar XS, COMPeXPro
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Laser Selection Guide

Applications

Excimer Lasers

UV Optical Systems

Customer Support

LMC Accessories

Excimer Laser Applications

Laser Selection Guide

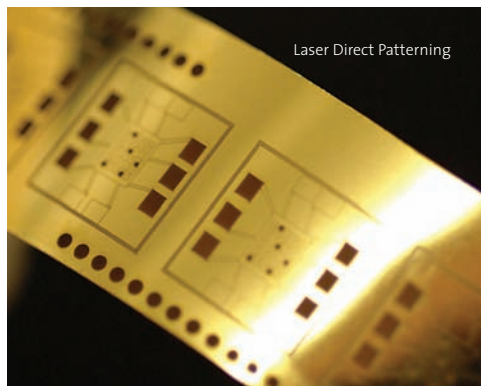
Applications

Excimer Lasers

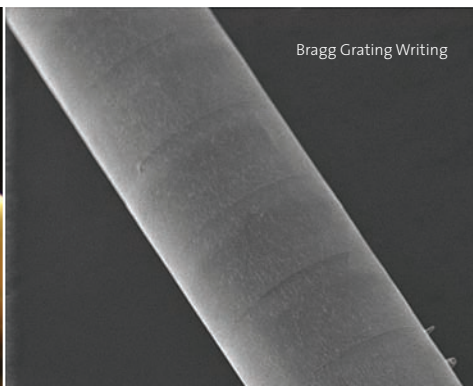
UV Optical Systems

Customer Support

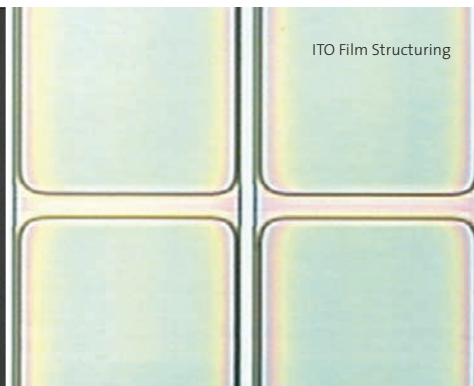
LMC Accessories



Laser Direct Patterning



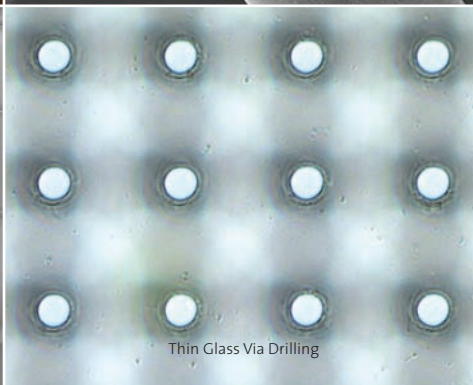
Bragg Grating Writing



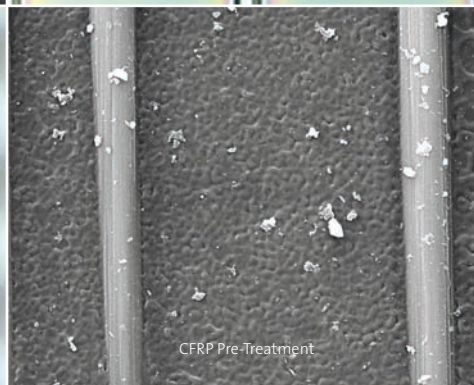
ITO Film Structuring



Si Wafer Dopant Activation



Thin Glass Via Drilling



CFRP Pre-Treatment

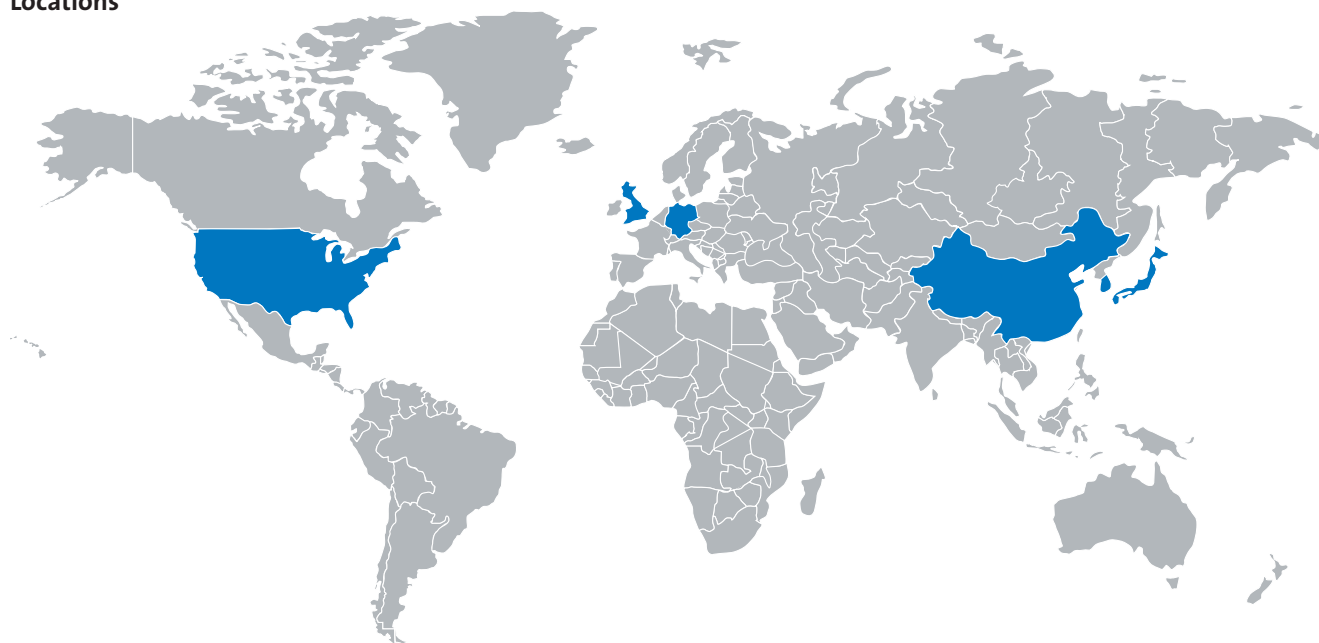
Excimer Lasers: Masters of Microprocessing



Applications Labs Worldwide



Worldwide Application Lab Locations



Our laser applications labs provide state-of-the-art feasibility testing of material processing methods. Please contact your Coherent representative or Coherent sales office for more information. For contact information, please go to page 50.

ExciStar XS

Excimer Lasers



ExciStar XS excimer lasers are tabletop systems with an ultra-compact design for easy installation and operation. Due to the integration of the Almeta XS tube design, they deliver excellent results in low pulse energy applications.

Featuring soft corona preionization, the ExciStar XS provides a homogeneous energy distribution and high pulse-to-pulse stability. Solid-state switching provides immediate and maintenance-free operation, and units are available with maximum repetition rates of 200 Hz and 500 Hz.

Excistar XS

Excimer Lasers

Key Features

- Ultra-Compact
- Lightweight Design
- Almeta XS Tube Design

- Corona Preionization
- Solid-State Switch

- Energy Monitor

Customer Benefits

- Low investment costs
- Flexible integration
- Extended tube lifetime
- High pulse-to-pulse stability
- Available at 157 nm, 193 nm, 248 nm and 351 nm wavelengths
- Homogeneous beam profile
- Immediate operation
- Maintenance-free operation
- Preset stabilized energy operation

Specifications

	Wavelength (nm)	Excistar XS 200/ Excistar XS 200 e-mon	Excistar XS 500/ Excistar XS 500 e-mon
Max. Pulse Energy (mJ)	157	2	2
	193	10	10
	248	12	12
	351	5	5
Stabilized Pulse Energy (W)	157	1	1
	193	5	5
	248	8	8
	351	4	4
Average Pulse Power (W) (1)	157	0.2	0.5
	193	1	2.5
	248	1.6	4
	351	0.8	2
Energy Stability (sigma, %)	All	<2	<3
Maximum Repetition Rate (Hz)	All	200	500
Pulse Duration (typ., ns)	All	5	5
Beam Dimension (FWHM, VxH, mm ²)	All	6 x 3	6 x 3
Beam Divergence (FWHM, VxH, mrad ²)	All	<3 x 1.5	<3 x 1.5
Part-No. (for all wavelengths)	All	1171094 (without e-mon)	1171095 (without e-mon)
		1171096 (including e-mon)	1171097 (including e-mon)

Weight/Utilities/ Dimensions

Weight	58 kg / 128 lbs.
Cooling	Air-cooled
Electrical	230 V, 50 or 60Hz, 2000VAC, 16A (recommended external fuse), single phase
Dimensions (L x W x H)	649 x 300 x 400 mm (25.6 x 11.8 x 15.7 in.)

¹ Measured at stabilized energy and maximum repetition rate.

IndyStar

Excimer Lasers



The IndyStar Series represents a compact laser series for applications needing high repetition rates up to 2000 Hz and low pulse energy. Available for 193 nm and 248 nm, it combines the demanding requirements of a semi-S2-certification with an extended components lifetime.

The IndyStar from Coherent is setting new standards for components lifetime in industrial applications. Based on the Almeta-tube-technology, the IndyStar achieves lifetimes of many billion pulses, resulting in a reduction of the overall costs of operation.

The success of a UV-laser application depends on high performance, reliability, easy process integration, safety and fast-response support from your laser supplier. Coherent knows that at the core of your business is your process device and its heart is the laser. The IndyStar series is engineered to meet the demands in every aspect of an industrial laser.

Accessories	Part No.	Product Description
	1285557	External Heat Exchanger KB200VE Pro – 19"; cooling capacity 2 kW; water-to-air

IndyStar

Excimer Lasers

Key Features

- Industrial Design with Semi-S2-certificate
- Corona Preionization
- Solid-State Pulser
- AlmetaTube Technology
- Modified Electronic Concept
- Integrated Energy Monitor
- Compact Design, Single Phase, Advanced Service Concept

Customer Benefits

- High uptime
- Low maintenance
- Homogeneous beam profile
- “Soft” discharge for better pointing and energy stability
- No warm-up time, maintenance-free
- All metal sealed tube design
- Extended lifetimes for many billion pulses
- Proven design
- “POWERLOK” function integrated
- Lowest jitter by “TIMELOK” function
- Laser operation at preset stabilized energy
- Quick and easy integration

Specifications	Parameter	ArF	ArF	KrF	KrF
	Wavelength (nm)	193	193	248	248
	Max. Repetition Rate (Hz)	1000	2000	1000	2000
	Stabilized Pulse Energy (mJ)	8	4	12	6
	Stabilized Pulse Power (W)	8	8	12	12
	Energy Stability (sigma, %)	<2	<2	<2	<2
	Beam Dimensions (FWHM, V x H, mm ²)	6 x 2.7	5.7 x 2.3	5.8 x 2.8	5.8 x 2.7
	Beam Divergence (FWHM, V x H, mrad ²)	<3.5 x 1.5	<3.5 x 1.5	<3.0 x 2.3	<3.5 x 1.5
	Pulse Duration (FWHM)(ns)	5 ±2	4 ±1	6 ±2	4 ±1
	Part No.	IndyStar 193 1 kHz 1166017	IndyStar 193 2 kHz 1162918	IndyStar 248 1 kHz 1166018	IndyStar 248 2 kHz 1166016
Weight/Utilities/ Dimensions	Weight	135 kg/298 lbs.			
	Cooling				
	1 kHz-version	Air-cooled; water-cooling optionally			
	2 kHz-version	Water-cooled			
	Electrical	230V, 50/60 Hz, 2000 VAC, 16A (recommended external fuse), single or two phases			
	Dimensions (L x W x H)	974 x 381 x 838 mm (38.35 x 14.96 x 32.95 in.)			

COMPexPro

Excimer Lasers



COMPexPro lasers are highly effective light sources, featuring a compact design and easy installation and operation. They deliver superior results in demanding applications, such as solid sampling systems (LA-ICP-MS), material research (PLD) and precise material processing.

Featuring new ceramic preionization, the COMPexPro provides multi-hundred millijoules output, plus unmatched pulse-to-pulse stability. The COMPexPro also comes with an improved gas processor that extends both gas and optics lifetimes.

Accessories	Part No.	Product Description
	26082610	Unstable Resonator Optics 193 nm (COMPexPro 50)
	1280255	Unstable Resonator Optics 193 nm (COMPexPro 100)
	26082710	Unstable Resonator Optics 248 nm (COMPexPro 50 and 100)
	26082810	Unstable Resonator Optics 308 nm (COMPexPro 100)
	26083010	Unstable Resonator Optics 193 nm (COMPexPro 200)
	26083110	Unstable Resonator Optics 248 nm (COMPexPro 200)
	26083210	Unstable Resonator Optics 308 nm (COMPexPro 200)
	262456	Unstable Resonator Adapter (COMPexPro 50, 100 and 200)
	1149339	Beam Aligner
	1132990	Temperature Stabilization Module

COMPexPro

Excimer Lasers

Key Features

- Ceramic Preionization
- Integrated Vacuum Pump and Halogen Filter
- Integrated, Purgable Energy Monitor
- Air-Cooled (up to 20 Hz), Single-Phase

Customer Benefits

- Unmatched pulse-to-pulse stability
- Increased pulse energy
- Increased static gas lifetime
- Compact standalone design
- Preset stabilized energy operation
- Quick and easy integration

Specifications

	Wavelength ¹ (nm)	COMPexPro 50	COMPexPro 102	COMPexPro 110	COMPexPro 201	COMPexPro 205
Maximum Pulse Energy ¹ (mJ)	193	100	200	200	400	400
	248	150	400	400	700	700
	308	-	250	250	500	500
	351	-	150	150	300	300
Maximum Average Power ² (W)	193	4	4	12	4	15
	248	7	7	30	7	30
	308	-	5	16	4	20
	351	-	3	12	3	15
Maximum Repetition Rate (Hz)	All	50	20	100	10	50
Pulse Duration (FWHM, ns, typ.)	All	20	20	20	25	25
Energy Stability (sigma, %)	All	1	1	1	1	1
Beam Dimensions (FWHM, V x H, mm ² , typ.)	All	14 x 5	24 x 10	24 x 10	24 x 10	24 x 10
Beam Divergence (FWHM, V x H, mrad ² , typ.)	All	2 x 1	3 x 1	3 x 1	3 x 1	3 x 1
Part No. (F-Version)	All	1124409	1113836	1113838	1115129	1115131
Part No. (XeCl-Version)	All	-	1113837	1113839	1115130	1115132

Weight/Utilities/ Dimensions

Weight	
COMPexPro 50/100	270 kg/591 lbs.
COMPexPro 200	325 kg/716 lbs.
Cooling	Water, 2 to 3 l/min. (0.5 to 0.8 gal./min.), 15 to 20°C, required for repetition rates above 20 Hz
Electrical	230 V ±10%, 16 A (50/60 Hz, 1-Phase) 208 V ±10%, 16 A (50/60 Hz, 1-Phase) 120 V ±10%, 25 A (50/60 Hz, 1-Phase) 104 V ±10%, 25 A (50/60 Hz, 1-Phase)
Dimensions (L x W x H)	
COMPexPro 50/100	1282 x 375 x 793 mm (51 x 15 x 31 in.)
COMPexPro 200	1682 x 375 x 793 mm (67 x 15 x 31 in.)

¹ Measured at 10 Hz.

² Measured at maximum repetition rate.

BraggStar M

Excimer Lasers



The BraggStar M delivers high pulse energy and great spatial coherence for Fiber Bragg Grating (FBG) writing. High pulse energy is a critical advantage in some FBG writing applications, and high spatial coherence is always beneficial since it enables creation of FBGs with higher contrast and/or longer length.

The BraggStar M uses a coherence enhanced optical design at the typical FBG-wavelength of 248 nm

resulting in significantly higher spatial coherence compared to conventional broad-use excimer lasers. It stands out due to its compact design and the ease of operation. The new BraggStar M builds on the field-proven COMPex platform with more than 2500 installed units worldwide specifically designed for high reliability and longevity.

Accessories	Part No.	Product Description
	1149339	Beam Aligner
	1132990	Temperature Stabilization Module
	262856	Upgrade Kit VCR (VCR gas connections instead of regular Gyrolok)

BraggStar M

Excimer Lasers

Key Features

- Coherence Optimized Resonator
- Compact Design, Air-Cooled (up to 20 Hz), Single Phase
- Ceramic Preionization

Customer Benefits

- Enables the writing of large area high contrast FBGs
- Ease of operation
- Quick and easy integration
- Unmatched pulse-to-pulse stability
- Increased static gas lifetime

Specifications	Wavelength (nm)	248
	Pulse Energy ¹ (mJ)	140
	Average Power ² (W)	12
	Maximum Repetition Rate (Hz)	100
	Pulse Duration (ns, typ.)	20
	Energy Stability (1 sigma, %)	1
	Beam Dimensions (FWHM, V x H, mm ² , typ.)	12 x 4.5
	Beam Divergence (FWHM, V x H, mrad ² , typ.)	≤0.3 x 0.2
	Spatial Coherence (short axis, FWHM, μm, typ.)	800
	Part No.	1213132
Weight/Utilities/ Dimensions	Weight	270 kg/591 lbs.
	Cooling	Water, 2 to 3 l/min. (0.5 to 0.8 gal./min.), 15 to 20°C, required for Repetition Rates above 20 Hz
	Electrical (50/60 Hz, 1-Phase)	230 V ±10%, 16 A
		208 V ±10%, 16 A
		120 V ±10%, 25 A
	Dimensions (L x W x H)	1282 x 375 x 793 mm (67 x 15 x 31 in.)

¹ Measured at 10 Hz.

² Measured at maximum repetition rate.

Laser Selection Guide

Applications

Excimer Lasers

UV Optical Systems

Customer Support

LMC Accessories

LPXpro

Excimer Lasers

Laser Selection Guide

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LMC Accessories



LPXpro is a family of RoHS compliant excimer lasers, offered at wavelengths of 193 nm, 248 nm, 308 nm and 351 nm, with output powers as high as 80W at 248 nm. The LPFpro family expands wavelength range to vacuum UV with 157 nm. The beam quality, high pulse energy, short pulse length, and high peak power of LPXpro and LPFpro lasers combine to optimize UV applications.

These characteristics, plus their proven reliability and low cost of ownership, make LPXpro lasers suitable for a wide range of demanding, high precision processing tasks. These include drilling, pulsed laser deposition (PLD), laser direct patterning (LDP), laser lift off (LLO) and cleaning.

Accessories	Part No.	Product Description
	26083020	Unstable Resonator Optics 193 nm (external resonator configuration)
	26083120	Unstable Resonator Optics 248 nm (external resonator configuration)
	26083220	Unstable Resonator Optics 308 nm (external resonator configuration)
	26083320	Unstable Resonator Optics 351 nm (external resonator configuration)
	26083010	Unstable Resonator Optics 193 nm (LPXpro 240)
	26083110	Unstable Resonator Optics 248 nm (LPXpro 240)
	262856	Upgrade Kit VCR Gas Connections
	1218314	Beam Aligner

LPXpro

Excimer Lasers

Key Features

- Adaptable Resonator Configuration
- Flexible Pulse Energy
- F-version
- C-version
- True Specs
- Internal Burst Generator
- Rugged Laser Frame
- Longest Gas Life

Customer Benefits

- Fit to application requirements
- Advanced process control
- 193 nm, 248 nm, 351 nm operation
- 308 nm operation
- Reliable long-term operation
- Programmable laser pulses
- Unmatched beam stability
- Low operation costs

Specifications

	Wavelength ¹ (nm)	LPXpro 210	LPXpro 220	LPXpro 240	LPXpro 305	LPFpro 205	LPFpro 220
Max. Pulse Energy (mJ) up to 10 Hz	157	-	-	-	-	50	40
	193	450	300	160	600	400	250
	248	800	550	300	1100	-	-
	308	500	300	-	700	-	-
	351	400	-	-	400	-	-
Max. Stabilized Pulse Energy (mJ) at Full Repetition Rate	157	-	-	-	-	-	-
	193	300	250	80	400	-	-
	248	700	400	160	800	-	-
	308	450	275	-	600	-	-
	351	200	-	-	300	-	-
Max. Rep. Rate (Hz)	all	100	200	300/400 ²	50	50	200
Max. Stabilized Average Power (W) at Full Repetition Rate	157	-	-	-	-	2.5 ³	7 ³
	193	30	50	24	20	15 ³	40 ³
	248	70	80	64	40	-	-
	308	45	55	-	30	-	-
	351	20	-	-	15	-	-
Energy Stability (at 5 Hz, 1 sigma, %)	248	≤1	≤1	≤2	≤1	≤10 ⁴	≤10 ⁴
Pulse Duration (FWHM, ns, typ.)	248	25	20	15	25	-	-
Avg. Beam Dimensions (V x H, FWHM, mm ² , typ.)	248	12 x 24	8 x 24	8 x 22	12 x 30	10 x 24 ⁴	10 x 24 ⁴
Beam Divergence (V x H, FWHM, mrad ² , typ.)	248	≤1 x 3	≤1 x 3	≤1 x 3	≤1 x 3	≤2 x 6 ⁴	≤2 x 6 ⁴
Part No. (F-Version, 400V)		1120125	1120129	1152299	1120133	1120137	1120139
Part No. (F-Version, 208V)		1120126	1120130	1152300	1120134	1120138	1120140
Part No. (C-Version, 400V)		1120127	1120131	-	1120135	-	-
Part No. (C-Version, 208V)		1120128	1120132	-	1120136	-	-

Weight/Utilities/ Dimensions

Weight	
LPFpro/LPXpro 200	400 kg/880 lbs.
LPXpro 305	430 kg/946 lbs.
Cooling	Water, ≤7 l/min. (1.8 gal./min.), 15 to 20°C
Electrical	208 or 400 VAC, 50/60 Hz, 3-phase
Dimensions (L x W x H)	
Laser Head	1966 x 800 x 475 mm (77 x 32 x 19 in.)
Power Supply	750 x 460 x 185 mm (30 x 18 x 7 in.)

¹ 157 nm with LPFpro only; 193 nm, 248 nm, and 351 nm with LPXpro F-version only; 308 nm with LPXpro C-version only.

² At 193 nm (300 Hz only).

³ Max. average power at maximum high voltage. Max. stabilized power not specified for LPFpro.

⁴ At 157 nm.

LEAP

Excimer Lasers



LEAP is a series of high duty-cycle excimer lasers, offered at wavelengths 248 nm and 308 nm, with output powers as high as 130W. The beam quality, high stabilized pulse energy of 650 mJ, short pulse length and high peak power of LEAP lasers combine to optimize UV manufacturing applications. These

characteristics, plus their reliability and economy, make LEAP lasers suitable for a wide range of demanding, high-precision processing tasks. These include micro drilling and structuring, laser direct patterning (LDP), and surface treatment.

Accessories	Part No.	Product Description
	1150265	Fork Lift Slot Set
	1150266	Transportation Wheels
	1138927	Unstable Resonator Optics 248 nm (LEAP 130K)

LEAP

Excimer Lasers

Key Features

- Short UV wavelength, 308 nm or 248 nm
- Stabilized high UV-pulse energies up to 650 mJ
- Large range of pulse energy and repetition rate
- High average power of 130W
- Long-Life-Design - uncompromised longevity

Customer Benefits

- Precise “cold” ablation with micron resolution
- Efficient processing with large area per pulse
- Cost efficient operation in many applications
- Large area processing with reduced TACT Time
- Solid-state laser excitation

Specifications

	LEAP 130K	LEAP 130C
Wavelength (nm)	248	308
Stabilized Pulse Energy Range (mJ)	550 to 650	550 to 650
Maximum Stabilized Average Power (W)	130	130
Maximum Repetition Rate (Hz)	200	200
Energy Stability (sigma, %)	≤1.5	≤1.5
Pulse Duration (FWHM)(ns)	28	22
Average Beam Dimensions (V x H, FWHM, mm ² , typ.)	33 x 12	33 x 14
Beam Divergence (V x H, FWHM, mrad)	≤4.5 x 1.5	≤4.5 x 1.5
Dynamic Gas Lifetime (at max. stabilized energy) (mio. pulses)	>30	>30
Part No. (200/208V)	1165692 LEAP 130K Excimer Laser 248 nm; 200/208V	1165693 LEAP 130C Excimer Laser 308 nm; 200/208V
Part No. (400V)	1165694 LEAP 130K Excimer Laser 248 nm; 400V	1165695 LEAP 130C Excimer Laser 308 nm; 400V
Weight/Utilities/ Dimensions		
Weight	850 kg/1874 lbs.	
Cooling	Water, 20 l/min. (37 gal./min.), 19 to 21°C	
Electrical	8.6 kVA, 3-phase, 200/208 VAC or 400 VAC, 50/60 Hz	
Dimensions (L x W x H)	2415 x 800 x 1130 mm ³ (95.1 x 31.4 x 44.5 in. ³)	

LAMBDA SX

Excimer Lasers

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The LAMBDA SX industrial excimer laser series provides unique high UV power to the production floor. It is designed to deliver the best energy stability available, and also features a number of innovative technologies for unsurpassed performance and reliability.

PowerLok

The proprietary PowerLok technology brings every pulse of a burst train to the desired energy level. It employs a self-learning algorithm, using a look-up table to smooth out cycling bursts. PowerLok is available on 300 Watts class models.

TimeLok

The proprietary TimeLok technology stabilizes the trigger-to-pulse delay of all solid-state HV switch-driven excimer lasers and minimizes the time jitter. It also employs a self-learning algorithm, using a look-up table for delay stabilization in any operation mode.

Onboard Logging/ExiScope

Laser parameters like HV, energy and sigma are recorded in data files. These files can easily be analyzed by the optional ExiScope software in order to track and improve laser performance. ExiScope serves as a virtual scope for evaluation of complex information available from the laser data files. Furthermore, the lasers can optionally be equipped with pulse shape analysis modules consisting of fast photo diode and digitizer module.

Optional Remote Beam Adjustment

LAMBDA SX lasers can optionally be equipped with motorized optics mounts which allow remote adjustment of the laser resonator by hand-held terminal. LAMBDA SX lasers are designed for 400VAC 3-phase with Neutral line supply. Mains cable is not supplied. Transformers to be configured for 190, 200, 208, 220, 360, 380, 420, 440, and 480VAC 3-phase line voltage are optionally available.

Accessories	Part No.	Product Description
	1258993	Analysis Software ExiScope
	1269634	Additional EMO Button Guard, SEMI
	1180124	15 meter Cable for Hand-held Terminal (5 meter cable comes with laser)
	1232579	Pulse Shape Analysis Module incl. Fast Photodiode and Digitizer
	1224269	Fast Photodiode Mounted (external Oscilloscope required)
	1270173	Mains Cable LAMBDA SX, 30 kVA, 25m
	1228700	Mains Cable LAMBDA SX, 60 kVA, 25m
	1136303	STEP UP TRANSFORMER 30 kVA
	1136304	STEP UP TRANSFORMER 60 kVA

LAMBDA SX K-Series and C-Series

Excimer Lasers

Key Features

- Industrial Design
- Industrial Interfaces
- Sealed and Purged Beam Path
- Highest UV Laser Power
- Adjustable Pulse Energy

Customer Benefits

- Rugged and reliable
- Unmatched laser beam stability
- Integrated industrial PC
- Ethernet interface
- Direct Control Port (DCP) hard wired interface
- Long optics lifetimes
- Lowest costs per Watt UV
- Advance process control

The K-Series and C-Series LAMBDA SX lasers are multi-purpose KrF and XeCl excimer lasers, respectively, providing 248 nm or 308 nm high power UV. The lasers are

ideal for high throughput micro structuring, industrial Pulsed Laser Deposition, Laser Lift-Off, and more.

Specifications¹

	LAMBDA SX K300	LAMBDA SX C300	LAMBDA SX C600
Wavelength (nm)	248	308	308
Maximum Stabilized Pulse Energy (mJ)	1000	1000	1000
Maximum Stabilized Average Power (W)	300	300	600
Maximum Repetition Rate (Hz)	300	300	600
Energy Stability (sigma, %)	≤1.2	≤1	≤1
Pulse Duration (FWHM)(ns)	32 ±5	29 ±5	24 ±4
Beam Dimensions ² (FWHM, V x H, mm ²)	34 ±3.5 x 14 ±2	35 ±3.5 x 13 ±2	35 ±4 x 14.5 ±3
Beam Divergence (FWHM, V x H, mrad ²)	≤4.5 x 1.5	≤4.5 x 1.5	≤4.5 x 1.5
Dynamic Gas Lifetime (at max. stabilized energy)(mio. pulses)	40	60	60
Part No.	1232152 LAMBDA SX K300, 400 VAC, 50/60 Hz	1273596 LAMBDA SX C300, 400 VAC, 50/60 Hz	1232149 LAMBDA SX C600, 400 VAC, 50/60 Hz

Weight/Utilities/ Dimensions

Weight	2000 kg/4409 lbs.	2100 kg/4630 lbs.	2200 kg/4850 lbs.
Cooling	Water, 1 to 25 l/min. (0.3 to 6.6 gal./min.), 10 to 15°C	Water, 3 to 28 l/min. (0.8 to 7.4 gal./min.), 10 to 15°C	Water, 3 to 70 l/min. (0.8 to 18.5 gal./min.), 12 to 15°C
Electrical	19 kVA, 3-phase, 400 VAC, 50/60 Hz	22 kVA, 3-phase, 400 VAC, 50/60 Hz	40 kVA, 3-phase 400 VAC, 50/60 Hz
Dimensions (L x W x H)	2800 x 850 x 2083 ³ mm (110.2 x 33.3 x 82 in.)	2800 x 850 x 2083 ³ mm (110.2 x 33.3 x 82 in.)	2800 x 850 x 2083 ³ mm (110.2 x 33.3 x 82 in.)

¹ All specifications are subject to change without prior notice in order to provide the best product possible.

² Beam dimensions measured at 1.0m from beam exit.

³ ±20 mm (0.8 in.).

LAMBDA SX-Series Hand-held Control Panel



LAMBDA SX for Excimer Laser Annealing

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The LAMBDA SX E-Series is specially designed for Excimer Laser Annealing (ELA) at 308 nm. The high quality demand in OLED and high resolution LCD display manufacturing requires high grade low temperature poly-Silicon (LTPS) which can be created only with high performance excimer lasers.

LAMBDA SX for Excimer Laser Annealing

Excimer Lasers

Key Features

- Best Pulse Stability
- Stable Beam Parameter

Customer Benefits

- High annealing homogeneity
- High annealing yield

Specifications¹

	LAMBDA SX E300	LAMBDA SX E500
Wavelength (nm)	308	308
Maximum Stabilized Pulse Energy (mJ)	1050	1000
Maximum Stabilized Average Power (W)	315	500
Maximum Repetition Rate (Hz)	300	500
Energy Stability (sigma, %)	≤0.8	≤0.45
Pulse Duration (FWHM)(ns)	29 ±5	24 ±4
Beam Dimensions ² (FWHM, V x H, mm ²)	35 ±3.5 x 13 ±2	35 ±4 x 14.5 ±3
Beam Divergence (FWHM, V x H, mrad ²)	≤4.5 x 1.5	≤4.5 x 1
Dynamic Gas Lifetime (at max. stabilized energy) (mio. pulses)	60	60
Part No.	1232150 LAMBDA SX E300, 400 VAC, 50/60 Hz	1232151 LAMBDA SX E500, 400 VAC, 50/60 HZ

Weight/Utilities/ Dimensions

Weight	2100 kg/4630 lbs.	2200 kg/4850 lbs.
Cooling	Water, 3 to 28 l/min. (3.2 to 6.6 gal./min.), 10 to 15°C	Water, 3 to 70 l/min. (3.2 to 6.6 gal./min.), 10 to 15°C
Electrical	22 kVA, 3-phase, 400 VAC, 50/60 Hz	40 kVA, 3-phase, 400 VAC, 50/60 Hz
Dimensions (L x W x H)	2800 x 850 x 2083 ³ mm (110.2 x 33.3 x 82 in.)	2800 x 850 x 2083 ³ mm (110.2 x 33.3 x 82 in.)

¹ All specifications are subject to change without prior notice in order to provide the best product possible.

² Beam dimensions measured at 1.0m from beam exit.

³ ±20 mm (0.8 in.).

LAMBDA SX-Series Hand-held Control Panel



VYPER

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The VYPER is a double beam or quad beam (TwinVYPER) very high power excimer laser specially designed for Excimer Laser Annealing (ELA). The high quality demand in high resolution mobile display manufacturing requires high grade low temperature poly-Silicon (LTPS) which can be created only with high performance excimer lasers. The VYPER laser fits perfectly to the high power LineBeam 750 and 1300 (TwinVYPER) optics.

TimeLok/EquiSwitch

The proprietary TimeLok and EquiSwitch technologies synchronize the two laser beams perfectly to a deviation of below 5 ns.

Onboard Logging/ExiScope

Laser parameters like HV, energy and sigma are recorded in data files. These files can easily be analyzed

by the optional ExiScope software in order to track and improve laser performance. ExiScope serves as a virtual scope for evaluation of complex information available from the laser data files. Furthermore, the lasers can optionally be equipped with pulse shape analysis modules consisting of fast photo diode and digitizer module.

Optional Remote Beam Adjustment

VYPER lasers can optionally be equipped with motorized optics mounts which allow remote adjustment of the laser resonator by hand-held terminal.

VYPER lasers are designed for 2x400VAC or 4x400VAC (TwinVYPER) 3-phase with Neutral line supply. Mains cables are not supplied. Transformers to be configured for 190, 200, 208, 220, 360, 380, 420, 440, and 480VAC 3-phase line voltage are optionally available.

Accessories	Part No.	Product Description
	1226717	Analysis Software ExiScope
	1269634	Additional EMO Button Guard, SEMI
	1187052	Cable Duct, 160 x 80 x 1200 mm
	1224269	Fast Photodiode Mounted (external Oscilloscope required)
	1255022	Motorized Optics Modules VYPER
	1202009	Pulse Shape Analysis Module incl. Fast Photodiode and Digitizer
	1207313	Upgrade Kit, 1200 Hz Operation, VYPER
	1180124	15 meter Cable for Hand-held Terminal (5 meter cable comes with laser)
<i>Two transformers / mains cables per VYPER required.</i>		
	1228700	Mains Cable LAMBDA SX, 60 kVA, 25m
	1136304	STEP UP TRANSFORMER 60 kVA

VYPER

Excimer Lasers

Key Features

- Highest UV pulse energy of 2 Joule/4 Joule at 600 Hz repetition rate
- Best energy stability
- Rugged field proven technology
- TimeLok trigger-to-pulse stabilization
- Hand-held terminal with advanced laser-control software
- Interface for full remote control
- Purged external resonator design for long-life laser optics and optimum beam-pointing stability
- Maintenance-free solid-state switch
- Onboard data recording

Specifications	VYPER	TwinVYPER
Wavelength (nm)	308	308
Maximum Stabilized Pulse Energy (mJ)	2000	4000
Maximum Stabilized Average Power (W)	1200	2400
Maximum Repetition Rate (Hz)	600	600
Energy Stability (sigma, %)	≤0.45	≤0.45
Pulse Duration (FWHM)(ns)	24 ±4	24 ±4
Average Beam Dimensions (FWHM, V x H, mm ²)	35 ±4 x 14.5 ±3 (2x)	35 ±4 x 14.5 ±3 (4x)
Beam Divergence (FWHM, V x H, mrad ²)	≤4.5 x 1.3 (2x)	≤4.5 x 1.3 (4x)
Dynamic Gas Lifetime (at max. stabilized energy)(mio. pulses)	100	100
Part No.	1254976 VYPER, 400 VAC 50/60 Hz	1258061 TwinVYPER, 50/60 Hz
Weight/Utilities/ Dimensions		
Weight	4400 kg/9700 lbs.	8800 kg/19,400 lbs.
Cooling	Water, up to 2x 70 l/min. (18.5 gal./min.), 12 to 15°C	Water, up to 4x 70 l/min. (18.5 gal./min.), 12 to 15°C
Electrical	2x 39 kVA, 3-phase, 400 VAC, 50 or 60 Hz	4x 39 kVA, 3-phase, 400 VAC, 50 or 60 Hz
Dimensions (L x W x H)	2800 x 1700 x 2085 mm (110 x 66.9 x 82 in.)	2800 x 1700 x 2085 mm (110 x 66.9 x 82 in.)

On-Site Requirements

Excimer Lasers



On-site preparation is required before an excimer laser can be installed. The following is a brief overview. For detailed information, please refer to the Site Preparation Manual, which is available from your Coherent representative.

Power Supply

Excimer laser power requirements vary by model and can be either single-phase (115V, 50/60 Hz or 230V, 50/60 Hz) or three-phase (200/208V, 50/60 Hz or 400V, 50/60 Hz).

To determine the power requirements and wall-plug configuration for a particular model, please refer to the laser specifications.

Gas Supply

The active medium of an excimer laser is a mixture of a rare gas (argon, krypton or xenon), a halogen (fluorine or hydrogen chloride), and a buffer gas (helium or neon). In addition to the premixed gas, another gas (in most cases, nitrogen) is needed to purge the laser beam and, for certain service procedures, a flush gas (helium) is also required. For more information about gas handling and installation, please refer to the site preparation manual.

Cooling

Excimer lasers have overall efficiencies of about 2% or 3%. Most of the dissipated electrical energy of the laser discharge is transformed into heat. Low duty cycle excimer lasers are usually air-cooled. However, at medium to high powers and a high duty cycle, most excimer lasers need water or external heat exchangers for cooling. For information about individual laser cooling requirements, please ask for detailed specifications about a system.

Exhaust Ventilation

At the installation site, the laser system must be connected to an exhaust ventilation system. COMPexPro, LPXPro, LAMBDA SX, and VYPER have their own ventilation fans, which guarantee the required negative pressure. For detailed information about individual exhaust ventilation requirements, please refer to the Site Preparation Manual.

Beam Path Purging

Excimer laser operation at 157 nm and 193 nm requires purging of the beam path with nitrogen in order to avoid absorption by ambient air.

UV Optical Systems, Modules and Components

UV Optical Systems

Customized Optical Systems for a wide range of R&D applications.



Modular System Approach

UV optical systems usually include a set of blocks that form the illumination beam path and the imaging beam path. The optical system shapes and homogenizes the laser radiation to illuminate a mask that contains the desired pattern. This mask, whose pattern can easily be changed, is then imaged with a projection lens onto the substrate.

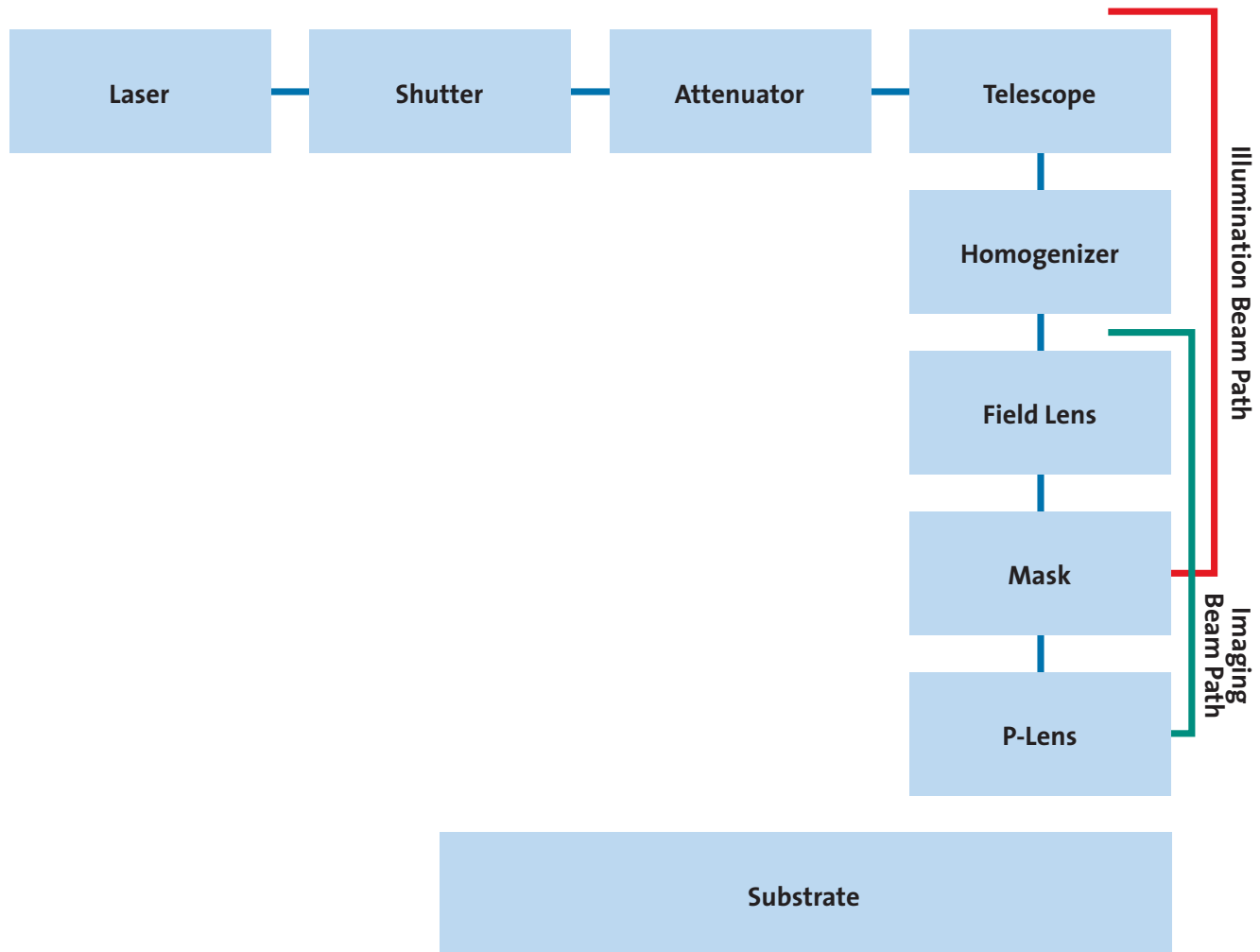
Using this technique provides an easy way to build dedicated optical beam delivery systems for a wide range of applications.

In addition to our optical and laser products, we also perform feasibility studies, application lab sample preparation/testing, and offer small-scale job shop opportunities to customers around the world.

UV Optical Systems, Modules and Components

UV Optical Systems

Functional Blocks



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UVblade

Systems for Laser Lift-Off Applications

UVblade380



Laser lift-off is the key technology in manufacturing flexible digital displays where thin-film transistor device structures are typically fabricated directly onto a polymer layer that has been spun on a glass substrate.

UVblade selectively detaches the polymer-based displays of all types from their rigid glass carriers. UVblade supports glass substrate generations up to Gen 8.

UVblade750



UVblade

Systems for Laser Lift-Off Applications

Key Features

- Cost effective laser optical solutions for Laser Lift-Off (LLO)
- Single shot processing
- Highest beam utilization
- Homogeneous energy distribution
- Includes Coherent excimer laser

Specifications ¹	UVblade250	UVblade380	UVblade465	UVblade750
Wavelength (nm)	308	308	308	308
Laser Pulse Energy (mJ)	580	580	900	950
Repetition Rate (Hz)	200	200	300	300
Energy Density Plateau ¹ (mJ/cm ²)	270	235	235	235
Beam Length ² (mm)	250	380	465	750
Beam Width ² (μm)	400	300	400	250
Homogeneity Long Axis ²	≤1.8%, 2 sigma	≤1.8%, 2 sigma	≤1.8%, 2 sigma	≤1.8%, 2 sigma
Steepness Short Axis (μm)	≤100	≤70	≤70	≤70
Depth of Focus (DOF)(μm)	±200	±200	±150	±100

Options

BeamScout Beam Profiler Package

¹ EDp measured at FWHM of small axis.

² More details on specs on request.

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LineBeam

Systems for Excimer Laser Annealing

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TwinVYPER excimer laser
with LB1300 beam delivery

LineBeam for Excimer Laser Annealing (ELA) of typically 50 nm to 120 nm thick amorphous silicon films on large flat panel display glass substrates transferred into industrial production in the mid 90s.

This technique is progressing to even longer line beams for annealing larger areas, employing new excimer lasers with more and more pulse energy.

LineBeam

Systems for Excimer Laser Annealing

Key Features

- Excellent beam profile homogeneity
- Outstanding optical lifetime performance
- Display industry proven technology, large installation base world wide
- Standard technology for silicon annealing process (LTPS-LCD, OLED)

Specifications	LineBeam	LB465	LB750	LB1000	LB1300
Wavelength (nm)		308	308	308	308
Laser Pulse Energy (mJ)		1050	2000	4000	4000
Energy Density (mJ/cm ²)					
Specification		≥350	≥430	≥435	≥435
Typical Value		460	500	490	490
Beam Length (mm)		465	750	1000	1300
Beam Width (μm)		350	400	580	450
Homogeneity Long Axis					
Specification		≤1.8%, 2 sigma	≤1.8%, 2 sigma	≤1.8%, 2 sigma	≤1.8%, 2 sigma
Typical Value		≤1.1%, 2 sigma	≤1.0%, 2 sigma	≤1.0%, 2 sigma	≤1.0%, 2 sigma
Steepness Short Axis (μm)		≤125	≤125	≤125	≤125
Depth of Focus (μm)		±150	±150	±120	±120
Options	Micro Smoothing Device Short Axis Fine Tuner Beam Profiler Pulse Expander Module Beam Stabilization Unit Beam Symmetry Generator Short Axis Online Monitor CB E-Sigma Monitor P-Lens Entrance Monitor SB E-Sigma Monitor				

VarioLas Family

UV Optical Systems - Material Processing Systems

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VarioLas UV material processing systems based on the COMPexPro 100 excimer laser series are affordable tools for high quality UV microprocessing. Superior optics design, rugged mechanics and unmatched pulse-to-pulse stability are the key ingredients in each of the VarioLas systems which are available for the common excimer laser wavelengths 193 nm, 248 nm and 308 nm.

machining of all kinds of materials such as polymers, semiconductors, ceramics or glasses.

The VarioLas SWEEP supports scanned, large-area processing with a 50 x 0.6 mm² line beam for applications such as dopant activation of wafers and surface annealing.

VarioLas mask imaging systems ECO and PRO provide micromachining resolutions of 30 µm and 5 µm, respectively, at a field size of 2 x 2 mm² and are ideal for

Accessories

Part No.

Safety Options

1161813	Class 1 Housing
1161812	Automated Safety Class 3 Interlock Circuit
1107556	Automated Beam Shutter for 193 nm
1107557	Automated Beam Shutter for 248 nm
1157558	Automated Beam Shutter for 308 nm

Part No.

Control Options

1161814	Control PC (with monitor)
1161815	Substrate Stage (3-axes incl. substrate chuck)
1161816	Observation Unit (for VarioLasPRO, 193 nm)
1161817	Observation Unit (for VarioLasPRO, 248 nm/308 nm)
1161818	Observation Unit (for VarioLasECO, all wavelengths)
1161819	Motorized Attenuator (upgrade)
1161820	Mot. Attenuator, Energy Control, PRO/ECO, 193 nm
1161821	Mot. Attenuator, Energy Control, PRO/ECO, 248 nm
1161822	Mot. Attenuator, Energy Control, PRO/ECO, 308 nm

VarioLas Family

UV Optical Systems - Material Processing Systems

Key Features

- High Energy Excimer Laser Inside
- Rock Solid Optical and Mechanical Design
- Modular Concept with Upgrading Options

Customer Benefits

- Superior pulse-to-pulse stability
- Largest on-sample fluence range
- Hands-off operation over weeks
- Maintenance-free operation
- Unmatched processing stability
- Customizable from optical beam train to ready-to-use workstation

Specifications¹

	Wavelength	VarioLasECO	VarioLasPRO	VarioLasSWEEP
Field Geometry	All	Square	Square	Line
Mask Field Size (mm ²)	All	20 x 20	20 x 20	-
Substrate Field Size (mm ²)	All	2 x 2	2 x 2	50 x 0.6
Resolution (μm)	All	30	5	-
Working Distance (mm)	All	50	50	150
Maximum Repetition Rate ² (Hz)	All	100	100	100
Maximum Energy Density (mJ/cm ²)	193	1000	1000	230
	248	3500	3500	600
	308	3000	3000	500
Energy Stability (% rms)	193	2	2	2
	248	1	1	1
	308	1	1	1
Pulse Width (ns)	193	15	15	15
	248	20	20	20
	308	20	20	20
Part No. ³	193	1156386	1156390	1156394
	248	1156387	1156391	1156395
	308	1156388	1156392	1156396

Weight/Utilities/ Dimensions

Weight	VarioLas beam delivery system	500 kg/1100 lbs.
	COMPexPro 102/110 laser model	250 kg/551 lbs.
Cooling	Air (if used with COMPexPro 102 laser model) Water, 2 to 3 l/min. (0.5 to 0.8 gal./min.), 15 to 20°C	
Electrical	230V, ±10%, 16A, 50/60 Hz switchable, 1-phase 115V, ±10%, 25A, 50/60 Hz switchable, 1-phase	
Options	20 Hz or 100 Hz COMPexPro 100 laser model	
Dimensions (L x W x H)	3300 x 1200 x 1830 mm (131 x 48 x 73 in.)	

¹ All specifications are typical data and are subject to change without prior notice in order to provide the best product possible.

² With COMPexPro 110 laser model (Maximum 20 Hz with COMPexPro 102 laser model).

³ VarioLas beam delivery requires COMPexPro 102 or 110 laser model.

GeoLasHD

UV Optical Systems - Solid Sampling System for LA-ICP-MS



The GeoLasHD makes the most out of today's advanced mass spectrometers. It provides unmatched energy densities ranging from 1 J/cm^2 up to 50 J/cm^2 for material-independent solid sampling. GeoLasHD uses sophisticated homogenizing optics to ensure accurate and shallow depth control, along with flat-bottom craters. Using 193 nm wavelength in solid

sampling produces smaller particle sizes, highest signal intensities and lowest intrinsic fractionation due to optimum material-light interaction. GeoLasHD has a rigid design which is virtually maintenance-free and allows the user to focus on what he is really interested in – uncompromised solid sampling and data recording day after day.

Accessories

Part No.

Safety Options

1114417	Class 1 Housing
1099616	Manual Mask Slider Assembly
1179091	MMG Sample Cell
2910682	Mass Flow Controller

GeoLasHD

UV Optical Systems - Solid Sampling System for LA-ICP-MS

Key Features

- High Energy 193 nm COMPexPro Inside
- Petrographic Microscope and EAGLE Software Package
- Large Range of Energy Densities
- High Definition Ethernet Camera

Customer Benefits

- Superior pulse-to-pulse stability
- Hands-off operation over weeks
- Superior observation capabilities
- Easy localization of fluid inclusions
- Accurate ablation of all materials
- Precise depth profiling with flat crater bottom
- Micron-Resolution Overview Mapping
- Live Image Observation

Specifications¹

GeoLasHD

Wavelength (nm)	193
Energy Density on Sample (J/cm ²)	1 to 50
Optical Resolution (μm)	1
Spot Size at Sample (μm)	4 to 160
Pulse Stability (% rms)	2
Beam Homogeneity (% rms)	1
Repetition Rate (Hz)	1 to 100
X,Y-Drive Min. Step Size (μm)	0.1
Z-Focus Min. Step Size (μm)	0.1
Part No.	
GeoLasHD	1294980

Weight/Utilities/ Dimensions

Weight	
GeoLasHD system	395kg/871 lbs.
Cooling	Air
Electrical	230V, ±10%, 16A, 50/60 Hz switchable, 1-phase
	115V, ±10%, 25A, 50/60 Hz switchable, 1-phase
Dimensions (L x W x H)	2470 x 1142 x 1440 mm (97 x 45 x 57 in.)

¹ All specifications are typical data and are subject to change without prior notice in order to provide the best product possible.

Components - Attenuator Module

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Attenuator Module, Manual

Variable attenuation substrate $60 \times 35 \times 2 \text{ mm}^3$ with inverse characteristic for high thermal stability. Compensator plate $60 \times 35 \times 2 \text{ mm}^3$ to compensate for any beam displacement. With manual knob and digital scale for accurate transmittance setting. Electromagnetic shutter.

Attenuator Module, Motorized

Variable attenuation substrate $60 \times 35 \times 2 \text{ mm}^3$ with inverse characteristic for high thermal stability. Compensator plate $60 \times 35 \times 2 \text{ mm}^3$ to compensate for any beam displacement. With DC motor and encoder, ATM RS-232 interface module, interface cables, mini-controller and control software for Windows*. Electromagnetic shutter.

Attenuator Module for 157 nm

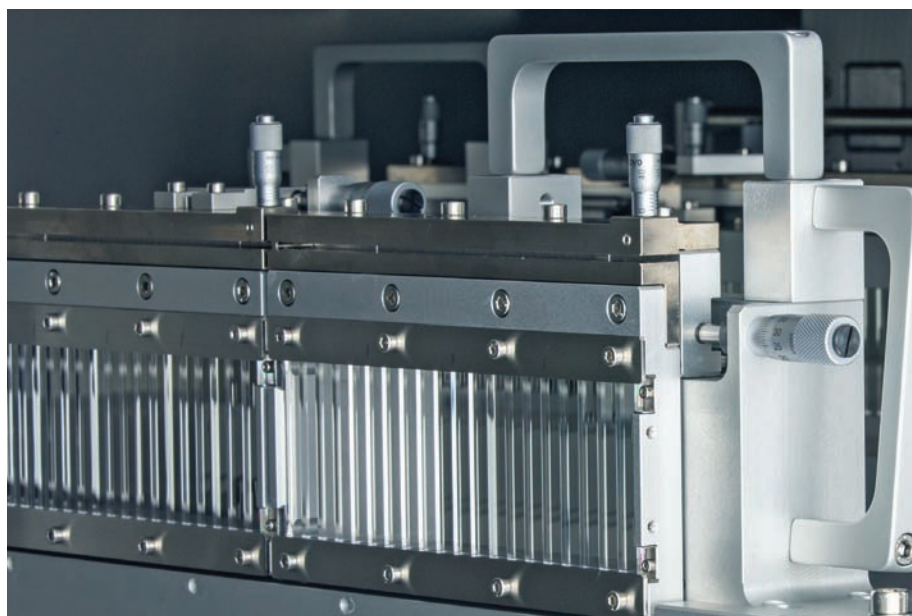
Leak-tight module housing with observation window. Variable attenuation substrate $60 \times 35 \times 2 \text{ mm}^3$ with inverse characteristic for high thermal stability. Compensator plate $60 \times 35 \times 2 \text{ mm}^3$ to compensate for any beam displacement. Manual knob and digital scale for transmittance setting. Electromagnetic shutter. Flanges for tube connections and vacuum exhaust. Purge gas inlet and exhaust gas outlet with gate valve.

* Windows is a registered trademark of Microsoft Corporation.

Specifications	Wavelength (nm)	Attenuator Module, Manual	Attenuator Module, Motorized	Attenuator Module for 157 nm
Part No.	157			1111338
	193	2910218	1116186	
	248	2910216	2910566	
	308	1116181	1116184	
	351	1116182	2910568	

Components - Homogenizers

UV Optical Systems



Superior Optics and Coatings

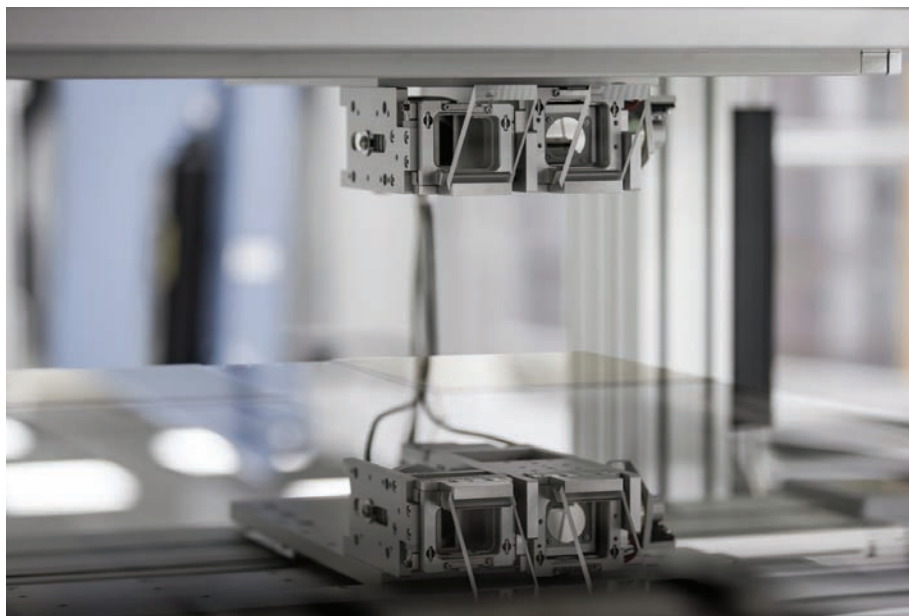
Because excimer lasers produce high-energy pulses of ultraviolet light, the materials used to make the optics must be carefully selected and the optics themselves must be carefully designed. You can rely on our deep knowledge and many years of experience to deliver the exact solutions you need.

Specifications

	Homogenizer 5x5	Homogenizer 10x10	Homogenizer 20x20
Homogenized Field Size (mm)	5 x 5	10 x 10	20 x 20
Zoom	±10%	±10%	±10%
Homogeneity	<±5%	<±5%	<±5%
Field Position	Entrance aperture	Entrance aperture	Entrance aperture
Approx. 600 mm after Homogenizer Exit (depending on wavelength)	32 x 32 mm, overall size entrance-exit approx. 1100 mm (depending on wavelength)	29.6 x 29.6 mm, overall size entrance-exit approx. 1000 mm (depending on wavelength)	29.6 x 29.6 mm, overall size entrance-exit approx. 900 mm (depending on wavelength)
Other versions on request	Field dimensions from 4 x 4 mm up to 200 mm		
Part No.	193 nm	1116198	1116202
	248 nm	1116199	1116203
	308 nm	1116200	1116204
	351 nm	1116201	1116205

Components - Projection Lenses

UV Optical Systems



Specifications	P-lens 4-10x/4-xxx	P-lens 5x/18-xxx	P-lens 5x/30-xxx	Doublet 50-xxx	Doublet 100-xxx
Wavelength (nm)	193 248 308 351	248 308	308	157 193 248 308 351	157 193 248 308 351
Demagnification	4 to 10x (higher demagnification on request)	5x	5x	Variable	Variable
Focal Length (mm)	approx. 100			approx. 50	approx. 100
Image Field Diameter	4 mm	18 mm	30 mm	Depending on wavelength	Depending on wavelength
Numerical Aperture	Depending on wavelength (diffraction-limited for all available wavelengths)	0.13 (diffraction-limited)	0.1 (diffraction-limited)	-	-
Spatial Resolution	3 μ m lines and spaces	2 μ m lines and spaces	2.5 μ m lines and spaces	50 μ m lines and spaces	50 μ m lines and spaces
Working Distance	Depending on wavelength, use of eye piece, and demagnification	Depending on wavelength	Depending on wavelength	Approx. 35 mm	Approx. 70 mm
Tracking Length	Depending on wavelength, use of eye piece, and demagnification	800 mm	1050 mm	Depending on wavelength and demagnification ratio	Depending on wavelength and demagnification ratio
Transmission	>80%	>80%	>80%	-	-
Part No.	157 nm 193 nm 248 nm 308 nm 351 nm	9680011 M290009 1116206 1116207	M290022 M290008	1116211 1116212 1116213 1116214 1116215	1116216 1116217 1116218 2921330 1116219

Service

Productivity Plus Service Agreement



With over 40 years of experience supporting critical laser environments, Coherent knows how important it is to establish lasting partnerships that enable our customers to achieve success today and well into the future. With Coherent's wide range of service products, everything you need is under one roof, designed to safeguard and enhance your investment.

- **Value-based service agreement programs**
- **Custom Service Agreements to meet your unique needs**
- **Factory-trained service engineers across the globe**
- **Knowledgeable technical support that is only a phone call away**
- **On-site and factory-tailored training courses**
- **Certified high quality parts and accessories, consumables and upgrades, all designed exclusively for your Coherent laser along its lifecycles**
- **Customer documents (e.g., detailed manuals)**

The Support you need to stay up and running

The Productivity Plus service agreement provides the highest level of customer care available anywhere. It goes beyond your warranty and guarantees the performance of your system. Productivity Plus (PPlus) protects your productivity and profitability from unexpected downtime and is available for most current Coherent products.

PPlus Service Agreements protect your investment with:

- Priority on-site service
- Preventative maintenance visits
- Unlimited access to the best tech support in the industry

PPlus Service Agreements save you money by:

- Protecting your investment in Coherent products
- Covering parts and labor
- Simplifying service costs

Coherent understands that each operation has its own support needs. We offer you a variety of support plans to choose from.

Productivity Plus	Product Description	PN for 12 month agreement
	ExciStar XS	1169709
	IndyStar	1169710
	BraggStar M	1169717
	COMPexPro	1169717
	LPXpro/LPFpro	1169716

Service

Training Programs



- Fully staffed training department at Coherent Goettingen
- Use the latest in presentation materials and techniques including manuals, video overheads and a fully equipped laboratory for hands-on training experience
- Train, re-train, update/improve FSE skills
- Train, to various levels, OEM FSE in a variety of laser types and applications
- End customer training when requested
- Factory and on site tailored training courses
- Class size restrictions are strictly enforced (max. of 4 trainees per class)

Training Courses	Product Line	A/1 day	A/2 days	AB/4 days	ABC/5 days
	ExciStar XS	1170393	1170393	1170393	1170393
	IndyStar series		1170394	1170394	1170394
	COMPexPro series		1100554	1100554	1100554
	LPXpro/LPFpro series		1100598	1100598	1100598
	Product Line		A/2 days	AB/4 days	ABC/10 days
	LEAP series		1170395	1170395	1170395
	LAMBDA SX series		1154279	1154279	1154279
	VYPER series		1192273	1192273	1192273
	UV Optical Systems		1100604	1100604	1100604

Laser Measurement and Control Accessories

Matrix of Recommendations

	Excistar XS 200 Hz	Excistar XS 500 Hz	IndyStar	COMPexPro/ BraggStar M	LFXpro/ LPFpro	LEAP	LAMBDA SX 300 Hz	LAMBDA SX 600 Hz/VYPER
Power Measurement								
FieldMaxII-TO with PM10X	•	•						
FieldMaxII-TO with PM30X			•					
FieldMaxII-TO with PM150-50XC ¹				•	• ²			
FieldMaxII-TO with PM150X					•	• ²		
FieldMaxII-TO with PM300F-50X						•	• ²	
FieldMaxII-TO with PM1K-100							•	•
Energy Measurement								
FieldMaxII-TOP with J-25MUV-xxx ³	•							
LabMax-TOP with J-25MT-10KHZ		•	• ⁴					
FieldMaxII-TOP with J-50MUV-xxx				• ⁴	• ^{2,4}			
EnergyMax-USB Sensor J-25MUV-193	•							
EnergyMax-USB Sensor J-50MUV-248				• ⁴	• ^{2,4}			

¹ Air cooled operation.

² Depending on laser model and wavelength, limited operation at full power.

³ "xxx = 193" for 157 nm and 193 nm; "xxx = 248" for 248 nm, 308 nm and 351 nm.

⁴ Heat sink required.

FieldMaxII-TOP

1098580

FieldMaxII-TOP meters work with a broad range of thermopile, optical and pyroelectric sensors to measure power from nW to kW and energy from nJ to J in the UV. USB connectivity and PC applications software suite allow live monitoring of multiple meters and statistical analysis.

FieldMaxII-TO Meter

LabMax-TOP Meter



Laser Selection Guide

Applications

Excimer Lasers

UV Optical Systems

Customer Support

LMC Accessories

Laser Measurement and Control Accessories

Matrix of Recommendations

Laser Selection Guide

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LabMax-TOP Meters

LabMax-TOP
1104622

LabMax meters are ideal for anyone who needs to analyze and monitor laser output. Data can be analyzed via statistical and trend analysis and stored in onboard flash memory for future retrieval with the File Manager tool. Alternatively, data can also be processed directly on a PC through USB, RS-232, or by logging data to a USB flash drive attached directly to the meter. Installable applications software and LabVIEW drivers are provided to support PC interfacing. The LabMax display can be positioned at many different angles so customers can place it within the limited bench space typically available in a laser lab and still easily view the display. LabMax-TOP is directly compatible with most Coherent thermal, pyroelectric and semiconductor sensors. Used with EnergyMax sensors, LabMax-TOP can measure nJ to joules and up to 10 kHz.

PowerMax Power Sensors

PM10X
1098423
PM30X
1098498
PM150-50XC
1098443
PM150X
1098455
PM300F-50X
1098481
PM1KX-100
1152086

PowerMax PM-model thermopile sensors are compatible with FieldMaxII and LabMax meters (both -TOP and -TO models) and provide accurate measurement of average laser power. For excimer applications, our X-coating offers damage and bleaching resistance in the ultraviolet. NIST-traceability and spectral mapping of the sensor response, loaded into EEPROM for automatic wavelength compensation, ensures measurement accuracy throughout the ultraviolet.

PowerMax-USB/RS Sensors



Laser Measurement and Control Accessories

Matrix of Recommendations

EnergyMax Energy Sensors

J-25MT-10KHZ

1110747

J-25MUV-193

1110741

J-25MUV-248

1110745

J-50MUV-248

1110572

J-50MUV-193, no diffuser

1146237

J-50MUV-248, no diffuser

1146243

With the EnergyMax family of pyroelectric sensors, robust MaxUV, MaxBlack and diffuse metallic sensor coatings offer a high damage threshold and long-term stability, which is further increased on certain models with the use of optimized diffuser stacks. Spectral mapping of all sensors and diffusers allows easy wavelength compensation and ensures accuracy throughout the ultraviolet. The addition of thermal compensation gives measurement accuracy that is unaffected by ambient conditions and average power levels. The electronic design offers a very high dynamic range and highly accurate and linear repetition rate performance from large diameter sensors. Coupled with a robust mechanical and electronic design that provides excellent noise immunity, EnergyMax is ideally suited for measuring the pulse energy from excimer lasers.

EnergyMax-USB Energy Sensors

J-25MUV-193, no diffuser

1191448

J-50MUV-248

1191449

EnergyMax detectors with direct USB high speed 2.0 connection to PC. No meter needed! Power provided via USB connection. Fast 14-bit A/D converter with up to five digits measurement resolution.

EnergyMax Heat Sinks

Small Heat Sink for J-25 Model Sensors

1123430

Large Heat Sink for J-50 Model Sensors

1123432

Optional heat sinks are available for EnergyMax sensors. Coupled with the sensors' inherent thermal compensation, these heat sinks allow pulse energy measurements at average powers in the tens of Watts – ideal for higher average power excimer lasers.

EnergyMax Energy Sensors

EnergyMax Heat Sinks



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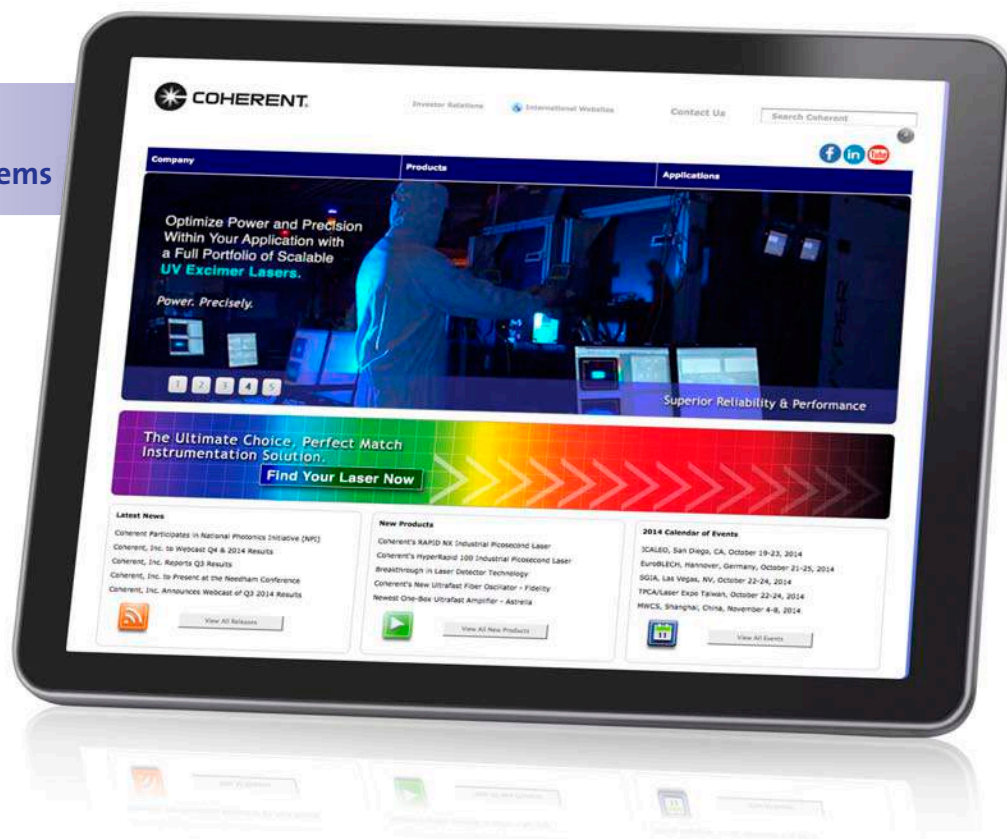
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Visit the Coherent Website

for more information about how Coherent can enable your excimer laser application.

www.Coherent.com/excimer
www.Coherent.com/uvopticalsystems



Use the Product and Application Finders below to quickly get more helpful details.

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Enhanced Application Finder

Technical Illustrations, Videos

Brochures, Tech Notes, Data Sheets



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