POLOS®

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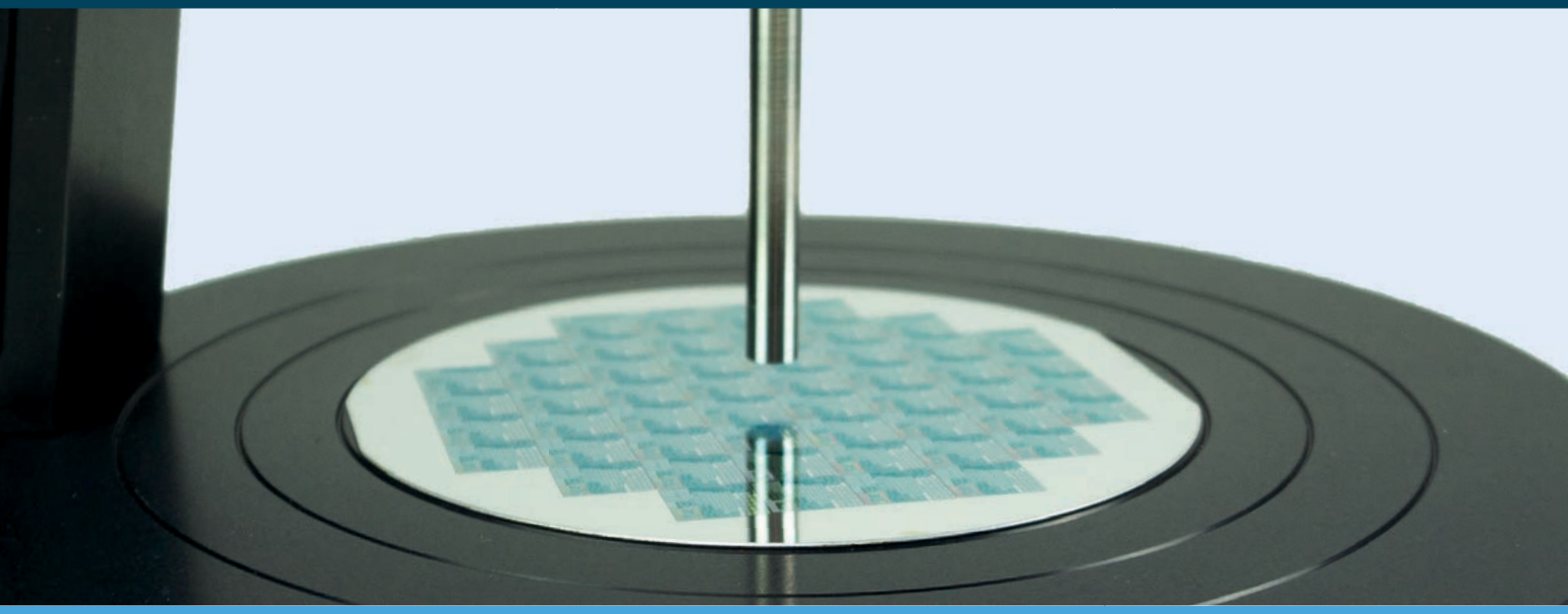

INNOVATIVE PRODUCTS FOR SEMICONDUCTOR, LIFE SCIENCE, LABORATORY AND PHARMACEUTICAL PROCESSES

POLOS® PHOTOLITHOGRAPHY

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032024-V1

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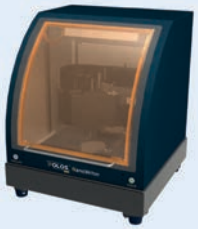
202309-V1

SYSTEM COMPARISON



MODEL	POLOS® MICROPRINTER	POLOS® NANOWRITER	POLOS® NANOWRITER ADVANCED
PC with software	Included		
Resolution	2 µm to 23 µm	0.8 - 1.5 - 2.5 µm 5 µm option	0.3 - 0.6 - 0.9 µm 5 µm option
Max substrate size	100 x 100 mm		
Max exposed area	75 x 75 mm	110 x 110 mm	
Max layer thickness	120 µm	Few microns	
Light-Source Wavelength	435 nm	405 nm (375 nm option)	
Optional Light-Source Wavelength	N/A	375 nm	
Auto-Focus wavelength	525 nm	650 nm	
Grayscale levels	256	4095	
Light-Source Lifetime	3 900 hour lamps	> 20,000 hours	
Alignment	Topside/bsa		
Alignment resolution	1 µm	0.5 µm	
Writing speed	Prints the full substrate from few seconds to several minutes.	200 mm/s	
Writing speeds @ highest res.		4 mm^2/min	1.4 mm^2/min
Writing speeds @ lowest res.		35 mm^2/min	
File Format	BMP, GDSII, DXF	BMP, TIFF, GDSII, CIF, DXF	
Dimensions (W x D x H) in mm	360 x 360 x 600	580 x 600 x 708	600 x 600 x 750
Weight	40 kg	260 kg	
Facilities	Only electricity	Electricity & compressed air. Vacuum pump included.	
Room Temp. Regulation needs	Not needed	+/- 1°C	
Warranty	1 year		
Warranty option	+2 years	1 year	

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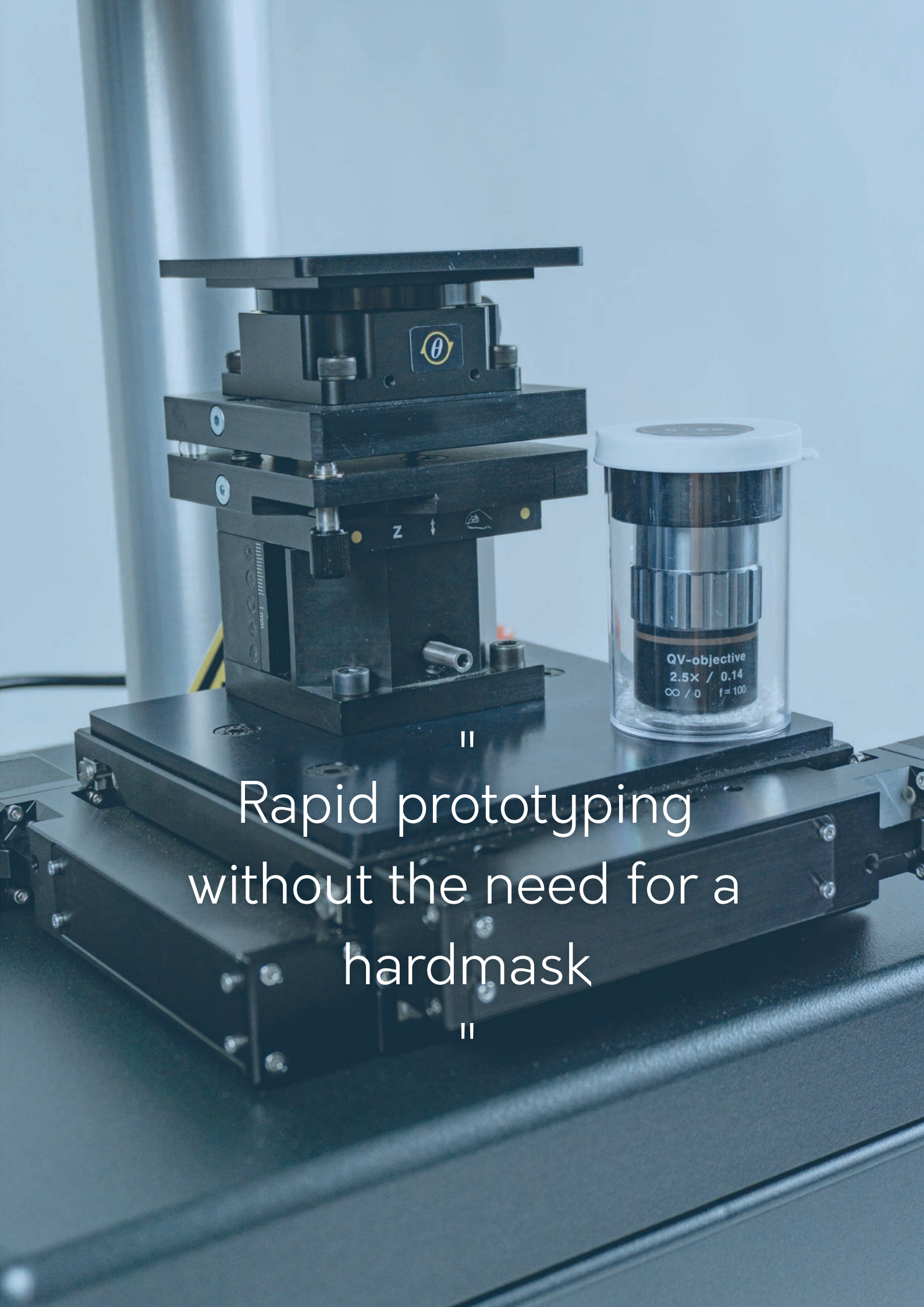

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Rapid prototyping without the need for a hardmask

"

PREMIUM EQUIPMENT

POLOS® MICROPRINTER

The POLOS® MicroPrinter is a maskless lithography device for rapid prototyping, based on µLCD projection technology, compatible with a wide range of resists and substrates. Our system can produce any 2D shapes at micron resolution without the need for a hardmask.

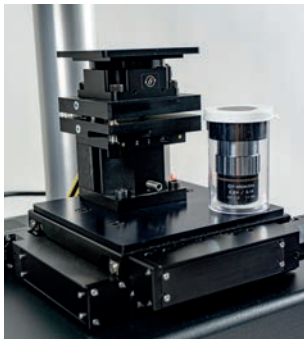
CONFIGURATION	
Light source	Exposure: 435 nm Alignment: 525 nm
Minimum feature size	Adjustable from 2 to 23 µm
Alignment resolution	Down to 1 µm/cm²
Maximum exposure area	75 x 75 mm²
Substrate size	Up to 4" wafers
System dimensions	36 (w) x 60 (h) x 36 (d) cm

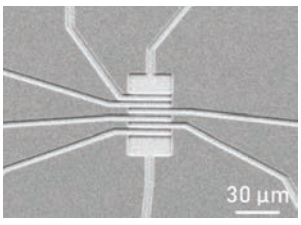
KEY FEATURES

- Writing resolution down to 2 µm
- Adjustable writing field and resolution with exchangeable objectives
- Compatible with CAD files and bitmap images
- Compatible with g-line photoresists
- Compatible with a wide range of substrates (silicon, glass, metal, plastic etc.)
- Compatible with any sample size up to 4" wafer
- Camera feedback for alignment steps

KEY BENEFITS

- Time and money saving thanks to the absence of a hardmask
- Intuitive alignment method with a direct overlay of the design on the sample
- Table-top, with a very small footprint
- Technology well suited for microelectronics, 2D-materials, microfluidics, optoelectronics, optics or any other 2D micro-fabrication applications





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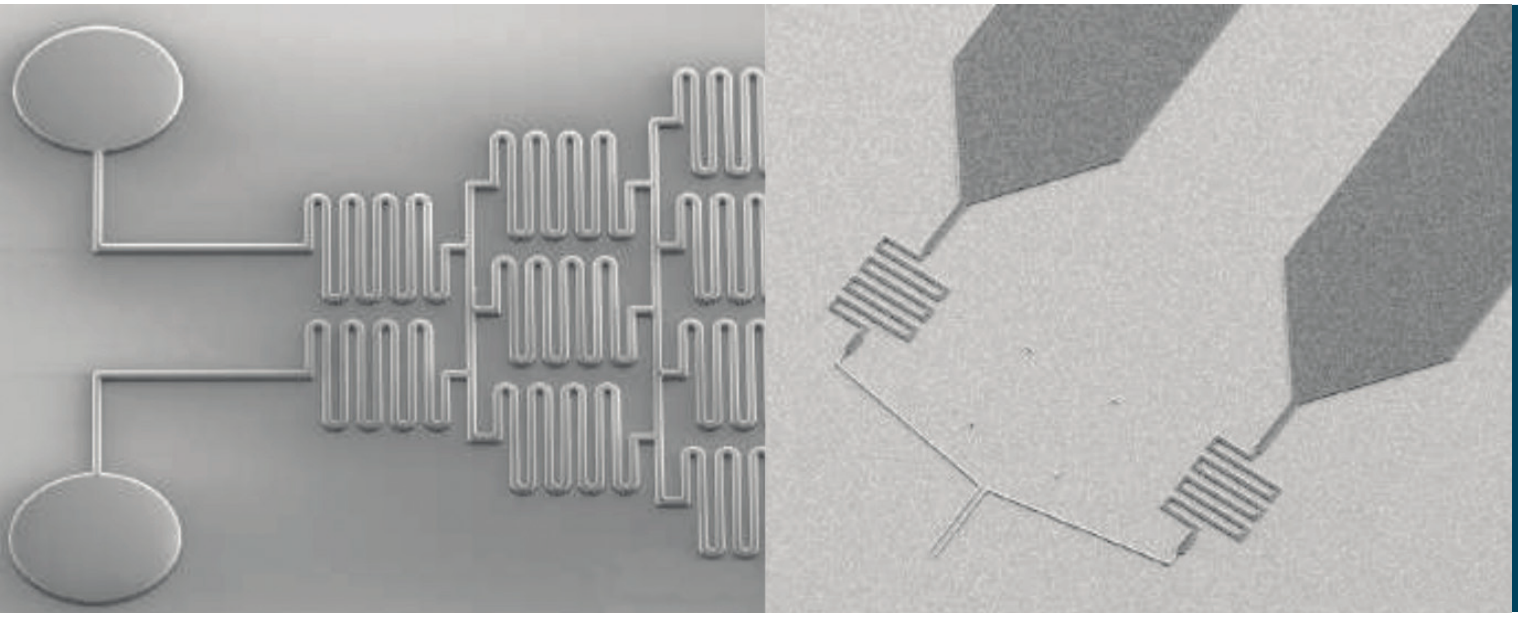

PREMIUM EQUIPMENT

SOFTWARE PACKAGE	
All-in-one PC	With Windows 10, 24" full HD
SFTprint software	Machine control, step-and-repeat, automatic dose test, stitching, alignment
SFTconverter	Conversion of standard formats (gdsii, dxf, cif, oas) to bitmap images. CAD software included

OPTIONS AND ACCESSORIES

- Multiple-sample holder (glass-slide, 4" wafer etc.)
- Objectives (see below)
- Manual or motorized Z stage with tilt correction
- Manual rotation stage (360°)

OPTICS POLOS® MICROPRINTER				
Objective	1X	2.5X	5X	10X
Writing field (mm)	13.6 x 7.7	5.4 x 3.0	2.7x 1.5	1.35 x 0.75
Smallest feature (µm)	23	8	4	2

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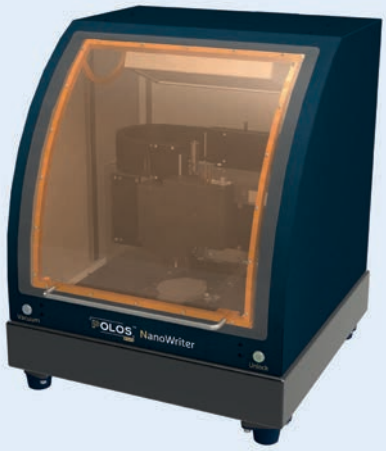
POLOS® NANOWRITER

The POLOS® NanoWriter is a versatile UV laser writer with high precision components specifically designed to give the user the highest degree of freedom to create microstructures in photosensitive layers. The POLOS® NanoWriter includes a 405 nm optical module capable of writing structures as small as 0.8 µm in photoresist layers.



This user-friendly tool supports up to 4095 levels of grayscale or pure binary mode and allows for 2.5D optical structures, surface structures as well as mask projects. Real-time laser-controlled autofocus and laser intensity control ensure high-quality imaging during the entire exposure process. The control electronics are all mounted within the frame, except for the control PC. This Microsoft Windows-based desktop PC and all required software is included in the package.

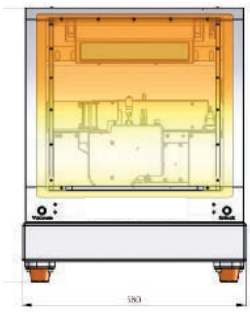
CONFIGURATION	
Max. writeable size	4 x 4"
Stroke scan & step	Max. 115 mm
Repeatability	< 50 nm RMS
Encoder resolution	2.5 nm
Scan speed	Max. 200 mm/s
Straightness axis	< 1 µm over 100 mm
Wafer thickness	0 - 10 mm
Max. substrate size	Min. 5 x 5 mm, max. 125 x 125 mm
Exposable area	Max. 110 x 110 mm (speed dependent)

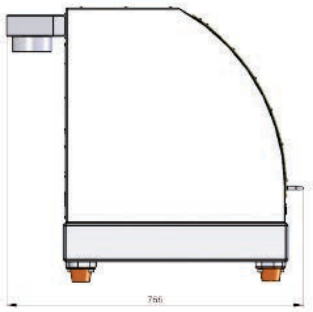
BENEFITS

- High quality, cost-efficient maskless lithography tool
- 375 nm source available for i-Line resists
- Market conform 0.8 µm resolution
- Compact optical module: use a spare optical unit for revolutionary machine downtime reduction
- User-friendly operation

DIMENSIONS

- Width: 580 mm
- Height: 708 mm
- Depth: 600 mm (not including optional air duct)
- Weight: 260 kg
- Compressed air: 5 - 7 Bar, Air quality according ISO8573-1:2010 class 3 or better.





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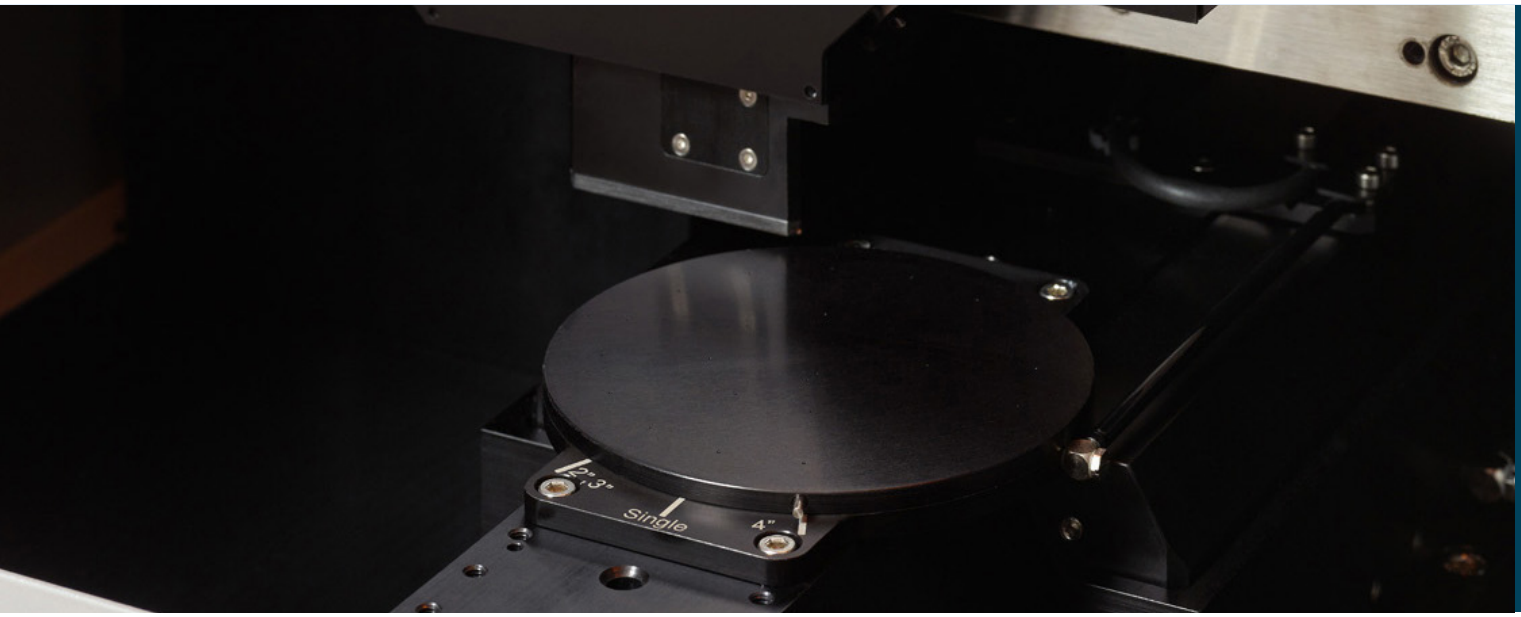

HIGH RESOLUTION EQUIPMENT

OPTICAL PROPERTIES	
Laser source	Standard 405 nm, GaN laser diode. 375 nm optional
Lifetime	>10.000 hours
Write modes	0.8 µm, optional 1.5 µm and 2.5 µm FWHM
Working distance	0.9 mm
Intensity	Max. 3 mW in the spot. Software controllable
Grayscale control	4095 levels
Autofocus	800 Hz bandwidth , 650 nm red laser controlled -0.3...x...+0.3 mm height variation with auto height tracking Fast voice coil actuator for accurate real time Z correction
Focus offset	Adjustable by software control

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HIGH RESOLUTION EQUIPMENT

POLOS® NANOWRITER ADVANCED

The POLOS® NanoWriter Advanced is a versatile UV laser writer with ultra-high precision components, specifically designed to give the user the highest degree of freedom to create micro-structures in photosensitive layers.

The POLOS® NanoWriter Advanced system includes a 405 nm optical module capable of writing structures as small as 300 nm in photoresist layers. This user-friendly tool supports up to 4095 levels of gray-scale or pure binary mode and allows for 3D optical structures, surface structures as well as mask projects. Real time laser controlled auto-focus and laser intensity control ensure high quality imaging during the entire exposure process. The control electronics are all mounted within the frame except for the control PC. This Microsoft Windows based desktop PC and all required software is included in the package.

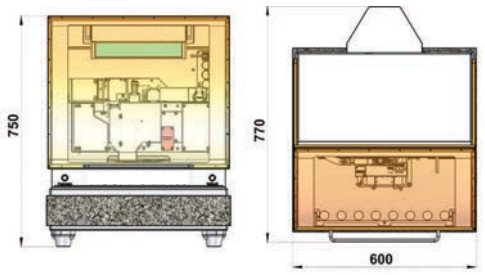
CONFIGURATION	
Max. writeable size	4 x 4"
Stroke scan & step	Max. 115 mm
Repeatability	< 50 nm RMS
Encoder resolution	2.5 nm
Scan speed	Max. 200 mm/s
Straightness axis	< 1 µm over 100 mm
Wafer thickness	0 - 10 mm
Max. substrate size	Min. 5 x 5 mm, max. 125 x 125 mm
Exposable area	Max. 110 x 110 mm (speed dependent)

BENEFITS

- Highest resolution on the market with 405 nm laser
- 375 nm source available for more demanding applications
- Minimal maintenance costs
- Compact optical module: use a spare optical unit for revolutionary machine downtime reduction
- User-friendly operation

DIMENSIONS

- Width: 600 mm
- Height: 750 mm
- Depth: 600 mm (not including optional air duct)
- Weight: 260 kg
- Compressed air: 57 Bar, Air quality according ISO8573-1:2010 class 3 or better.



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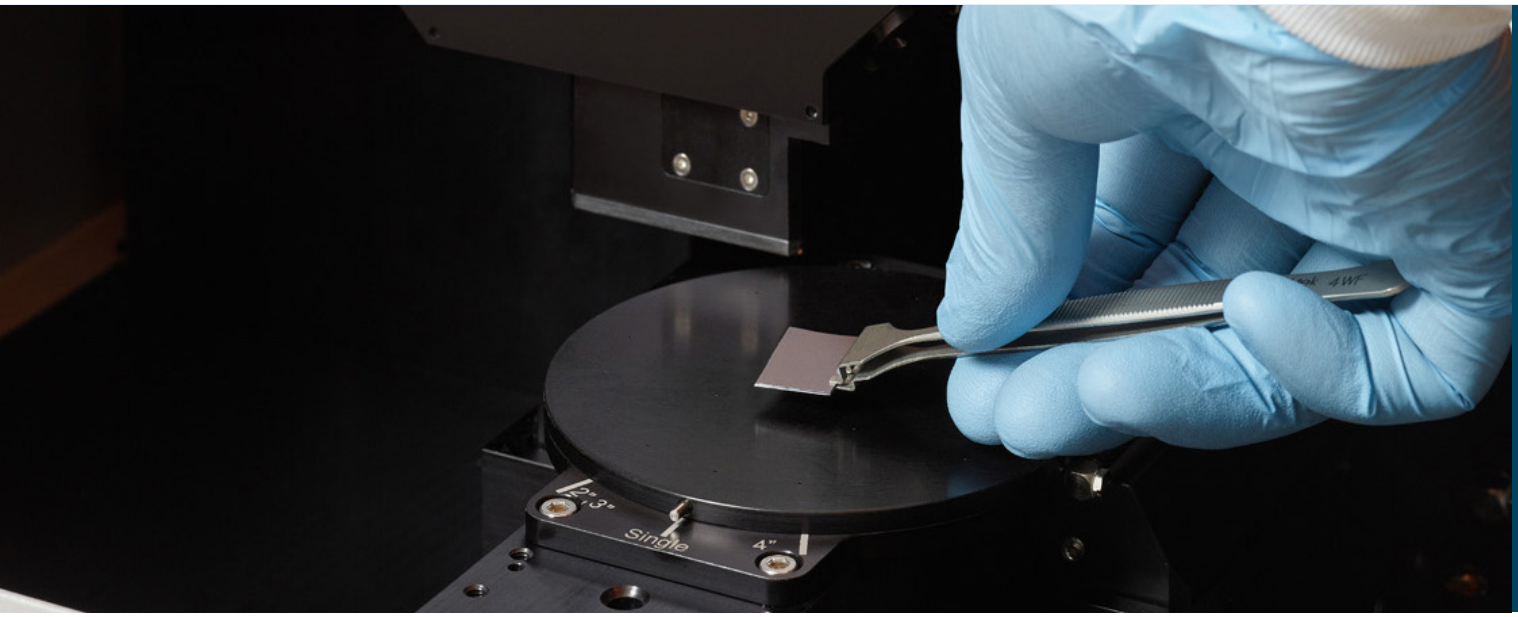

OPTICAL PROPERTIES	
Laser source	Standard 405 nm, GaN laser diode. 375 nm optional
Lifetime	>10.000 hours
Write modes	0.3 µm, optional 0.6 µm and 0.9 µm FWHM
NA	0.85
Working distance	0.6 mm
Intensity	Max. 3 mW in the spot. Software controllable
Grayscale control	4095 levels
Autofocus	800 Hz bandwidth , 650 nm red laser controlled -0.3...x...+0.3 mm height variation with auto height tracking Fast voice coil actuator for accurate real time Z correction
Focus offset	Adjustable by software control

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SYSTEM COMPARISON

At POLOS®, we offer various mask aligner systems: from entry-level low cost 4" & 6" LED (& Broadband) systems, to a full range of systems from 4" to 12" broadband NUV and DUV, manual to fully robotic, large scale FPD and custom engineered systems.

The mask aligners for wafers are applicable for various fields and at present utilized in board fields such as: the research and production of semiconductors, MEMS applications, research on bio chips and Nano technologies.

MODEL	MDA-400LJ	MDA-400M	MDA-400M-6	MDA-600S
Type	Fully manual	Fully manual	PC/PLC control Manual	PC control semi-auto
Mask size	Up to 5" x 5"	Up to 5" x 5"	Up to 7" x 7"	Up to 7" x 7"
Substrate size	Piece to 4" Ø	Piece to 4" Ø	Piece to 6" Ø	Piece to 6" Ø
UV lamp & power	UV-LED	350 W	350 W	350 W
Uniform beam size	125 mm Ø	4.25" x 4.25"	6.25" x 6.25"	6.25" x 6.25"
Beam uniformity	< ± 3 %	< ± 3 %	< ± 3 %	< ± 5 %
Beam wavelength	365 nm only	350 ~ 450 nm	350 ~ 450 nm	350 ~ 450 nm
365nm Intensity	~20 mW/cm²	~30 mW/cm²	~25 mW/cm²	~25 mW/cm²
Alignment accuracy	1 µm	1 µm	1 µm	1 µm
Process resolution	1 µm @ 1 µm PR thickness with vacuum contact			
Process mode	Soft, Hard, Vacuum contact & Proximity			
Substrate chuck moving	X, Y, Z & θ	X, Y, Z & θ	X, Y, Z & θ	X, Y, Z & θ
Options	Anti-Vibration table UV Intensity meter	Anti-Vibration table UV Intensity meter	Anti-Vibration table IR BSA UV Intensity meter	Anti-Vibration table CCD BSA UV Intensity meter UV-LED (365 nm) exposure module

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- Easy operation & installation
- PC operation with PLC control
- Image grab & data log
- More than 100 program recipes

Easily develop your process on small substrates, pieces or wafers up to 8". These mask aligners are widely used for MEMS and optoelectronics applications, such as LED production. Special configurations for nonstandard substrates such as hybrids and high-frequency components for fragile III-V materials.

Are you handling Taiko wafers? We make a special aligner for handling Taiko wafers.

MODEL	MDA-80MS	MDA-12SA	MDA-60FA	MDA-12FA
Type	PC control semi-auto	PC control semi-auto	Fully automatic	Fully automatic
Mask size	Up to 9" x 9"	Up to 14" x 14"	Up to 7" x 7"	Up to 14" x 14"
Substrate size	Piece to 8" x 8"	Piece to 8" x 8"	4" ~ 6"	8" ~ 12"
UV lamp & power	1 kW	2 kW / 5 kW	350 W / 500 W	2 kW / 5 kW
Uniform beam size	9.25" x 9.25"	14.25" x 14.25"	6.25" x 6.25"	14.25" x 14.25"
Beam uniformity	3.5 %	5 %	3 %	5 %
Beam wavelength	350 ~ 450 nm	350 ~ 450 nm	350 ~ 450 nm	350 ~ 450 nm
365nm Intensity	20 ~ 30 mW/cm^2	20 ~ 70 mW/cm^2	20 ~ 30 mW/cm^2	20 ~ 70 mW/cm^2
Alignment accuracy	1 µm	1 µm	0.5 µm	0.5µm
Process resolution	1 µm @ 1 µm PR thickness with vacuum contact			
Process mode	Soft, Hard, Vacuum contact & Proximity			
Substrate chuck moving	X, Y (manual), Z & θ (motorized)	X, Y, Z & θ (motorized)	X, Y, Z & θ (motorized)	X, Y, Z & θ (motorized)
Options	CCD BSA, UV Intensity meter			
Frame	Anti-Vibration system			
Pre-aligner			±50 µm	±50 µm

We support training and initial testing with a range of resists and developers, and sample wafers. Do not hesitate to contact us for more information and all available options!

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MANUAL

4" UV LED MASK ALIGNER

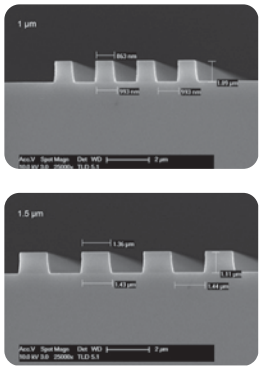
The MDA-400LJ is a mask aligner specially designed for university and research institutes. The system is equipped with a maintenance-free 365 nm LED light source (50,000 hours lifetime) and therefore ideal for resist processing.

Mask aligners with UV light mask light sources use significantly less energy compared to conventional mercury vapor lamps. The lights of the Midas mask aligner series do not need to warm-up and cool-down. No need for the cooling fan, filters or shutter. The LED light source is only switched on during the actual exposure process. LED masks have a much longer life-time. In terms of health, safety and environmental protection, the LED technology provides a significant improvement in mask alignment.

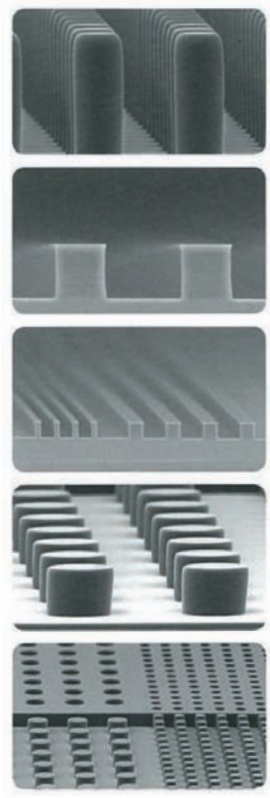
OPTIONS

- Anti-Vibration table
- UV Intensity Meter
- UV-LED (365 nm) Exposure Module

CONFIGURATION	
Substrate size	Up to 4" also available for 6"
Light source	UV LED
Resolution	1 µm with 1 µm thin PR @ Si Wafer
Alignment accuracy	± 1 µm
I-line beam intensity	About 10 mW/cm²
Process mode	Soft, Hard, Vacuum contact & Proximity



SEM 1 µm high pattern, generated with DPR-i5500 photoresist, processed MDA400LJ with the UV LED lightsource.



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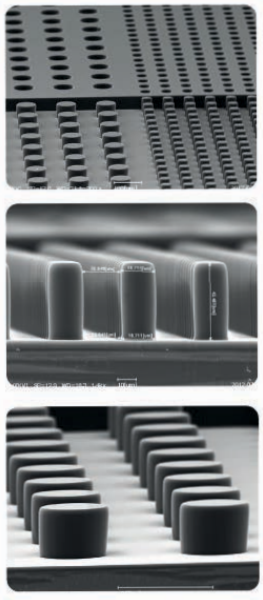
SEMI-AUTOMATIC

8" SEMI AUTOMATIC MASK ALIGNER

Semi automatic mask aligner MDA-80MS

- Easy operation & Installation
- PC Operation with PLC control
- Image grab & Data log
- More than 100 Program recipes

CONFIGURATION	
Type	PC control Semi Auto
Mask size	Up to 9" x 9"
Substrate size	Piece to 8" Ø
UV lamp & power	1 kW & power supply
Uniform beam size	9.25" x 9.25"
Beam uniformity	< ± 5 %
Beam wavelength	350 ~ 450 nm
365 nm intensity	15 ~ 25 mW/cm^2
Alignment accuracy	1 µm
Process resolution	1 µm @ 1 µm PR thickness with vacuum contact
Process mode	Soft, Hard, Vacuum contact & Proximity
Substrate chuck moving	X, Y (Manual), Z, θ (motorized)
Frame	Anti-vibration table
Options	CCD BSA, UV Intensity meter, etc.



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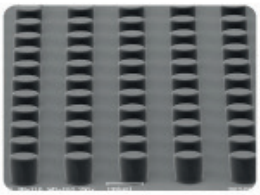
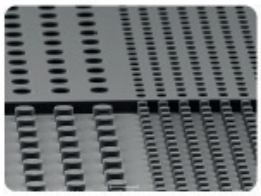
AUTOMATIC

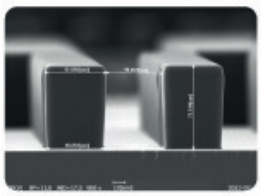
12" FULL AUTOMATIC MASK ALIGNER

The MDA-12FA represents the next generation of full-field lithography systems. This Full Auto Mask Aligner platform ensures a higher Overlay Accuracy and a more reliable operation. This machine offers users higher productivity and easy control.

CONFIGURATION	
Substrate size	Up to 12"
UV lamp & power	2 kW [5 kW]
Resolution	2 µm with 1 µm thin @ Si wafer
Alignment Accuracy	< 0.5 µm
Lamp Uniformity	< ± 5 %
Uniform Beam Size	14.25" x 14.25"
365 nm Beam Intensity	2 kW (20~30 mW/cm^2) 5 kW (40~90 mW/cm^2)
Motorized	Microscope X, Y-axis, Zoom and Focus Stage X, Y, θ and Z-axis
Process mode	Soft, Hard, Vacuum contact & Proximity
Options	BSA / Auto Mask Changer







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WHS® PHOTOMASK HANDLING

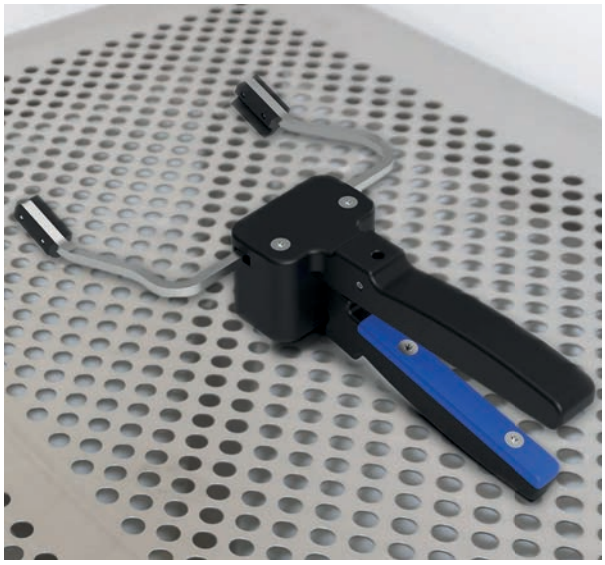
We manufacture next-generation lithography photomask handling tools designed to reduce particles, prevent ESD and improve ergonomic conditions for the technician. Whether you are working with reticles or masks we have a solution for your photomask handling requirements or will custom engineer a product specifically for your needs.

WHS® MECHANICAL MASK PICK SIDE GRIP - L1 SERIES

A normally closed (consistent-force) mechanical pick for handling from 5" up to 9" square photomasks from the tangential edge to reduce contamination by eliminating contact with chrome. Advanced gripper manufacturing for longevity, antistatic properties, and general chemical resistance. ISO Class 3.

FEATURES

- Normally-Closed Tangential-Edge Handling
- Antistatic Construction With Ground Path
- Ergonomic Safe Mask/Reticle Handling

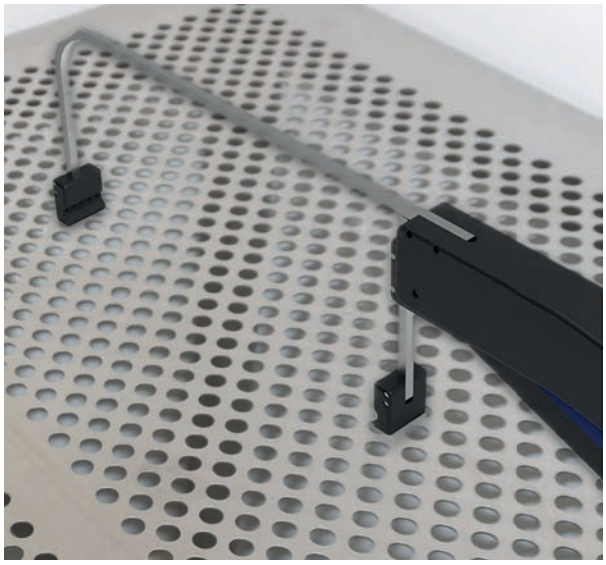


WHS® MECHANICAL MASK PICK HORIZONTAL GRIP - L2 SERIES

A normally closed (consistent-force) mechanical pick for handling from 5" up to 9" square photomasks from the tangential edge to reduce contamination by eliminating contact with chrome. Advanced gripper manufacturing for longevity, antistatic properties, and general chemical resistance. ISO Class 3.

FEATURES

- Normally-Closed Tangential-Edge Handling
- Antistatic Construction With Ground Path
- Ergonomic Safe Mask/Reticle Handling



IONIZING AIR PENCIL

The pencil-type air ionizer can help remove static electricity on a material or object. This device is an ideal tool to clean parts and assemblies, not only in the Semiconductor market, but also in the Medical and Electronic Industries.

Quickly and easily, remove dust that adheres to surfaces such as silicon wafers and masks. An Ø1.5 mm air outlet and concentrated fast airflow are most suitable to effectively remove microscopic dust particles. The internal safety circuit cuts off HV power when it detects an abnormality in the HV circuit. A low voltage cable (modular) for easy and simplified operation connects pen and controller.

CONFIGURATION	
Input voltage	DC24V (using an AC adaptor: AC90V- AC264V 50/60 Hz)
Input current	0.5A max
Gas pressure	0.3 MPa Max. (pressure speed control is adjustable)
Purge gas	Air or nitrogen
Emitter material	Polysilicon
Ambient temperature	10°C - 40°C
Ambient humidity	35 % RH - 65 % (non - condensing)
Weight of pen	130 g
Weight of controller	750 g

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UV INTENSITY METER

The MIDAS UV Intensity meter is a great tool for measuring the intensity power for Mask Aligners. This UV Intensity meter represents next generation of full-field UV Intensity meter systems. The sensor and probes are fully digital, so no calibration is needed.

CONFIGURATION	
Wavelength	365 nm (option: 405 nm / 248 nm)
Uniformity	Automatic calculation
Measuring point	5 ~ 9 point
Battery	Recharging type
Dimension (mm)	80 (w) x 150 (d) x 45 (h) mm

INSPECTION LAMP

These inspection lamps were developed for inspecting wafers with possible use of a microscope. Using the mounting flange, it is possible to fix the inspection lamp onto a microscope or onto any process machine.

FEATURES

- No UV or infraded light (even with white)
- Long service life 10 years on the LED
- Colour selection for each inspection process

We have various colour lamps available, contact us for all options.

032024-V1

PHOTORESIST PRODUCTS

KemLab™ is a photoresist manufacturer and photo-lithography research and innovation company focused on quality and cost-competitive high-tech photosensitive imaging materials used in the electronics industry. Offering Positive and Negative photoresists for advanced packaging, MEMS & Microfluidics, integrated circuits, metal lift-off, compound semiconductors, LED, image reversal, diffraction gratings and sensor markets.

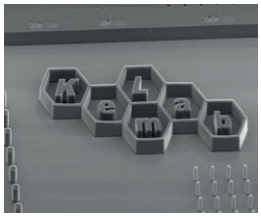
BENEFITS

- Short lead times
- Competitive pricing
- Product support
- Resist customization

We can offer a variety of photoresists. Visit our website to find the complete list of resists by film thickness, competitive products, tone, developer, or exposure.

HARE SQ

Negative Tone Epoxy

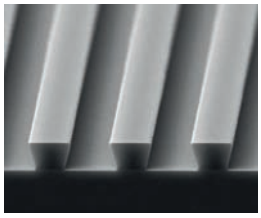


NEGATIVE

- 2 - 200 µm FT
- Applications: Microfluidics, MEMS

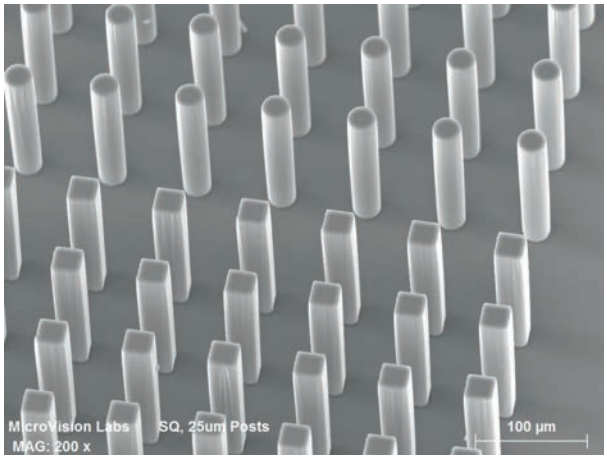
APOL-LO 3200

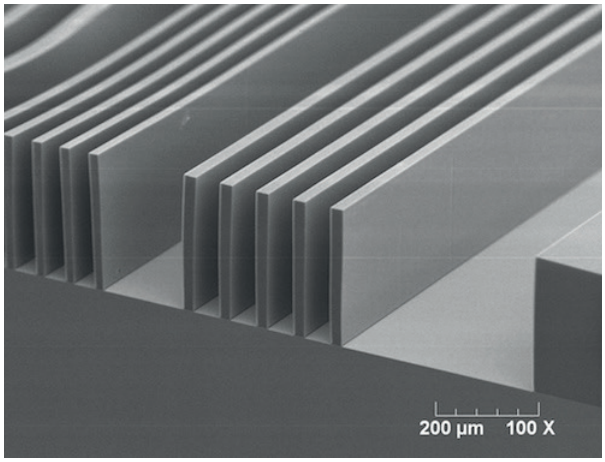
Negative Lift-Off



NEGATIVE

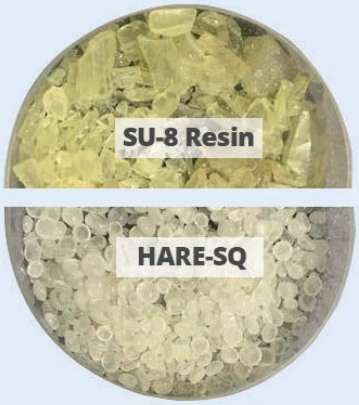
- 2 - 210 µm FT
- Applications: Compound Semiconductor, LED



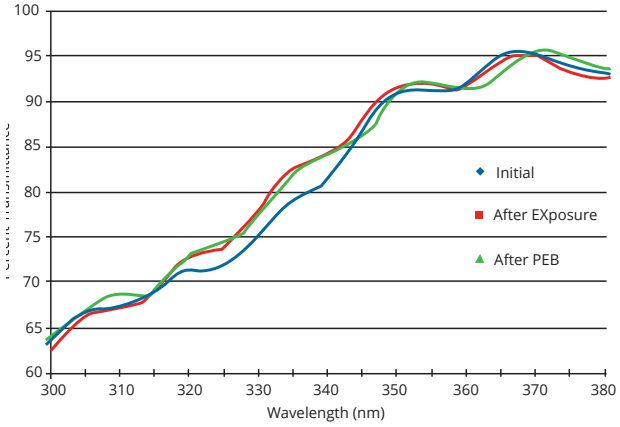


HARE-SQ NEGATIVE TONE RESIST

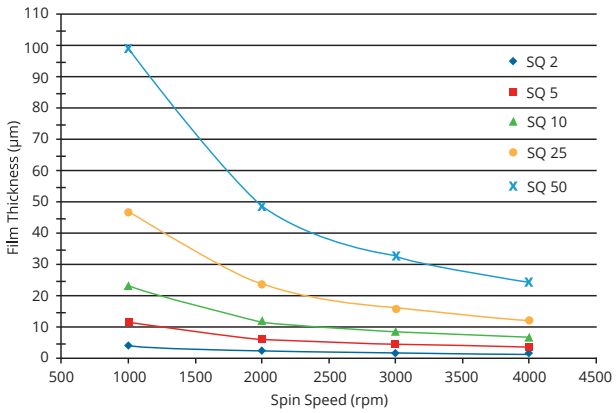
HARE-SQ (High Aspect Ratio Epoxy / Superior Quality) is an epoxy based negative photoresist designed for polymeric MEMS, microfluidics, micromachining and other microelectronic applications. The HARE-SQ system is designed for use in thick film applications of 2 to 100 µm, and is ideal for use in permanent applications in which the photoresist remains within the finished device.



HARE-SQ: Percent Transmittance vs. Wavelength



Film Thickness vs. Spin Speed



- Clearer layer (cleaner then SU-8 Resin)
- Lower opacity (Higher transparency – less dosing power/power intensity required)
- Fewer particles
- Fewer micro-bubbles
- More consistent product

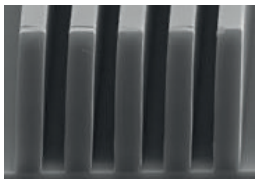
ADVANTAGES

- The HARE-SQ photoresist uses an epoxy resin with superior cleanliness and excellent reproducibility
- Consistent surface energy of cross-linked resist (an important property for microfluidic applications).
- Fully compatible with SU-8 processes.

SUBSTRATES

HARE SQ adheres to variety of substrates; including silicon, gold, aluminum, chromium and copper Proper substrate cleaning & dehydration improve adhesion.

Logo & posts in 50 µm film



5 µm dense line/ space in 25 µm film

032024-V1

SYSTEM COMPARISON

Specifications POLOS® SPIN series

- Programmable CW & CCW and puddling rotation
- Automatic safety lid lock with sensor interlock
- Speed 0 rpm - 12,000 rpm, accuracy +/- 0.1 rpm
- Acceleration / deceleration 1 - 30,000 rpm/sec, selectable per step

Specifications POLOS® Advanced series

- Automatic safety lid lock with sensor interlock
- Automatic sequential or parallel chemical dispense
- Up to 6 spray nozzles, each independently programmable

NEW!

MODEL	SPIN150x	SPIN200i	POLOS® 200 Advanced	POLOS® 300 Advanced
Max. substrate diameter	150 mm round or 4" x 4" square	260 mm round or 6" x 6" square	260 mm round or 6" x 6" square	360 mm round or 8" x 8" square
Max. process chamber diameter	-	302 mm	302 mm	402 mm
Dimension (desktop version)	-	380 (w) x 307 (h) x 559 (d) mm	380 (w) x 307 (h) x 559 (d) mm	430 (w) x 310 (h) x 650 (d) mm
Shipping weight	-	20 kg	20 kg	32 kg
Shipping dimensions	-	680 (w) x 580 (h) x 480 (d) mm	680 (w) x 580 (h) x 480 (d) mm	780 (w) x 620 (h) x 580 (d) mm
Free programmable outputs	3 dry relays, nominal switching capacity 0.5A / 125 VAC - 0.3A / 60DC 3 Programmable Dry Contacts: e.g. for automated control of Dispense unit, Nitrogen diffuser, etc.		3 dry relays, nominal switching capacity 0.5A / 125 VAC - 0.3A / 60DC Up to 16 digital input, 16 digital output, 4 analog input, 4 analog output (with optional IO modules)	
REQUIREMENTS				
Voltage	100 - 120 VAC / 200 - 240 VAC 50 / 60 Hz (auto select)			
Power consumption	Max. 500 W		Max. 1800 W	
Max. current	5 A / 2.5 A		10 A / 8 A	
Vacuum	- 65 kPa (-19 inHg), ≥ 80 LPM Tube OD Ø8 mm		- 80 kPa (-24 inHg), ≥ 80 LPM Tube OD Ø8 mm	
Motor purge gas	20 - 50 kPa, 2-5 L/min, tube OD Ø 6 mm 500 L/hr			
Drain connection	1" M-NPT			

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Specifications POLOS® Automated series

- Fully automatic operation, stand-alone systems
- Automatic safety lid lock with sensor interlock
- Speed 100 ~ 6,000 rpm, accuracy +/- 0.1 rpm
- Acceleration / deceleration 1 - 3,000 rpm/sec, selectable per step

MODEL	POLOS® 450 Advanced	POLOS® SPIN4000A	POLOS® SPIN5000A
Max. substrate diameter	460 mm round or 10" x 10" square	300 mm round or 8" x 8" square	500 mm round or 10" x 10" square
Max. process chamber diameter	502 mm	400 mm (15.7")	850 mm
Dimension (desktop version)	795 (w) x 638 (h) x 922 (d) mm	650 (w) x 1200 (h) x 945 (d) mm	1700 (w) × 2100 (h) × 1700 (d) mm
Shipping weight	75 kg	350 kg	2150 kg
Shipping dimensions	800 (w) x 790 (h) x 1180 (d) mm	1230 (w) x 1390 (h) x 1420 (d) mm	2200 (w) x 2500 (h) x 2200 (d) mm
Free programmable outputs	3 dry relays, nominal switching capacity 0.5A / 125 VAC - 0.3A / 60DC Up to 16 digital input and output, 4 analog input and output (with optional IO modules)	HMI : USB / PLC : R232	
REQUIREMENTS			
Voltage	100 - 120 VAC / 200 - 240 VAC 50 / 60 Hz (auto select)	1 KW	9.5 KW
Power consumption	Max. 1800 W	Pump power: AC 220V Main power: AC 220V/1P/15A	
Max. current	10 A / 8 A		
Vacuum	- 80 kPa (-24 inHg), ≥ 80 LPM Tube OD Ø8 mm	-600 mm Hg	-600 mm Hg
Motor purge gas	20 - 50 kPa, 2-5 L/min, tube OD Ø 6 mm 500 L/hr	NO	
Drain connection	1" M-NPT	50 mm	50 mm

032024-V1

POLOS® SPIN150x SPIN COATER

NEW!

The POLOS® SPIN150x is a versatile and high-quality substrate spin coater, made from NPP. It is specifically designed for R&D and low volume production. Desktop version for manual or automated (optional) chemical dispense.

AVAILABLE MID 2024!

UNIQUE NEW DESIGN

The new unique outer shell and drain design allows you to switch between tabletop and indeck model in-field, in addition the unit is designed to be upgraded in-field using a wide range of different accessories to ease dispensing and overall handling.

LIQUID FILTER TRAP

The Spin X Series is equipped with a liquid filter trap to protect the critical components of our spin coaters, such as the drive unit, vacuum valve, vacuum sensor and ServoBL Controller. The liquid filter trap will capture any liquids entering the vacuum lines via the process chamber or vacuum chuck.

Any resists or fluids will be safely kept in a liquid jar/bottle, which can be viewed through a cut-out in the spinner housing. We recommend that all our customers check the liquid jar/bottle during their maintenance schedule and empty the bottle in case any liquids are present.

SPECIFICATIONS HARDWARE:

- Liquid filter trap
- Unique outer shell and drain design to switch between desktop and in-deck model in-field
- Center injection holder for syringe or dispense nozzle
- Lid lock and vacuum sensor for user safety
- Large (detachable) touchscreen display
- USB port to store recipes on USB drive and for software updates specifications drive-unit:
- Indirect brushless drive unit - Up to 12.000 RPM (Depending on substrate / chuck)
- High acceleration and accuracy
- Acceleration/deceleration 1 - 30.000 RPM
- CW, CCW rotation and puddle option

COMPLIMENTARY CHUCK AND ADAPTER:

- 1 x A-V36-S45-PP-HD - Vacuum chuck
- 1 x D-V10-S50-PP-HD - Fragment adapter

CONFIGURATION	
Housing material	Natural polypropylene (NPP)
Max. substrate diameter	Up to 6” (150 mm) wafers Up to 4” x 4” (100 mm) substrates

SUITABLE FOR:

- Coating
- Cleaning
- Rinse/Dry
- Developing
- Etching
- PDMI
- and other processes

IN-DECK MODEL

032024-V1

SPIN200i SPIN COATER

The single wafer spin coater SPIN200i is an advanced system that offers precise, repeatable process control. An aerodynamically efficient chamber enhances uniformity, while the natural polypropylene or PTFE construction ensures a metal-free, contamination-free process area that is easy to clean.

The SPIN200i comes with a chuck that will hold from 4" to 8" wafers. This spin coater offers exceptional value and capability: precision speed range of up to 12,000 rpm, programmable in 1 rpm, for CW, CCW rotation (ideal for “puddle" develop), and per-step acceleration of max. 30,000. It is also programmable in 1 rpm, to cover any process requirement. It is programmed through an easy-entry color touchscreen. The self-explanatory icons make it easy to operate even for new users.

A quality choice for the long-term, all our spinners are designed and manufactured in Germany.

CONFIGURATION	
Housing material	Natural polypropylene (NPP)
Process chamber material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Interface	Detachable, full-size touchscreen, glove friendly, IP52, chemical resistant
External connection	1 USB port on the side of your display
Max. substrate diameter	260 mm round or 6" x 6" square
Max. process chamber diameter	302 mm
Dimension (desktop version)	380 (w) x 307 (h) x 599 (d) mm

OPTIONS SPIN150i & SPIN200i

Liners are available in PET. 0.5 mm thick, transparent, antistatic (108 - 1010 Ω) to prevent possible build-up of static charge in the chamber.

Central Dispensing Syringe Holder for single or triple syringes, with integrated N2 diffuser.

Corrugated Drainhose and connector in NPP, including connection to connect to the drainport.

Foot Switch for hand free usage; controlling start/stop function and vacuum.

032024-V1

POLOS® 200 ADVANCED

Our high quality, all NPP and PTFE POLOS® single wafer spin coaters are specifically designed for R&D and single wafer production in the MEMS, Semiconductor, PV, Microfluidic fields, etc. Suitable for all typical spin processes: cleaning, rinse/dry, coating, developing and etching.

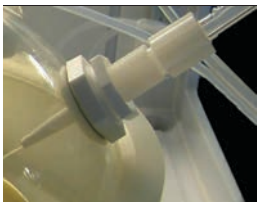
The POLOS® 200 Advanced "Top of the line" spin coater supports fragments starting from 5 mm up to 200 mm (or 8") or 6" x 6" square. This revolutionary spin coater can be used as a fully automatic solution for your process. The system will support a large variety of fluids thanks to the full plastic housing available in natural polypropylene as well as PTFE. The control of the motor mode rotation (clockwise/counterclockwise), in combination with the up to 6 automatic dispensers in the POLOS® Advanced systems, enables a uniform deposition of multilayer thin films and photoresist development. These features enable a quick process optimization with fully automatic recipes and high reproducibility.

CONFIGURATION	
Housing material	Natural polypropylene (NPP)
Process chamber material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Interface	Detachable, full-size touchscreen, glove friendly, IP52, chemical resistant
External connection	1 USB port on the side of your display
Max. substrate diameter	260 mm round or 6" x 6" square
Max. process chamber diameter	302 mm
Dimension (desktop version)	380 (w) x 307 (h) x 599 (d) mm

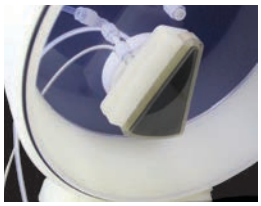
OPTIONS POLOS® 200 ADVANCED

The vacuum pump is quiet and reliable.

Auto Dispense Lines Full PTFE dispense vessel automated injector line.



Jet Spray injector for accurate dispensing of chemicals, with adjustable dispensing position.



The sapphire MegPie is a single-wafer megasonic transducer used for cleaning and sonochemical processing.

032024-V1

ADVANCED SERIES

POLOS® 300 ADVANCED

The POLOS® 300 Advanced single substrate spin processor is perfectly suitable for a wide range of applications, including drying, rinsing, cleaning, and coating. This table-top spin processor is seamlessly built in a full-plastic housing, in natural polypropylene (NPP) or optional PTFE, and is suitable for processing fragments as small as 5 mm up to substrates sizes up to Ø 300 mm or 8" x 8".

The POLOS® 300 Advanced allows the user to either dispense manually through a syringe, or use the optional manifold with a selectable valve for dispensing one (1) chemical from the dispense vessel (DV), DI water or N2.

FEATURES

- Post-CMP cleaning
- LIGA processes
- TSV processing
- Mask cleaning
- Etch assist
- SU-8 develop
- Plating pre-cleaning
- Lift off
- Pre-plating bubble removal
- Resist strip
- Post-laser cleaning

CONFIGURATION	
Housing material	Natural polypropylene (NPP)
Process chamber material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Interface	Detachable, full-size touchscreen, glove friendly, IP52, chemical resistant
External connection	1 USB port on the side of your display
Max. substrate diameter	300 mm round or 8" x 8" square
Max. process chamber diameter	342 mm
Dimension (desktop version)	430 (w) x 310 (h) x 650 (d) mm

032024-V1

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Next generation of full-field spin coating systems

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ADVANCED SERIES

POLOS® 450 ADVANCED

The POLOS® Advanced series spin processors are advanced systems, offering precise and repeatable process control. An aerodynamically efficient chamber enhances uniformity, while natural polypropylene process chamber guarantees a contamination-free, easy to clean process area. All units feature programmable CW & CCW Rotation and puddle function.

The POLOS® 450 Advanced is a table-top Single Substrate Spinner with NPP housing, spincup and manual chemical dispense. The inside diameter measures 500 mm for substrates up to max. Ø 500 mm round and 350 x 350 mm square substrates.

FEATURES

- Automatic Sequential or Parallel Chemical Dispenses
- Up to 6 spray nozzles, each programmable independently

CONFIGURATION	
Housing material	Natural polypropylene (NPP)
Process chamber material	Natural polypropylene (NPP) or high chemical resistant PTFE (TFM™)
Spin speed RPM	0 - 1500 rpm** ± 1 rpm steps
Spin speed accuracy	± 0.1 rpm**
Spin rotational direction	Clockwise, Counter clockwise and Puddle
Max. acceleration	≤1500 rpm/s depends on the load**
Free programmable outputs	3 dry relays, nominal switching capacity 0.5A / 125 VAC - 0.3A / 60DC
Max. substrate diameter	460 mm round and 350 x 350 mm square substrates
Max. process chamber diameter	502 mm
Dimension (desktop version)	795 (w) x 638 (h) x 922 (d) mm
Motor purge gas	20 - 50 kPa. Tube OD Ø 6mm 500 L/hr
Drain connection	1.5" M-NPT

**Measured without substrate, limitations may apply depending on chuck used and substrate specification.

032024-V1

AUTOMATED SERIES

POLOS® SPIN4000A

New in our portfolio is the POLOS® SPIN4000A. This powerful spin coater system is especially designed for research and variable processes of all applications. It is characterized by its ability to operate fully automatic. The POLOS® SPIN4000A represents the next generation of full-field spin coating systems.

The POLOS® SPIN4000A is a stand-alone, fully automatic spin coater system. The steel housing guarantees a contamination free work area, and its high-end components ensure a repeatable, programmable spin process of up 300 x 300 mm substrates, over and over.

FEATURES

- Automatic Photoresist Dispense with up to 3 spray nozzles (optional)
- 8,5" touch screen
- Vacuum pump
- Upper cover (optional)

CONFIGURATION	
Spin speed RPM	6000 rpm
Spin speed accuracy	0.1 rpm
Spin rotational direction	Clockwise and Counter clockwise
Max. acceleration	≤3000 rpm/s depends on the load**
Free programmable outputs	20 steps, 20 recipes (save & load)
Max. substrate diameter	300 mm round or 8” x 8” square substrates
Dimension (desktop version)	650 (w) x 1200 (h) x 945 (d) mm

**Measured without substrate, limitations may apply depending on chuck used and substrate specification.

032024-V1

AUTOMATED SERIES

POLOS® SPIN5000A

Also new in our portfolio is the POLOS® SPIN5000A. This powerful spin coater system is especially designed for research and variable processes of all applications. It is characterized by its ability to be fully customizable and operate fully automatic. The POLOS® SPIN5000A represents the next generation of full-field spin coating systems.

The POLOS® SPIN5000A is a stand-alone, fully automatic spin coater system. The steel housing guarantees a contamination free work area, and its high-end components ensure a repeatable, programmable spin process of up 500 x 500 mm substrates, over and over.

FEATURES

- Automatic Dispense with up to 3 spray nozzles (optional)
- 8,5" touch screen
- Vacuum pump
- Upper cover (optional)

CONFIGURATION	
Spin speed RPM	1200 rpm
Spin speed accuracy	0.1 rpm
Spin rotational direction	Clockwise and Counter clockwise
Max. acceleration	≤3000 rpm/s depends on the load**
Free programmable outputs	20 steps, 20 recipes (save & load)
Max. substrate diameter	700 mm round or 500 x 500 mm square substrates
Dimension (desktop version)	1700 (w) × 2100 (h) × 1700 (d) mm

**Measured without substrate, limitations may apply depending on chuck used and substrate specification.

032024-V1

POLOS® HOTPLATE 200

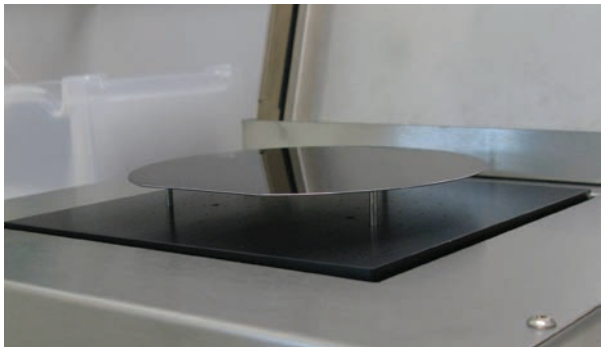
Our all NEW table-top hotplate is a versatile and affordable tool for R&D and pilot lines. It is designed with a hinged lid with N2 connector and is suitable for soft bake as well as hard bake processes, and curing of photoresist, epoxy or any other work requiring precise temperature control. The POLOS® Hotplate 200 also has upgradeable options, including lifting pins, vacuum bake and proximity pins.

NEW!

Also available with a 350 x 350 mm heating area!

HOTPLATE 200 STANDARD

- Temperature Range 50 - 230°C
- Programmable storage of 20 programs (Temperature/Time)
- Countdown timer (1-999 sec.) with acoustic alarm
- Temperature Uniformity ±1°C
- Heater Surface Area 220 x 220 mm
- Suitable for 1 x 200 mm Wafer
- Power: max. 1200 W (approx. 550 W to remain at 200°C)
- Voltage: 230 or 110 VAC
- Heater Block Material: Aluminum (anodized)
- Housing Material: Stainless Steel
- Including Hinged Lid with N2 connection
- Weight: 12 kg
- Dimensions: approx. 450 x 320 x 135 mm *dims. are without hinged lid



The system is designed for an ambient temperature of 50°C - 230°C.

HOTPLATE 200 ADVANCED

- Temperature Range 50 - 230°C
- Programmable storage of 20 programs (Temperature/Time)
- Countdown timer (1-999 sec.) with acoustic alarm
- Temperature Uniformity ±1°C
- Heater Surface Area 220 x 220 mm
- Suitable for 1 x 200 mm Wafer
- Equipped with programmable (electric) Lifting Pins set in radius of 80 mm
- Equipped with Proximity Pins to hold the wafer above the heating plate while baking
- Equipped with perforated vacuum plate to realize a hard contact bake
- Power: max. 1200 W (approx. 550 W to remain at 200°C)
- Voltage: 230 or 110 VAC
- Heater Block Material: Aluminum (anodized)
- Housing Material: Stainless Steel
- Including Hinged Lid with N2 connection
- Weight: 12 kg
- Dimensions: approx. 450 x 320 x 135 mm *dims. are without hinged lid

032024-V1

POLOS® SPIN WET STATION

An extremely versatile platform for a wide range of processes. Based on the proven high quality POLOS® single substrate spin processor, the modular design spin process station provides excellent value for money: full plastic construction, with high-end components, compatible with any chemical environment in a modular set-up, suitable for your specific requirement.

The seamless integration of polypropylene (optional PTFE) spin processor in the base station allows you to work with all kinds of chemicals. In the station housing various modules can be incorporated and centrally controlled for supply of chemicals and gases.

Standard configurations are available for cleaning substrates as well as photo masks, photoresist coating, developing, etching and lift-off processes.

Value for money: Fully automatic, accurate and repeatable processing.

AUTOMATIC DISPENSE

Static chemical dispense through a range of adjustable nozzles in the domed lid. Adjustable back-side spray arm. Heavy-duty motor: programmable for 1 to 12,000 rpm. CW & CCW rotation allowing puddle mode. Megasonic is available as an option.

FREELY PROGRAMMABLE PROCESS

- Sequentially programmable multiple dispense lines.
- Step-less programming of various flows within a process step from 150 up to 2500 ml/min (depending on dispense line thickness. For optional integrated mixing systems, the mixing rates of the various chemicals can be programmed per step.

Source: Fraunhofer ENAS-Dr. Knut Gottfried, Precise Bulk Silicon Wet Etching 2013

SYSTEM COMPARISON

MODEL	POLOS® UC330	POLOS® UC320	POLOS® UC360c
System type	Bench-top	Bench-top	Stand-Alone
Flow rate	1 - 20 ml/min	0.1 - 5 ml/min	< 50 ml/min
Spray diameter	10 - 60 mm	5 - 20 mm	< 100 mm
Spray height	40 - 150 mm	10 - 80 mm	40 - 150 mm
Median droplet size	40 um	40 um	10 - 40 µm
Max. viscosity	30 cps	30 cps	30 cps
Particle size in suspension	< 20 um	< 20 um	< 20 um
Solid concentration	< 30%	< 30%	< 30%
Recommended shaping air pressure	0.01 - 0.05 Mpa	0.01 - 0.05 Mpa	0.01 - 0.05 Mpa
Max. spray area	300 × 300 mm	150 × 150 mm	600 × 600 mm
Motion	XYZ servo system	XYZ servo system	XYZ servo system
Motion precision	± 0.02 mm	± 0.02 mm	± 0.02 mm
Max. velocity	XY axis: 300 mm/sec; Z axis: 30 mm/sec	XY axis: 200 mm/sec; Z axis: 30 mm/sec	XY axis: 500 mm/sec; Z axis: 30 mm/sec
Control method	PLC	PLC	Motion controller & touch screen
Input voltage	220 VAC 50/60 Hz	220 VAC 50/60 Hz	220 VAC 50/60 Hz
System dimension (mm)	1110 (w) x 850 (d) x 970 (h)	830 (w) x 690 (d) x 950 (h)	1720 (w) x 1390 (d) x 2190 (h)
Exhaust system	Built-in exhaust system	Built-in exhaust system	Built-in exhaust system

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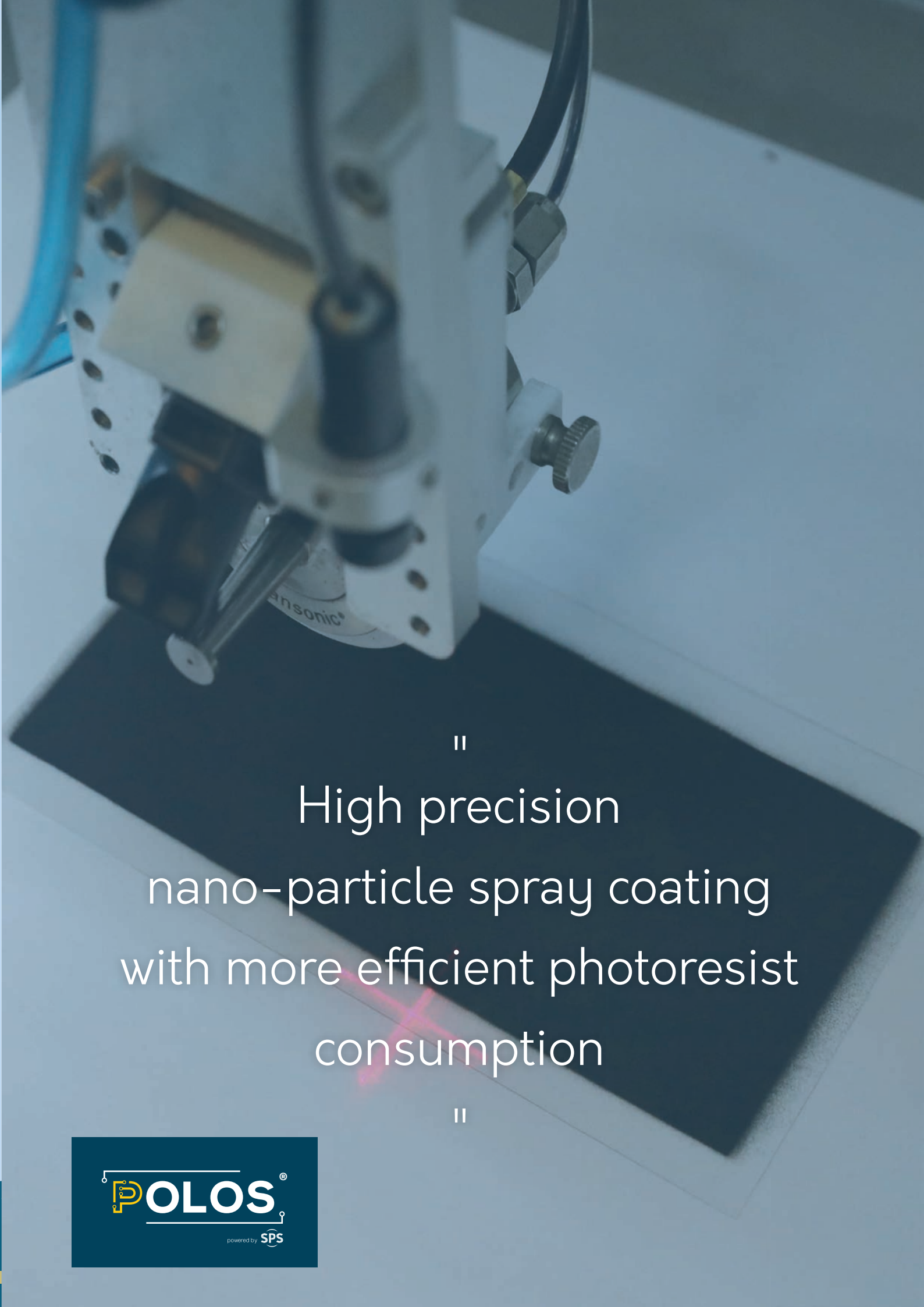

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High precision nano-particle spray coating with more efficient photoresist consumption

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POLOS®
powered by SPS

POLOS® UC330 ULTRASONIC SPRAY COATING SYSTEM

Our POLOS® Table-Top Ultrasonic Spray Coating Systems are used for precision coating in the fields of R&D and small volume production. Typical applications include photoresist coatings for various wafer materials and creating functional layers for thin-film processes.

Our systems allow high precision nano-particle coating with more efficient photoresist consumption compared to standard photoresist application techniques. On our Ultrasonic Spray Coating Systems the material usage ratio exceeds 95%, this will allow our users to reduce costs of photoresist consumption and improve their process efficiency.

Listening to the needs of our customers, we designed a compact system with easy-to-use software controls, the ability to choose from the wide range of Ultrasonic Nozzles and complimentary options will allow our customers to find the perfect match for their process application.

The POLOS® UC330 is standard supplied with integrated syringe pump, carrier gas regulation, ultrasonic generator and controllable motion system. With patented ultrasonic spray technology, the system can provide highly uniform and efficient fine spray coating.

CONFIGURATION	
Utrasonic nozzle	All series of patented ultrasonic spray nozzles available. Controlled by a multi-closed-loop system with a control step size of 0.01 W for high accuracy.
Motion system	High-precision XYZ motor driven stages and laser positioning allowing accurate controllable and repeatable coating.
Liquid delivery	Syringe pump with accuracy up to 0.01 ul/min. Different specifications can be equipped to achieve stable liquid supply.
Exhaust system	Connect the build-in exhaust system to your cleanroom exhaust line.

HIGHLIGHTS

- High precision nanoparticle coating due to Ultrasonic Nozzle, material consumption ratio > 95%.
- Compatible with all series of POLOS® by Siansonic® nozzles; Spray width from 1 mm to 100 mm and flow rate of 0.001 ml/min - 50 ml/min.
- Max. spray area: 300 mm x 300 mm.

OPTIONS

- Vacuum heating plate with maximum temperature of 150°C.
- Ultrasonic bath: used to pre-disperse the coating liquid.
- Ultrasonic syringe: Used to provide nano particle dispersion during the liquid delivery process and to avoid the solid settlement during spray coating.

032024-V1

SPECIFICATIONS

PARTS	ITEMS	VALUE	REMARK
Basic specifications	System dimension	1110 (w) x 850 (d) x 970 (h) mm	
	Air tube size	6 mm	
	Input air pressure	> 0.4 Mpa	
Power supply	Input voltage	220 VAC 50/60 Hz	
	Input current	16 A	
	Max. power	3300 W	
Nozzle (Z402)	Max. power	5.5 W	Optional nozzles available: Specification of the nozzles could be reviewed on nozzle datasheet.
	Flow rate	1 - 20 ml/min	
	Spray diameter	10 - 60 mm	
	Spray height	40 -150 mm	
	Median droplet size	40 um	
	Max. viscosity	30 cps	
	Particle size in suspension	< 20 um	
	Solid concentration	< 30%	
	Recommended shaping air pressure	0.01 - 0.05 Mpa	
	Environment temperature	0 - 60°C	
Motion system	Max. spray area	300 × 300 mm	
	Motion	XYZ servo system	
	Motion precision	± 0.02 mm	
	Max. velocity	XY axis: 300 mm/sec; Z axis: 30 mm/sec	
	Control method	PLC	

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SPECIFICATIONS CONTINUED

PARTS	ITEMS	VALUE	REMARK
Liquid delivery (syringe pump)	Single channel syringe pump	Channel No: 1	
	Max. linear velocity	65 mm/min	
	Min. linear velocity	5 µm/min	
	Display	LCD: 128 × 64 mm	
	Syringe	10 ml or 25 ml	Hamilton
	Liquid tube	1/8” PFA, PEEK connector	Corrosion resistance
	Extra parts (optional)	Ultrasonic syringe 25 ml	Dispersion
Air control	Precision air regulator	> 0.003 MPa	
Nozzle position	Laser positioning	Fast align spray position	
Exhaust system	Could be connected to the exhaust system of the laboratory or cleaning room	Built-in exhaust system	Diameter of exhaust outlet 50 mm
Vacuum heating plate (optional)	Max. temp.	150°C	
	Accuracy	± 1°C	
	Size	300 × 300 mm	
	Material	Aluminum	
	Vacuum source	Vacuum generator	
High temperature heating plate (optional)	High temperature heating plate	500°C	
Ultrasonic dispersion bath (optional)	Power supply	AC220 V, 50 HZ	AC110 V, 60 HZ (optional)
	Ultrasonic frequency	40 kHZ	
	Power	180 W	
	Timer	1 - 30 min	
	Volume	10 L	
	Heating power	250 W	
	Heating range	20 - 80°C	

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TABLE-TOP SYSTEMS

POLOS® UC320 ULTRASONIC SPRAY COATING SYSTEM

Our POLOS® Table-Top Ultrasonic Spray Coating Systems are used for precision coating in the fields of R&D and small volume production. Typical applications include photoresist coatings for various wafer materials and creating functional layers for thin-film processes.

Our systems allow high precision nano-particle coating with more efficient photoresist consumption compared to standard photoresist application techniques. On our Ultrasonic Spray Coating Systems the material usage ratio exceeds 95%, this will allow our users to reduce costs of photoresist consumption and improve their process efficiency.

Listening to the needs of our customers, we designed a compact system with easy-to-use software controls, the ability to choose from the wide range of Ultrasonic Nozzles and complimentary options will allow our customers to find the perfect match for their process application.

The POLOS® UC320 is standard supplied with integrated syringe pump, carrier gas regulation, ultrasonic generator and controllable motion system. With patented ultrasonic spray technology, the system can provide highly uniform and efficient fine spray coating.

CONFIGURATION	
Utrasonic nozzle	All series of patented ultrasonic spray nozzles available. Controlled by a multi-closed-loop system with a control step size of 0.01 W for high accuracy.
Motion system	High-precision XYZ motor driven stages and laser positioning allowing accurate controllable and repeatable coating.
Liquid delivery	Syringe pump with accuracy up to 0.01 ul/min. Different specifications can be equipped to achieve stable liquid supply.
Exhaust system	Connect the build-in exhaust system to your cleanroom exhaust line.

HIGHLIGHTS

- High precision nanoparticle coating due to Ultrasonic Nozzle, material consumption ratio > 95%.
- Compatible with all series of POLOS® by Siansonic® nozzles; Spray width from 1 mm to 100 mm and flow rate of 0.001 ml/min - 50 ml/min.
- Max. spray area: 150 mm x 150 mm.

OPTIONS

- Vacuum heating plate with maximum temperature of 150°C.
- Ultrasonic bath: used to pre-disperse the coating liquid.
- Ultrasonic syringe: Used to provide nano particle dispersion during the liquid delivery process and to avoid the solid settlement during spray coating.

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SPECIFICATIONS

PARTS	ITEMS	VALUE	REMARK
Basic specifications	System dimension	830 (w) x 690 (d) x 950 (h) mm	
	Air tube size	6 mm	
	Input air pressure	> 0.4 Mpa	
Power supply	Input voltage	220 VAC 50/60 Hz	
	Input current	10 A	
	Max. power	1600 W	
Nozzle (Z402)	Max. power	5.5 W	Optional nozzles available: Specification of the nozzles could be reviewed on nozzle datasheet.
	Flow rate	0.1 - 5 ml/min	
	Spray diameter	5 - 20 mm	
	Spray height	10 - 80 mm	
	Median droplet size	40 um	
	Max. viscosity	30 cps	
	Particle size in suspension	< 20 um	
	Solid concentration	< 30%	
	Recommended shaping air pressure	0.01 - 0.05 Mpa	
	Environment temperature	0 - 60°C	
Motion system	Max. spray area	150 × 150 mm	
	Motion	XYZ servo system	
	Motion precision	± 0.02 mm	
	Max. velocity	XY axis: 200 mm/sec; Z axis: 30 mm/sec	
	Control method	PLC	

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SPECIFICATIONS CONTINUED

PARTS	ITEMS	VALUE	REMARK
Liquid delivery (syringe pump)	Single channel syringe pump	Channel No: 1	
	Max. linear velocity	65 mm/min	
	Min. linear velocity	5 µm/min	
	Display	LCD: 128 × 64 mm	
	Syringe	10 ml or 25 ml	Hamilton
	Liquid tube	1/8" PFA, PEEK connector	Corrosion resistance
	Extra parts (optional)	Ultrasonic syringe 25 ml	Dispersion
Air control	Precision air regulator	> 0.003 MPa	
Nozzle position	Laser positioning	Fast align spray position	
Exhaust system	Could be connected to the exhaust system of the laboratory or cleaning room	Built-in exhaust system	Diameter of exhaust outlet 50 mm
Vacuum heating plate (optional)	Max. temp.	150°C	
	Accuracy	± 1°C	
	Size	150 × 150 mm	
	Material	Aluminum	
	Vacuum source	Vacuum generator	
High temperature heating plate (optional)	High temperature heating plate	500°C	
Ultrasonic dispersion bath (optional)	Power supply	AC220 V, 50 HZ	AC110 V, 60 HZ (optional)
	Ultrasonic frequency	40 kHZ	
	Power	180 W	
	Timer	1 - 30 min	
	Volume	10 L	
	Heating power	250 W	
	Heating range	20 - 80°C	

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STAND-ALONE SYSTEMS

POLOS® UC360C ULTRASONIC SPRAY COATING SYSTEM

Our POLOS® UC360c Ultrasonic Spray Coating System is used for precision coating in the fields of R&D and pilot scale manufacturing. Typical applications include thin film solar cell, fuel cell, glass coating, stent coating, balloon catheter coating, ultrasonic spray pyrolysis, and more!

Our systems allow highly precision nano-particle coating with more efficient photoresist consumption compared to standard photoresist application techniques. On our Ultrasonic Spray Coating Systems the material usage ratio exceeds 95%, this will allow our users to reduce costs of photoresist consumption and improve their process efficiency.

Listening to the needs of our customers, we designed a compact system with easy-to-use software controls, the ability to choose from the wide range of Ultrasonic Nozzles and complimentary options will allow our customers to find the perfect match for their process application.

The POLOS® UC360c is standard supplied with integrated syringe pump, carrier gas regulation, ultrasonic generator and controllable motion system. With patented ultrasonic spray technology, the system can provide highly uniform nano-scale thin film coatings, such as fuel cell, solar cell, glass coating, TCO, electronics, and more.

HIGHLIGHTS

- Stand-alone System
- High precision nanoparticle coating due to Ultrasonic Nozzle, material consumption ratio > 95% (Optional Nozzles Available)
- Compatible with all series of POLOS® by Siansonic® nozzles; Spray width from 1 mm to 100 mm and flow rate of 0.001 ml/min - 50 ml/min
- Max. spray area: 600 mm x 600 mm
- Patented full digital ultrasonic generator, Control step size: 0.01W
- Uniformity: >95%
- Liquid viscosity: <30 cps
- Thickness of coating: 20 nm - 100 micron (depending on material)
- XYZ servo motion system
- Continuous syringe pump
- Exhaust system
- Laser light for positioning of nozzle

OPTIONS

- Vacuum heating plate with maximum temperature of 150°C.
- Ultrasonic bath: used to pre-disperse the coating liquid.
- Ultrasonic syringe: Used to provide nano particle dispersion during the liquid delivery process and to avoid the solid settlement during spray coating.

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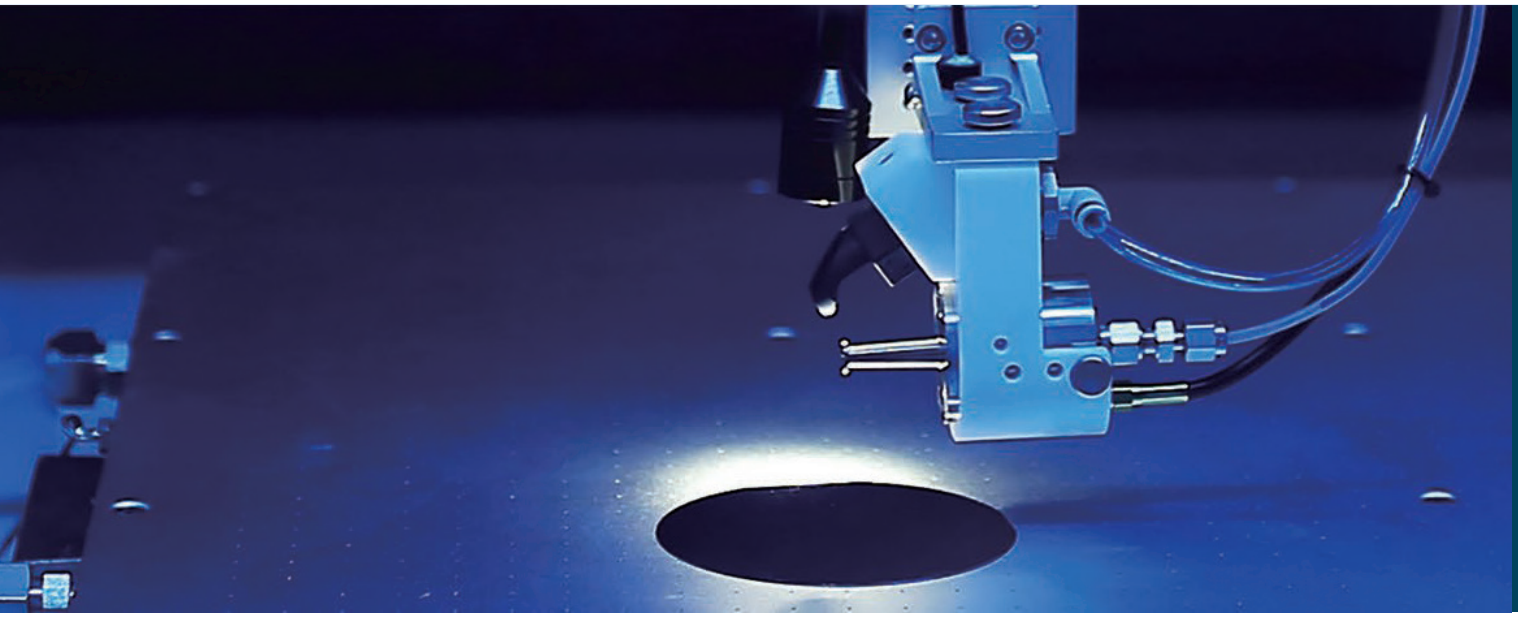

SPECIFICATIONS

PARTS	VALUE	REMARK
System dimension	1720 (w) x 1390 (d) x 2190 (h) mm	
Weight	650 kg	
Power input/supply	220 VAC 50/60 Hz	
Nozzle	Droplet Size: 10-40 µm; Spray Width: < 100 mm; Flow Rate: < 50 ml/min	Optional nozzles available: Specification of the nozzles could be reviewed on nozzle datasheet.
Ultrasonic Generator	Digital ultrasonic generator with power, control step size: 0.01 W	
Motion system	XYZ servo motor system; Max. spray area: 600 mm x 600 mm	
Liquid delivery (syringe pump)	Continuous syringe pump system, constant liquid delivery in 24/7	
Vacuum heating plate (optional)	< 150°C	
Nozzle position	Laser light for positioning of nozzle	
Control	Motion controller & touch screen	
Exhaust system	Including fan and ready for connecting to exhaust system	
Ultrasonic dispersion	Ultrasonic Bath: tor pre-dispersion of the suspensions (Optional) Ultrasonic dispersion liquid delivery technology can provide Nano particles dispersion during liquid delivery (Optional)	

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SYSTEM COMPARISON

All systems include the following features:

- Single-click analysis (no need for initial guess)
- Dynamic measurements
- Reflectance, Transmittance, Absorption, Color parameters
- Save videos for presentations
- 350+ non-identical materials
- Running on Windows 7/8/10
- Free of-charge Software update

MODEL	FR-pOrtable	FR-pRo					
	-	UV/VIS	VIS/NIR	RED/NIR	UV/NIR-HR	UV/NIR-EXT	D UV/NIR
Type	Portable system	Table-top system					
Spectral Range	380 nm - 1020 nm	200 nm - 850 nm	380 nm - 1000 nm	600 nm - 1040 nm	190 nm - 1100 nm	190 nm - 1000 nm	190 nm - 1700 nm
Thickness Range	12 nm - 90 µm	200 nm - 250 µm	12 nm - 100 µm	200 nm - 250 µm	1 nm - 120 µm	3 nm - 80 µm	1 nm - 250 µm
Thickness Accuracy	0.2 % or 1 nm	0.2 % or 1 nm					
Thickness Precision	0.07 nm or 1 ‰	0.07 nm or 1‰					
Light Source MTBF	20,000 h	2,000h					
Dimensions (mm)	110 (w) x 40 (d) x 300 (h)	390 (w) x 320 (d) x 420 (h)					
Power Requirements	USB - supplied	110 V / 220 V					

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MODEL	FR-ES			FR-Scanner	
	VIS/NIR	NIR	NIR-N1	UV/VIS	VIS/NIR
Type	Table-top system			Table-top system	
Spectral Range	370 nm - 1020 nm	900 nm - 1700 nm	850 nm - 1050 nm	200 nm - 850 nm	370 nm - 1020 nm
Thickness Range	12 nm - 100 µm	50 nm - 250 µm	1 µm - 200 µm	3 nm - 80 um	15 nm - 100 um
Thickness Accuracy	0.2 % or 1 nm	0.4 % or 3 nm	0.2 % or 50 nm	1 nm or 0.2 %	
Thickness Precision	0.05 nm	0.1 nm	-	0.02 nm	
Light Source MTBF	Halogen (internal), 3000h (MTBF)			2,000 h	5,000 h
Dimensions (mm)	220 (w) x 200 (d) x 60 (h)			600 (w) x 750 (l) x 500 (h) & 450 (w) x 320 (l) x 250 (h)	
Power Requirements	110 V / 230 V, 50-60 Hz, 10 W			110 V / 230 V, 50-60 Hz, 300 W	

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POLOS® FR-PORTABLE

FR-pOrtable is a unique miniaturized solution for accurate & precise non-destructive characterization of transparent and semi-transparent single films or stack of films. It is a USB-powered film characterization tool at the Point-of-Need. With the FR-pOrtable, the user can perform reflectance and transmittance measurements in the 380 - 1020 nm spectral range.

The compact size of FR-pOrtable and the custom designed reflection probe, guarantee highly accurate and repeatable measurements.

FR-pOrtable, can be either mounted on the supplied stage or can be easily transformed to a handheld thickness measurement tool to be placed over the sample under characterization.

FR-pOrtable is the only optical characterization tool for in-field applications.

APPLICATIONS

- Universities & Research labs
- Semiconductors (Oxides, Nitrides, Si, Resists, etc.)
- MEMS devices (Photoresists, Si membranes, etc.)
- LED
- Data Storage
- Hard/Soft coatings on curved substrates
- Polymer coatings, adhesives, etc.
- Biomedical (parylene, balloon wall thickness, etc.)
- And more... (contact us with your requirements)

FEATURES

- Thickness measurement range: 12 nm to 90 µm
- Refractive Index (n & k) calculation
- Broad Spectral Range: 380 nm – 1020 nm
- USB powered
- Portable
- Reflectance, Transmittance, Absorption and Color parameters

ACCESSORIES

- At-the-Field adaptor: For measurements at the Point-of-Need
- Transmittance module: For the measurement of transmittance & absorbance spectra of coatings, coating thickness etc.
- Manual X-Y stage: For the characterization of coatings at multiple positions (manual movement)

PRINCIPLE OF OPERATION

White Light Reflectance Spectroscopy (WLRS) measures the amount of light reflected from a film or a multilayer stack over a range of wavelengths, with the incident light normal (perpendicular) to the sample surface.

The measured reflectance spectrum, produced by interference from the interfaces is being used to determine the thickness, optical constants (n & k), etc. of free-standing and supported (on transparent or partially/fully reflective substrates) stack of films.

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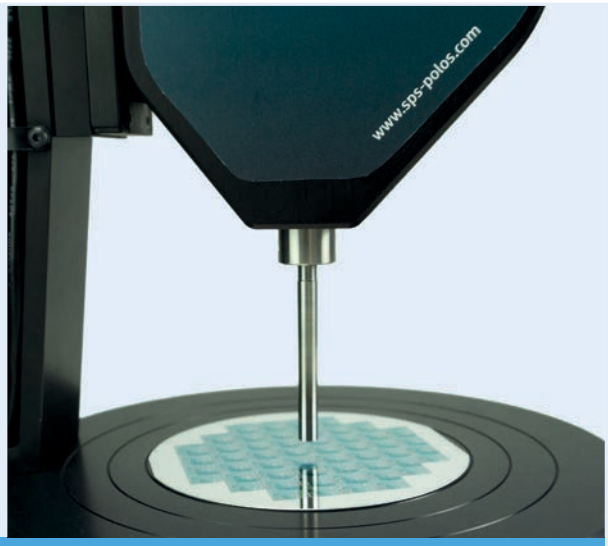

CONFIGURATION

Thickness range*	12 nm - 90 µm
Refractive Index calculation	✓
Thickness Accuracy[1]	0.2 % or 1 nm
Thickness Precision[2],[3]	0.07 nm or 1 ‰ (0.01 nm[3])
Thickness stability[4]	0.06 nm
Sample size	1 mm to 180 mm and up
Spectral Range	380 nm - 1020 nm
Working distance	3 mm - 20 mm
Spot size	360 um (diameter)
Light Source Lifetime	20,000 h
Wavelength resolution	0.8 nm
Number of Layers Measured	Max. 5 layers
Measurement time	10 ms
A/D converter	16 bit
Power	USB - supplied
Dimensions	300 (h) x 110 (w) x 40 (d) mm[5]

*Specifications are subject to change without any notice, [1]Measurements compared with a calibrated spectroscopic ellipsometer and XRD, [2]Average of standard deviation of mean value over 15 days. Sample: 1micron SiO_2 on Si wafer, [3]Standard deviation of 100 thickness measurements. Sample: 1micron SiO_2 on Si wafer, [4]2*Standard-Deviation of daily average over 15 days. Sample: 1micron SiO_2 on Si wafer, [5]Without the stage

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POLOS® FR-PRO

FR-pRo is a modular and expandable platform for the characterization of coatings in the 1 nm – 1 mm thickness range. FR-pRo tools are tailored to the customer needs and are used in a wide range of diverse applications such as: Absorbance / Transmittance / Reflectance measurements, Film Characterization under temperature and ambient controlled environment or even in liquid environment and many more.

FR-pRo is assembled by user selected modules. The Core Unit accommodate the light source, the spectrometer (for any spectral regime in the 200 nm - 2500 nm range) and the control & communication electronics. Then, there is a wide range of accessories, such as:

- Film/Cuvette Holder for Absorbance/Transmittance and chemical concentration measurements
- Film Thickness kit for characterization of coatings
- Thermal or Liquid kits for measurements under controlled Temperature or in Liquid environment
- Integration Spheres for diffuse & total reflectance

By the combination of different modules, the final set-up meets any end-user needs.

APPLICATIONS

- Universities & Research labs
- Semiconductors
- Polymer & Resist characterization
- Chemical measurements
- Dielectric characterizations
- Biomedical
- Hardcoat, Anodization, Metal parts process
- Optical Coating
- Non-metal Films
- And more...

FEATURES

- Thickness measurement range: 12 nm to 90 µm
- Refractive Index (n & k) calculation
- Broad Spectral Range: 380 nm – 1020 nm
- USB powered
- Portable
- Reflectance, Transmittance, Absorption and Color parameters

MODEL*	SPECTRAL RANGE	THICKNESS RANGE
FR-pRo UV/VIS	200 nm - 850 nm	200 nm - 250 µm
FR-pRo VIS/NIR	380 nm - 1000 nm	12 nm - 100 µm
FR-pRo RED/NIR	600 nm - 1040 nm	200 nm - 250 µm
FR-pRo UV/NIR-HR	190 nm - 1100 nm	1 nm - 120 µm
FR-pRo UV/NIR-EXT	190 nm - 1000 nm	3 nm - 80 µm
FR-pRo-D UV/NIR	190 nm - 1700 nm	1 nm - 250 µm

* Specifications are subject to change without any notice;
** Thickness measurements range is representative of the spectra range and refers to a single film layer with refractive index ~1.5 over a high reflective substrate

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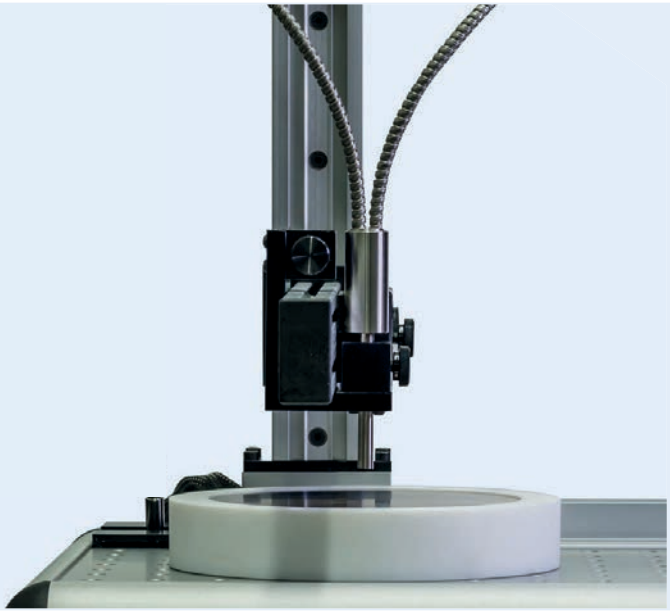

CONFIGURATION	
Computer	Touch Panel PC with 19" screen
Focusing module	Optical module attached on the reflection probe for <100 µm diameter spot size
Film/Cuvette kit	Transmission measurements of films or liquids in standard cuvettes
External base	To accommodate samples up to 300 mm in diameter (reflectance & transmission)
Scanner (motorized)	Polar (R-Θ) or Cartesian (X-Y) automated stage with wafer chuck. The polar option support reflectance and the Cartesian support reflectance & transmittance
Integrating sphere	For the characterization of specular and diffuse reflectance of coatings and surfaces
Manual X-Y stage	Manual X-Y stage for positioning measurements over an area of 100 mm x 100 mm
Thermal Module	Hot plate embedded in the FR-tool operating in the room temperature - 200°C range. Programmable temperature controller (0.1°C accuracy) operated through FR-Monitor
Liquid Module	Teflon® cell for measurements in liquids with optical window (quartz). Sample holder for insertion of the sample into the liquid capable to handle up to 30 mm x 30 mm samples
Flow cells	Measurement of minute values of absorbance, fluorescence in liquids

PRINCIPLE OF OPERATION

White Light Reflectance Spectroscopy (WLRS) measures the amount of light reflected from a film or a multilayer stack over a range of wavelengths, with the incident light normal (perpendicular) to the sample surface.

The measured reflectance spectrum, produced by interference from the interfaces is being used to determine the thickness, optical constants (n & k), etc. of free-standing and supported (on transparent or partially/fully reflective substrates) stack of films.

032024-V1

POLOS® FR-ES

FR-ES is a compact and light-weighted unit for the characterization of coatings. With FR-ES the user can perform reflectance and transmittance measurements in the 370 - 1020 nm spectral range. The FR-ES platform is designed to provide an excellent performance in terms of characterization of coatings.

The FR-ES can be employed in a wide range of diverse applications, such as: Film thickness, Refractive Index, Color, Transmittance, Reflectance, and many more. There are three configurations available: VIS/NIR (370 - 1020 nm), NIR-N1 (850 - 1050 nm), NIR (900 - 1700 nm).

Then, there is a wide range of accessories, such as:
- Filters to block light at certain spectral regimes
- FR-Mic for measurements at very small areas
- Manual stage, either 25 x 25 mm or 100 x 100 mm or 200 x 200 mm
- Film/Cuvette Holder for Absorbance / Transmittance and chemical concentration measurements
- Integration Spheres for diffuse & total reflectance

By the combination of different modules, the final set-up meets any end-user needs.

APPLICATIONS
- Universities & Research labs
- Semiconductors
- Polymer & Resist characterization
- Chemical measurements
- Dielectric characterizations
- Biomedical
- Hardcoat, Anodization, Metal parts process
- Optical Coating
- Non-metal Films
- And many more...

FEATURES
- Single-click analysis (no need for initial guess)
- Dynamic measurements
- Measurement of n & k, color is included
- Save images and videos for presentations
- Multiple installations for off-line analysis
- Free of-charge Software update

PRINCIPLE OF OPERATION
White Light Reflectance Spectroscopy (WLRS) measures the amount of light reflected from a film or a multilayer stack over a spectral range, with the incident light normal (perpendicular) to the sample surface.

The measured reflectance spectrum, produced by interference from the individual interfaces is being used to determine the thickness, optical constants (n & k), etc. of free-standing and supported (on transparent or partially/fully reflective substrates) stack of films.

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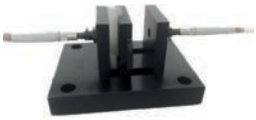
ACCESSORIES

- Focusing module: Optical module attached on the reflection probe for <100 µm diameter spot size
- Transmittance module: Optical module for transmittance/ absorbance measurements
- Film/Cuvette kit: Transmission measurements of films or liquids in standard cuvettes
- Contact probe: Thickness & optical measurements of coatings in the field. Ideal for curved surfaces
- Microscope: Microscope-based reflectance and thickness measurements with high lateral resolution
- Manual X-Y stage: Manual X-Y stage for measurements over an area of 25 x 25 mm or 100 x 100 mm or 200 x 200 mm



MODEL	VIS/ NIR	NIR	NIR-N1
Spectral Range (nm)	370 - 1020	900 - 1700	850 - 1050
Pixels	3648	512	3648
Min Thick -SiO_2	12 nm	50 nm	1 um
Max Thick -SiO_2	100 um	250 um	500 um
Max Thick -Si	-	-	300 um
n&k -Min. Thickness	100 nm	500 nm	-
Thick. Accuracy *,**	1 nm / 0.2%	3 nm / 0.4%	50 nm / 0.2%
Thick. Precision*,**	0.05 nm	0.1 nm	-
Thick. stability *,**	0.05 nm	0.15 nm	-
API support	Yes	-	Yes
Light Source	Halogen (internal), 3000h (MTBF)		
Integration Time	5 msec (min)		
Spot size	Diameter of 350 um (smaller spot size as option)		
Material Database	> 700 different materials		
Dimensions (cm) / Weight (kg)	20 x 22 x 6 (L x W x H), 1.8 (stage excluded)		
Power	110 V / 230 V, 50-60 Hz, 10 W		

* Specifications are subject to change without any notice; ** Thickness range depends on the spectral range and refers to a single layer with refractive index ~1.5 over Si or similar substrate

032024-V1

POLOS® FR-SCANNER

FR-Scanner is a compact bench-top tool for the automatic characterization of films and coatings on wafers, masks or other substrates. Automated, ultra-fast & accurate wafer mapping; FR-Scanner is the ideal tool for the fast and accurate mapping of film properties: thickness, refractive index, uniformity, color etc.
Wafers of any diameter (300 mm max.) / shape can be accommodated on the vacuum chuck.

FR-Scanner scans the wafers by rotating the wafer and by moving it linearly (Polar Coordinates) with unparalleled speed and accuracy in both radius and angle. This way, accurate reflectance data with high repeatability are recorded, making FR-Scanner the ideal tool for at-line and on-line characterization of coatings on wafers or other substrates at processing facilities.

It is offered in a wide range of configurations for the characterization of films as thin as few nanometers and as thick as several hundreds of microns and is accompanied with a dedicated S/W for daily routine use. The FR-Scanner provides excellent performance in terms of accuracy, precision, reproducibility and long-term stability.

APPLICATIONS

- Semiconductor Manufacturing (photoresists, dielectrics, poly-Si, a-Si, DLC, photonic multilayer structures)
- PV Industry
- University & Research labs
- Liquid Crystal Display
- Optical Coatings
- Polymers
- MEMS and MOEMS
- Substrates: transparent (glass, quartz, etc.) and semi-transparent

FEATURES

- Single-click analysis (no need for initial guess)
- Dynamic measurements
- Measurement of n & k, color is included
- Save videos for presentations
- 600+ non-identical materials
- Multiple installations for off-line analysis
- Free of-charge Software update

PRINCIPLE OF OPERATION

White Light Reflectance Spectroscopy (WLRS) measures the amount of light reflected from a film or a multilayer stack over a range of wavelengths, with the incident light normal (perpendicular) to the sample surface.

The measured reflectance spectrum, produced by interference from the interfaces is being used to determine the thickness, optical constants (n & k), etc. of free-standing and supported (on transparent or partially/fully reflective substrates) stack of films.

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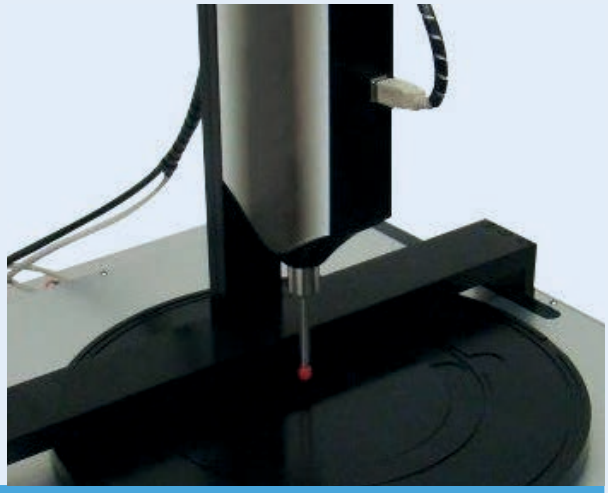

MODEL	UV/Vis	UV/ NIR-EXT	UV/ NIR-HR	D UV/ NIR	VIS/ NIR	NIR D Vis/ NIR	NIR	NIR-980	NIR-1310
Spectral Range (nm)	200 - 850	200 - 1020	200 - 1100	200 - 1700	370 - 1020	370 - 1700	900 - 1700	900 - 1050	1280 - 1350
Pixels	3648	3648	3648	3648 & 512	3648	3648 & 512	512	3648	512
Thickness range	3 nm - 80 um	3 nm - 90 um	3 nm - 120 um	1 nm - 250 um	15 nm - 100 um	15 nm - 250 um	50 nm - 250 um	300 nm - 1.2 mm	12 um - 2 mm
Min. Thickness for n & k[1]	50 nm	50 nm	50 nm	50 nm	100 nm	100 nm	500 nm	-	-
Thickness Accuracy[2]	1 nm or 0.2 %	1 nm or 0.2 %	1 nm or 0.2 %	1 nm or 0.2 %	1 nm or 0.2 %	2 nm or 0.2 %	3 nm or 0.4 %	50 nm or 0.2 %	50 nm or 0.2 %
Thickness Precision[3,4]	0.02 nm	0.02 nm	0.02 nm	0.02 nm	0.02 nm	0.02 nm	0.1 nm	5 nm	5 nm
Thickness stability[5]	0.05 nm	0.05 nm	0.05 nm	0.05 nm	0.05 nm	0.05 nm	0.15 nm	5 nm	5 nm
Light Source	Balanced Deuterium & Halogen				Halogen				SLED
Light Source MTBF	2,000 h				5,000 h				200,000 h
Material Database	> 600 different materials								
Sample Size	Wafers: 2"- 3"- 4"- 6"- 8" - 300 mm[1]								
Resolution in R/ Angle	5 µm/0.1°								
Scanning Speed[6]	300 meas/min (8" wafer size)								
Dimensions (mm)	600 (w) x 750 (L) x 500 (h) mm and 450 (w) x 320 (L) x 250 (h) mm								
Power Requirements	110 V/230 V, 50-60 Hz, 300 W								

[1] Specifications are subject to change without any notice, [2] Measurements compared with a calibrated spectroscopic ellipsometer and XRD, [3] Average of standard deviation of mean value over 15 days. Sample: 1micron SiO_2 on Si wafer, [4] Standard deviation of 100 thickness measurements. Sample: 1micron SiO_2 on Si wafer, [5] 2*Standard-Deviation of daily average over 15 days. Sample: 1micron SiO_2 on Si wafer. [6] The chuck can accommodate samples of arbitrary shape. Stage 450 mm wafers is also available on request. True X-Y scanning is also possible through custom-made configuration.

032024-V1

SYSTEM COMPARISON

At POLOS®, we provide a full line of desktop ALD equipment for research to pilot line, from thermal ALD to plasma ALD. Our simple and reliable ALD systems lead to fast, proof-of-concept solutions at the lowest cost. These systems are user-friendly and flexible to quickly optimize your process.

MODEL	AT200M	AT410	AT650T	AT650P
System type	Thermal	Thermal	Thermal	Plasma
Substrate size	2"	4" (also available in 6" and 8")	6"	6"
Heated precursors	Up to 2	Up to 3	Up to 4	Up to 4
Temperature range	Up to 250°C	Up to 310°C	40 - 400°C	40 - 400°C
Chamber	Stainless-steel	Aluminum	Aluminum	Aluminum
Customizable chucks	Yes	Yes	Yes	Yes
Glovebox integration	Not required. Fits in glovebox.	Yes	No	No

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2 INCH TABLE-TOP ALD SYSTEM

Meet the smallest footprint ALD tool available on the market. The AT200M is specifically designed for simple operation and installation. Its small size makes it ideal for SEM/ TEM prep or for use in a glovebox. It is by far the lowest cost ALD tool on the market.

The AT200M utilizes semiconductor grade components, metal-sealed lines and a robust PLC driven user interface that yields fast cycling and high-quality single component thin films while still realizing easy maintenance and safe, repeatable operation.

OPTIONS

- Vacuum pump
- Ozone generator (ATOzone)
- Bottle heaters
- ALD precursors

FEATURES

- Small Footprint Desktop Thermal ALD system
- Stocked for immediate shipment. Worldwide.
- Accommodates samples from 2" x 2" x 3" or two 2" round wafers (customizable chucks)
- 2 precursor ports with heat traced lines
- Vented precursor enclosure
- High temperature compatible fast pulsing ALD valves with ultrafast MFC for integrated inert gas purge - standard
- Up to 2 heated precursors
- All stainless-steel chamber with temperature range to 250°C
- High exposure available with static processing mode
- 5" Display with integrated PLC control
- Lifetime SW upgrades included
- 1 year warranty (parts and labor included)

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THERMAL ALD

4 INCH TABLE-TOP ALD SYSTEM

ALD technology has taken a leap in the past couple of years. POLOS® offers various systems, including a table top version for surface controlled layer-by-layer depostion with atomic layer accuracy.

7" 16-bit color touchscreen HMI

Analog pressure controller for quick pressure check and pulse monitoring.

7" touchscreen display with complete control over operation of the tool, recipe generation and sensor date. Easy to use and robust control SW interface.

NEW! 6" and 8" systems also available!

R&D SYSTEM FOR GROWING CONFORMAL THIN FILMS AT SMALLER SCALES

Large substrate and precursor temperature ranges

- Chamber temperatures from RT to 350 °C ± 1°C
- Precursor temperatures from RT to 150 °C ± 2°C with opt. heating jackets

Fast cycling capability

- 6-10 cycles/min or up to 1.2 nm/min of Al_2O_3 (best in class)

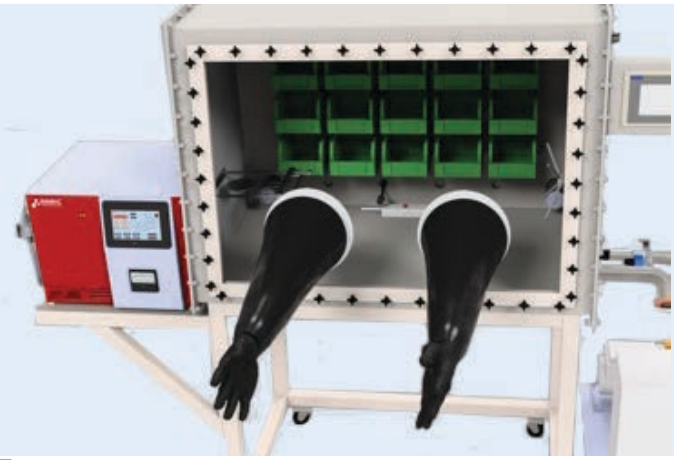
Up to five ALD precursor sources at one time

- Three (3) organometallic or other metal containing sources all up to 150°C

TABLE TOP ALD SYSTEMS

There is a need for deposition equipment optimized for growing conformal thin films at smaller scales at a reasonable cost. The AT410 4" system accomplishes these goals and fills a space in the market.

The AT-410 ALD system provides a solution to conformal, conductive thin films for 3D sample prep while also providing traditional 2D coatings that are currently grown using sputtering/ evaporation. The AT410 not only pushes the boundaries, but is also an effective replacement for current sample preparation processes all within a bench-top configuration at a comparable price point.



GLOVEBOX INTEGRATION

A standard AT410 can be attached to a glove box with a glove box adapter upgrade. The system is sealed to an open side of a pressxisting or new glove box.

The deposition chamber and sample holder are completely sealed within the inert gas environment. Air sensitive materials and substrates can be handled and deposited with utmost confidence. 100% of the glove box floor and shelving will remain accessible after installation ALD system.

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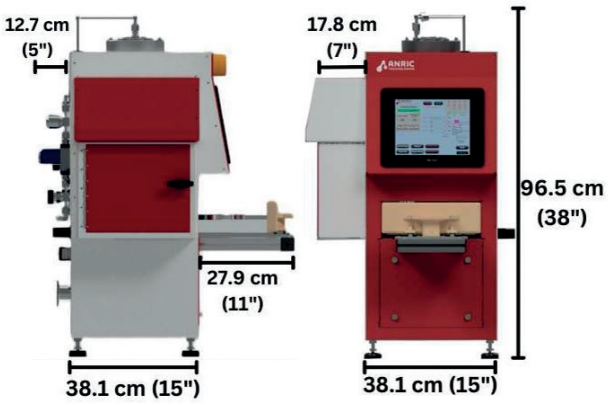
6 INCH TABLE-TOP ALD SYSTEM

The AT650T is a small footprint desktop thermal ALD tool with in-field upgradeability to Plasma. It is designed with a streamlined chamber design and small chamber volume, while also offering fast cycling capability and high exposure for deep penetration processing.

The AT650T has a small footprint (15" by 15"), bench-top installation and is fully cleanroom compatible. Its fast cycling capability and high exposure make deep penetration processing possible. Due to its simple system maintenance and low utilities cost, this tool is a very cost effective desktop thermal ALD system.

OPTIONS

- Upgrade to Plasma
- Customized chuck/platen
- ATOzone - ozone generator (required for some films: Pt, Ir, SiO_2, MoO_2, high quality Al_2O_3 below 60°C, high quality HfO_2)
- QCM (Quartz Crystal Microbalance)
- Additional Counter reactant lines (MFC controlled) – up to 2 additional
- Optional 4th heated precursor (185°C)
- Additional heated precursor line to 185°C for 4 total



FEATURES

- Smallest Footprint Desktop Plasma ALD
- Affordable Plasma ALD at the cost of a thermal system
- Accommodates samples of 6" diameter with optional customizable chucks
- Warm walled aluminum chamber with heated sample holder from 40 – 400°C
- 3 organometallic sources (can be heated to 185°C with nitrogen assist), 1 at RT (upgradeable to 185°C) and up to 4 oxidant/ reductant sources.
- High temperature compatible fast pulsing ALD valves with ultrafast MFC for integrated inert gas purge - standard
- Substrate temperature to 400°C
- High exposure available with static processing mode
- Full HW and SW interlocks for safe operation even in multi-user environment.

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6 INCH TABLE-TOP ALD SYSTEM

The AT650P is a small footprint desktop plasma ALD tool with a streamlined chamber design and small chamber volume, while also offering fast cycling capability and high exposure for deep penetration processing.

The AT650P has a small footprint (15" by 15"), bench-top installation and is fully cleanroom compatible. Its fast cycling capability and high exposure make deep penetration processing possible. Due to its simple system maintenance and low utilities cost, this tool is a very cost effective desktop plasma ALD system.

OPTIONS

- Customized chuck/platen
- QCM (Quartz Crystal Microbalance)
- Additional Counter reactant lines (MFC controlled) – up to 2 additional
- Optional 4th heated precursor (185°C)
- External control – PC/software link (allows programing and running, remotely)
- Higher than standard pressure regime

FEATURES

- Smallest Footprint Desktop Plasma ALD
- Affordable Plasma ALD at the cost of a thermal system
- Accommodates samples of 6" diameter with optional customizable chucks
- Warm walled aluminum chamber with heated sample holder from 40 – 400°C
- 3 organometallic sources (can be heated to 185°C with nitrogen assist), 1 at RT (upgradeable to 185°C) and up to 4 oxidant/ reductant sources.
- High temperature compatible fast pulsing ALD valves with ultrafast MFC for integrated inert gas purge - standard
- Substrate temperature to 400°C
- High exposure available with static processing mode
- Integrated matching network
- Full HW and SW interlocks for safe operation even in multi-user environment.

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AT-OZONE GENERATOR

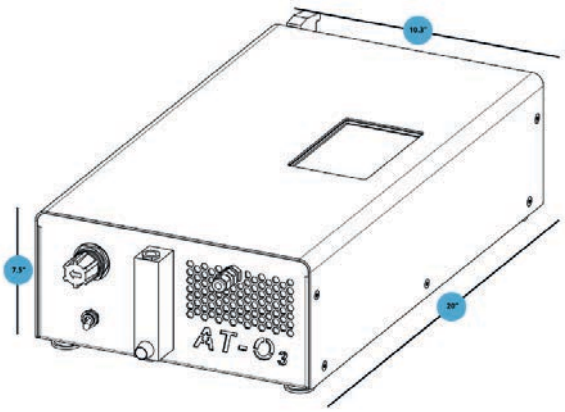
The ATOzone (Ozone Generator) system utilizes high quality components that deliver high concentration (up to 12%) ozone in a very small form. The system does not require expensive and bulky water cooling. The built-in high velocity fans keep the plasma cell cool even during prolonged or constant use.

The user can choose between manual or automatic switching between ozone, oxygen and off positions.

In Thermal ALD processes ozone is required for low temp Pt, Ir, SiO_2, MoO_2, high quality Al_2O_3 below 60°C and high quality HfO_2

OPTIONS

- Ozone Safety Monitor (Integrated)
  - Green: ozone level is below 1500 ppb
  - Yellow: ozone level 1500 ppb to 3500 ppb
  - Red: ozone level greater than 3500 ppb



FEATURES

- Ozone production range: 12% by weight at low flow, 6% at high flow.
- Integrated O2 regulator: 3 – 29 psi
- High capacity ozone destructor for off-cycle ozone flow
- Can be controlled by 3 – 24 V input signal
- Override switch for manual ozone control
- Front panel switch for O2 or Ozone output selection

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PROTECT YOUR WAFERS

The most valuable product in the semiconductor and electronics industry is also the most fragile and susceptible to mishandling and contamination. Mix in that not all wafers are created equal, which means one product does not fit all wafers! POLOS® offers various solutions to safely ship and store your wafers; from single wafer shipping shippers, wafer boxes, wafer containers, wafer carrier trays to coin style and clamshell shippers.

From the most advanced eLX wafer canisters to cost-efficient wafer jars, we offer tailor fit products to meet your requirements. Our coin style and clamshell shippers keep the wafers secure and only contact the edges of the wafer during shipping and storage.

The single wafer shippers are available in different sizes 1", 1.5", 2", 2.5", 3", 4", 5" and 6" and in materials Natural PP or ESD-Safe Conductive PP. They are impact resistant with a screw-on lid for secure packing. Available from stock! Contact us for special requests!

WAFER SIZE	ePAK DESCRIPTION	INTERNAL DIAMETER	ORDER CODE
1" (25 mm)	eCT1-25-ASSY-1-eM-08-NAT	25.4 mm	eWB0091-ASSY-1
1.5" (38 mm)	eCT1.5-38-ASSY-1-eM-08-NAT	39.6 mm	eWB0325-ASSY-1
2" (50 mm)	eCT2-50-ASSY-1-eM-08-NAT	52 mm	eWB0021-ASSY-1
2.5" (63 mm)	eCT2.5-63-ASSY-1-eM-08-NAT	65.5 mm	eWB0328-ASSY-1
3" (76 mm)	eCT3-76-ASSY-1-eM-08-NAT	78.6 mm	eWB0022-ASSY-1
4" (100 mm)	eCT4-100-ASSY-1-eM-08-NAT	104 mm	eWB0024-ASSY-1
5" (125 mm)	eCT5-125-ASSY-1-eM-08-NAT	127 mm	eWB0060-ASSY-1
6" (150 mm)	eCT6-150-ASSY-1-eM-08-NAT	152 mm	eWB0025-ASSY-1

Process boats and storage boxes for 2, 3, 4, 6 and 8" wafers. Designed with open or closed slots to ensure easy and safe wafer handling.

Wafer shipping boxes for 1, 2, 2,5, 3, 4, 6 and 8" wafers. Designed to hold multiple wafers by the edge.

Plastic wafer jars, with foams and wafer separators and liners for easy loading / unloading in automated or manual applications.

ELX wafer canisters enhanced protection of wafer surfaces. Minimizes lateral movement without applying compression to delicate wafer edges.

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VACUUM HANDLING

The manufacturing cycle of Si wafers and other compound material wafers such as; InP, SiC, GaAs, GaN and Ge, consists of many process steps. To be able to safely handle your wafers between and during your process, WHS® offers a wide range of vacuum handling and mechanical handling solutions. All our vacuum handling solutions are interchangeable and compatible with other brands.

CORDLESS VACUUM WAND ASSEMBLY

Advanced technology cordless portable battery-powered vacuum wand allows independance from vacuum lines. Provides mobility to go anywhere in the cleanroom. The wireless smart charger base electronics keep the (owner replaceable) Lithium-Ion battery fully charged without the worry of damage from overcharging. Designed for wafer rescue or light-production, ISO Class 3.

FEATURES

- Self-Contained 600mbar (17.7" Hg Barometric) vacuum
- ESD-Safe Antistatic Construction with ground path
- Advanced HEPA filter 99,99% of 0,3 µm particles
- No house vacuum needed
- Base unit can handle all wafer sizes and tips/cups

TABLE-TOP PORTABLE WAND

Advanced table-top portable battery-powered vacuum wand allows independence from vacuum lines. Provides mobility to go anywhere in the cleanroom. The powerful vacuum pump, high performance battery and auto-shutoff holder allows this system to be used in a high production environment for multiple days on one charge. Ships with a choice of vacuum tip and small device adapter if needed. Designed for wafer rescue or heavy-production, 800mBar (23.6"Hg). ISO 3, FS209E Class 1.

FEATURES

- Self-contained 800 mbar (23.6" Hg Barometric) vacuum
- ESD-Safe Antistatic Construction with ground path
- Advanced HEPA filter 99,99% of 0,3 µm particles
- Auto-on pickup feature
- One unit for all wafer sizes
- Continuous runtime 20 hours

VACUUM TIPS - PEEK

We offer widely used antistatic PEEK tips for ESD-Safe wafer handling, or our high temperature Polyimide tips when handling wafers from/to your platen, evaporator, hotplate or any other high temperature equipment.

SMALL DEVICE CUPS

Antistatic conductive silicone rubber vacuum cups for high temperature applications, antistatic Nitrile Buna N rubber vacuum cups for general use application, or PUR® ultra silicone rubber non-marking vacuum cups for optic handling application. ISO Class 5.

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WHS® WAFER EDGE PICKS

Our line of photolithography wafer edge picks are the result of years of working with semiconductor companies to provide a non-contaminating secure means of handling photo masks. With the stringent cleanliness requirements for sub-micron applications today, our mask handling tools have become indispensable.

WHS® WAFER EDGE PICK G1 SERIES

The G1 series is an antistatic normally-closed edge grip mechanical wafer handling tool, 120-1000 µm thickness wafers. Antistatic PEEK backside contact, 3 mm perfluorocarbon elastomer high temperature + inert front side touch pad. Ergonomic weighted handle and easy to use trigger designed for safe handling of SEMI Standard round substrates.

FEATURES

- Normally-Closed Edge Wafer Handling
- Ergonomic Safe Wafer Handling
- ISO 4 (FS209E Class 10) Cleanroom Compatible
- Perfluorocarbon 3 mm Front Side Touchpad
- Antistatic Material Construction.

CONFIGURATION	
Sizes	0-76 mm (2”-3”), 100 mm (4”-5”), 150 mm (6”), or 200 mm (8”)
Type	Edge Grip
Material	Antistatic PEEK backside/gripper

WHS® WAFER EDGE PICK, SPATULA G2 SERIES

The G2 series is an antistatic normally-closed edge grip mechanical wafer handling tool, 120-1000 µm thickness wafers. The WHS-G2 features a knife edge spatula for lifting wafers from a flat surface. Compatible with < 160°C surfaces. Features knife edge spatula for lifting wafer from hotplates/ platens. Antistatic PEEK backside contact, 3 mm perfluorocarbon elastomer high temperature + inert front side touch pad. Ergonomic weighted handle and easy to use trigger designed for safe handling of SEMI Standard round substrates.

FEATURES

- Normally-Closed Edge Wafer Handling
- Knife-Edge Spatula Model
- Ergonomic Safe Wafer Handling
- ISO 4 (FS209E Class 10) Cleanroom Compatible
- Perfluorocarbon 3 mm Front Side Touchpad
- Antistatic Material Construction.

CONFIGURATION	
Sizes	0-76 mm (2”-3”), 100 mm (4”-5”), 150 mm (6”), or 200 mm (8”)
Type	Edge Grip with Spatula
Material	Antistatic PEEK backside/gripper

032024-V1

WAFER HANDLING SYSTEMS®

"

With decades of experience we deliver tools that not only work, but last in a cleanroom environment

"

HIGH-END PHOTOLITHOGRAPHY SOLUTIONS

POLOS® provides high-end Semiconductor equipment especially targeted to support; Universities, R&D institutes and small production facilities. Our portfolio consists of user-friendly and highly durable systems, mainly within the Photolithography process area. We are part of the SPS Group.

We believe technology moves the world forward. Not only in terms of growth, but also in terms of efficiency and sustainability. We are proud to be a part of an industry that holds the key to a better future for all. And we are extremely driven to help you innovate and improve your semiconductor production processes with innovative products, advice and service.

We carefully select our equipment, based on long-term experience and user feedback, to support your process. If you want to see for yourself how our solutions could fit into your cleanroom environment, simply contact us. We have at least 1 demo system operational at all times, as well as local service engineers and remote support! For more information, please contact your local office.

POLOS®: Empowering your research with tools for photolithography and coating applications, enabling unmatched results.

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