Polaris High-end 3D surface metrology

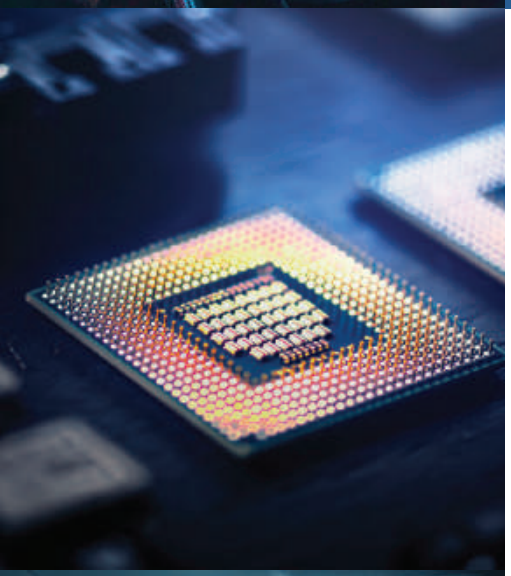
Accuracy and precision down to the nanometer for the most demanding measuring tasks on complex surfaces

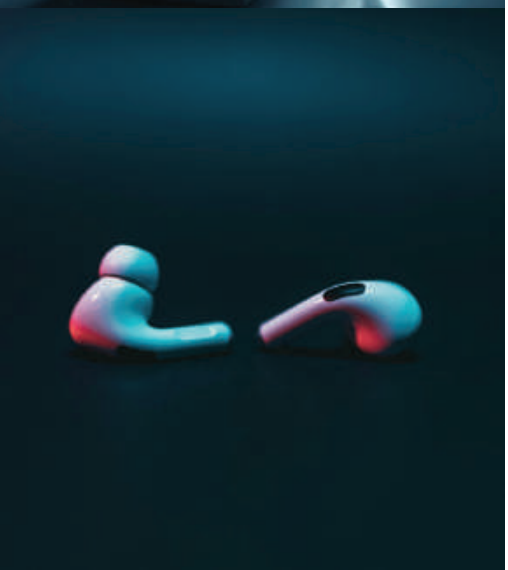
- **Highest optical and digital resolution**
- **Diffraction limited imaging**
- **Reliable technology**
- **ISO compliant roughness values**
- **Non-contact measurements**
- **Maintenance-free and robust**

Solarius is a leading provider of precision systems for non-contact surface inspection, measurement, analysis, and visualization.

Our products combine high-resolution sensors with automated data acquisition systems and powerful analysis tools. Offerings range from desktop systems for off-line inspection, to semi-automated systems for fast, precise measurements, to customized multi-station platforms for high-volume in-line inspection. Our design philosophy focuses on standard products as well as customized solutions to best meet specialized requirements.
This process starts with understanding metrology challenges and budget constraints, followed by in depth analysis by our application and development engineers.
Customizing data acquisition software, analysis tools, and user interfaces are part of our approach to solve unique metrology application tasks.

Solarius corporate office and product development center are headquarted in San Jose, California. Our global entities and operations for sales, application engineering, customer support, and product development are based in China (Shanghai), Europe (Munich and Essen) and India (Pune). Augmented by our international partner network Solarius oversees an installed base exceeding 2,000 active metrology systems worldwide.





Solarius target markets such as **medicine**, **power supply**, **consumer electronics** and the **semiconductor** industry.

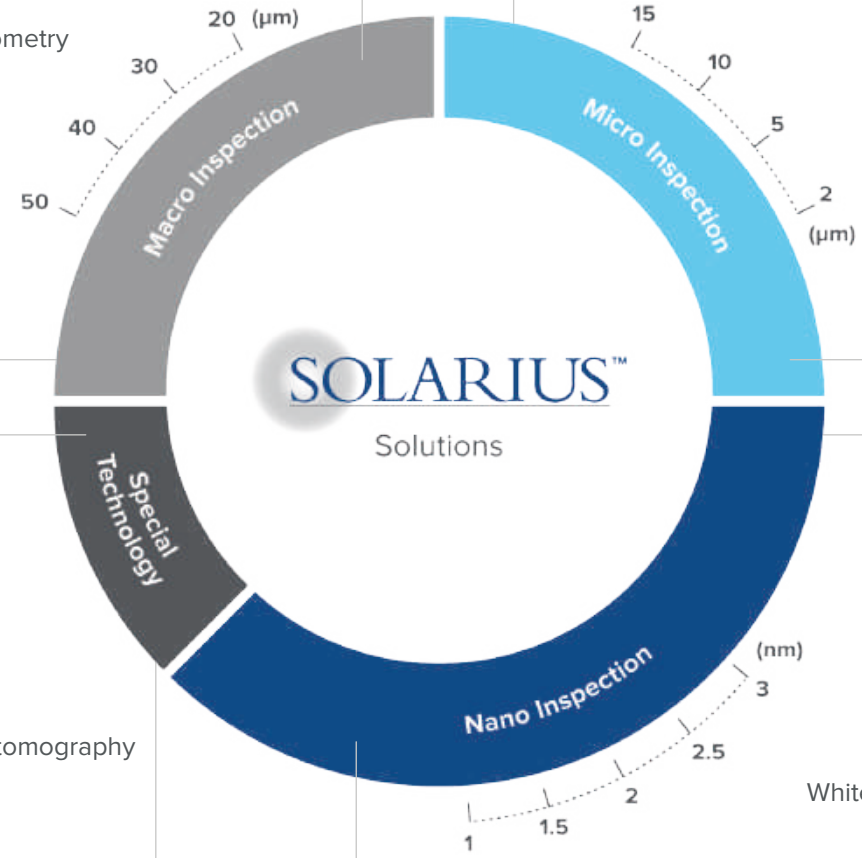
Specifically, the main focus of Solarius activities is on the challenges that regenerative energy supplies and the unstoppably advancing integration of increasingly intelligent systems require.

While innovations in medical technology are the basis for health and life, the semiconductor industry and energy supply are the starting point for every technological advance. Fuel cells enable emission-free mobility while hydrogen can effectively solve the storage problem of renewable energy. Micromechanical components and nanomaterials allow the fastest possible diagnoses and therapies and semiconductors are the basis for communication and control of almost every technological achievement of the present. While mobility is focused on range and availability and thus the requirements for energy efficiency and storage capacity will be addressed in the coming years with large investments, the semiconductor industry is still required to enable higher integration densities and computing power and with significant investments in new technologies to advance miniaturization to quantum systems.

In the medium to long term, Solarius' target markets are stable growth markets. Technological progress cannot and must not destroy the foundations of life any further, the integration and networking of communication and autonomous technology cannot be effectively and permanently halted even in case of uncontrollable events, and ultimately medical performance will continue to remain an unrestricted necessity, as current experience once again has demonstrated impressively.

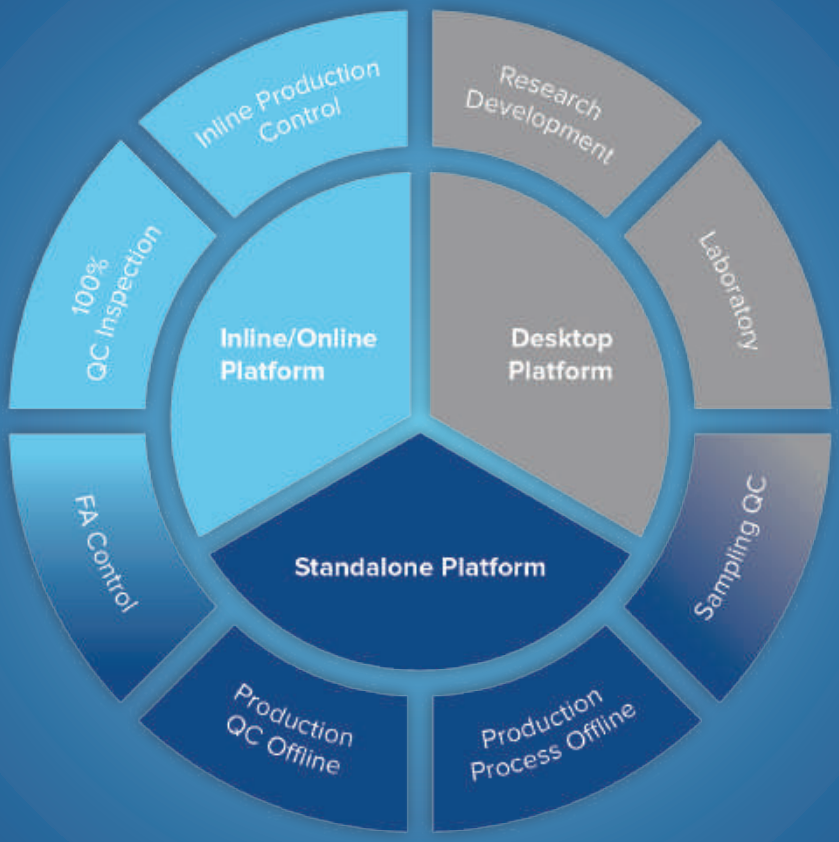
Vision camera
Focus variation
Confocal line
White light interferometry
Triangulation

Triangulation
Confocal area
Confocal point
Focus variation
Vision camera



Optical coherence tomography
TTV, CSI, Infrared
Dual Sensors.

Confocal Area
Confocal Line
Confocal Point
White light Interferometry
Holography

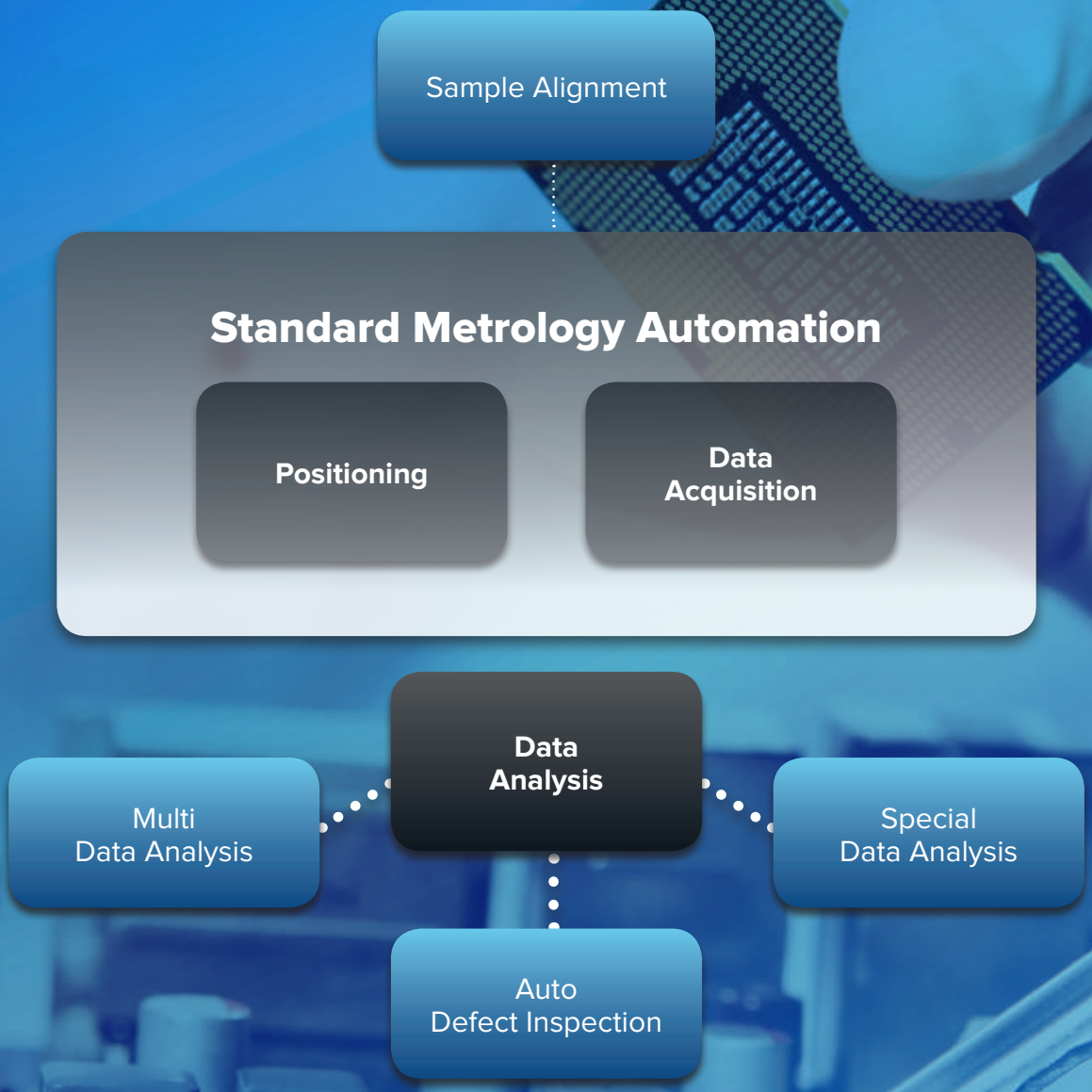


Solarius
Powerful User Interface

- **Sensor interchangeable without learning new UI**
- **Fully programmable for automatic inspection**
- **Algorithm to perform fully automatic data analysis**
- **Machine-learning for auto defect inspection**

Compliant with SEMI, GAMP, FDA standard SECS-GEM interface.

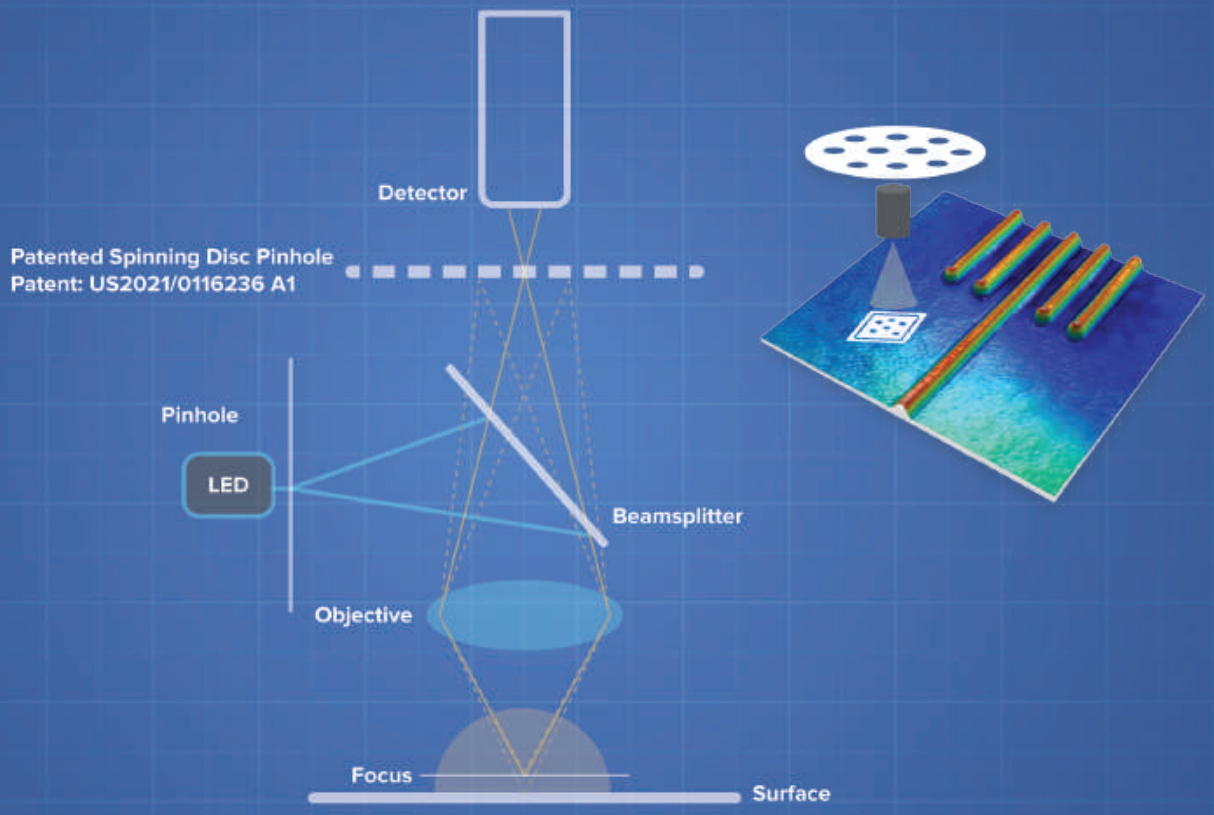
Automated **Metrology Solution**



Presented data formats: 3D image, 3D Models (Stp, Std), PDF, excel, csv, txt.

Confocal Area Sensor

Axial Resolution: **1~25nm**
Lateral Resolution: **160~480nm**

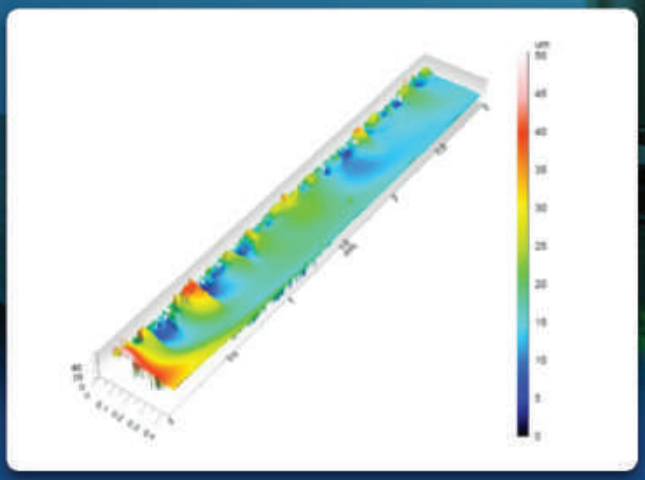


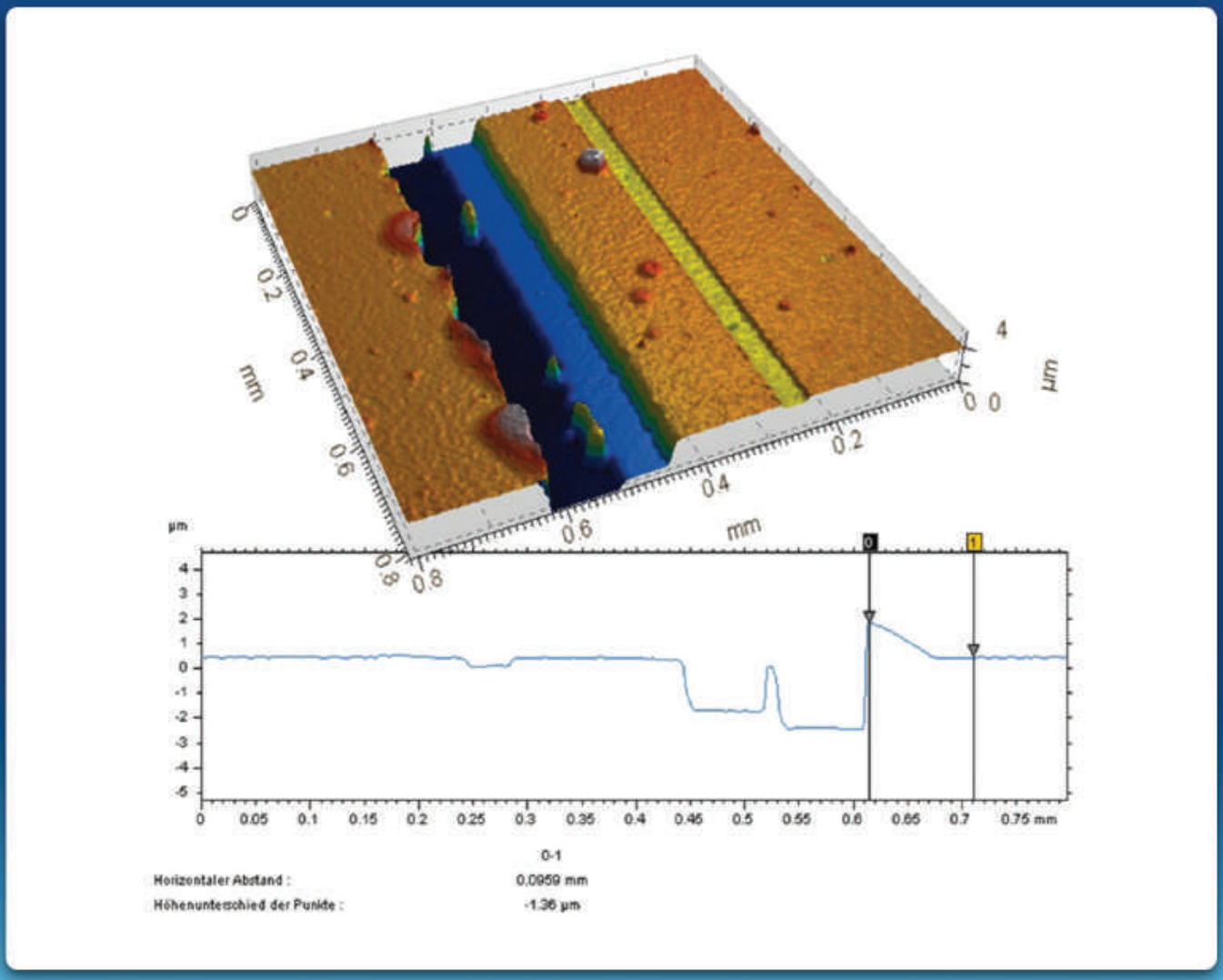
In a confocal microscope, light is focused onto the surface. The reflected light is focused through the objective onto a pinhole before reaching the detector.
Only surface reflection light in focus reaches the detector through the pinhole.
The object moves up and down through the Z-Range and an algorithm detects the focus position on the surface.

In the "Confocal Area Microscope" the LED light is focused by a rotating pinhole disc and the objective onto the surface that reflects the light. Only surface reflections in focus pass the pinhole disc again through the holes – that light falls on the CMOS Camera. The rotation of the disc causes the entire sample surface to be scanned without gaps.

Application

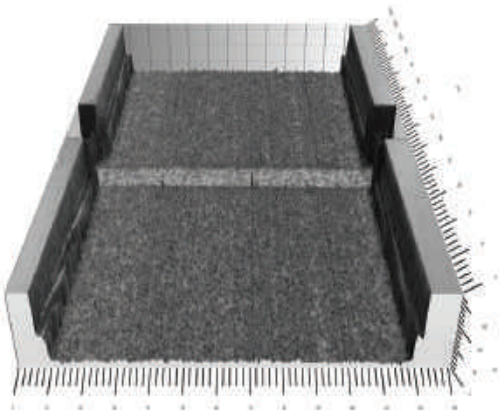
Wafer Dicing Trench Inspection

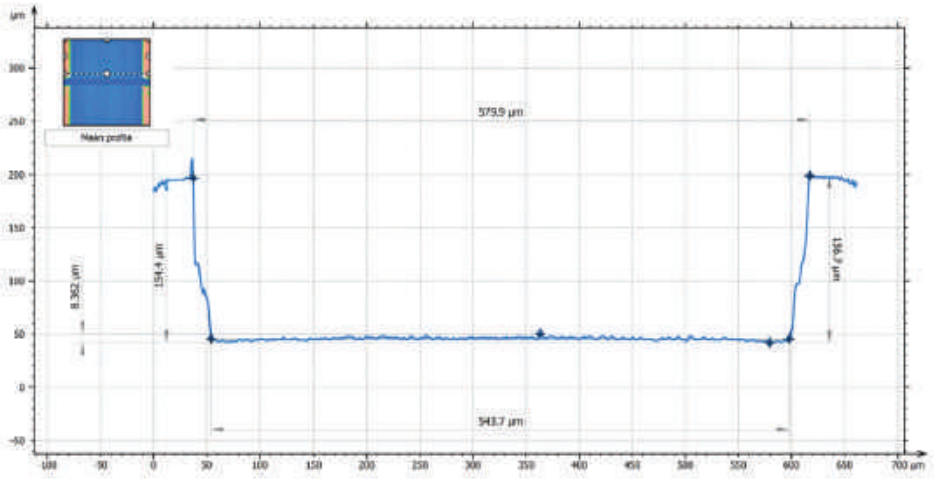


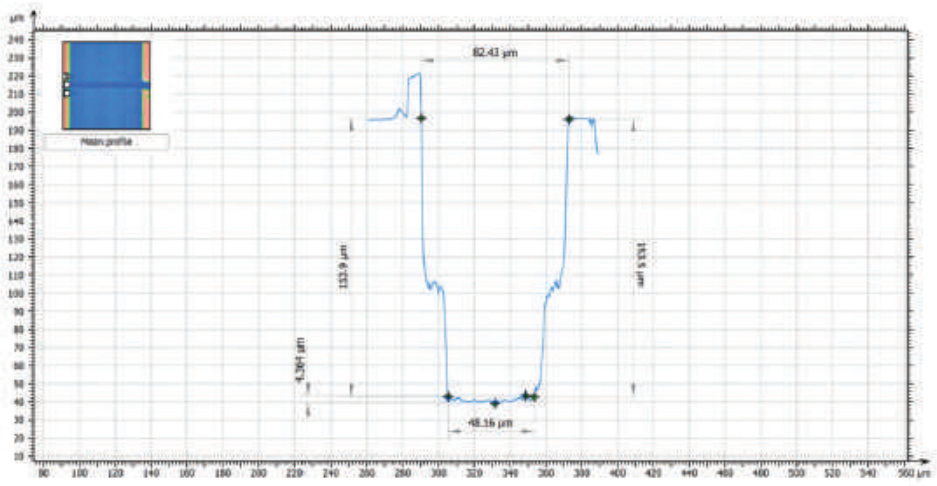


Application

Wafer Dicing Trench Inspection

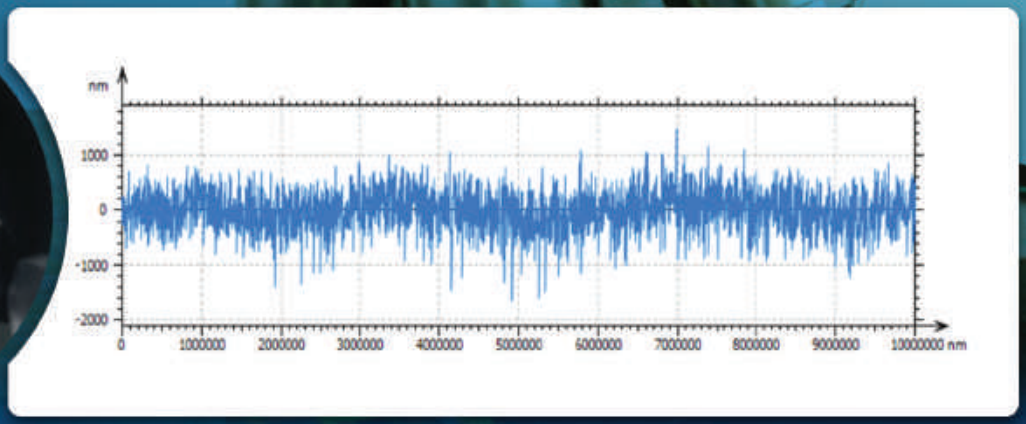




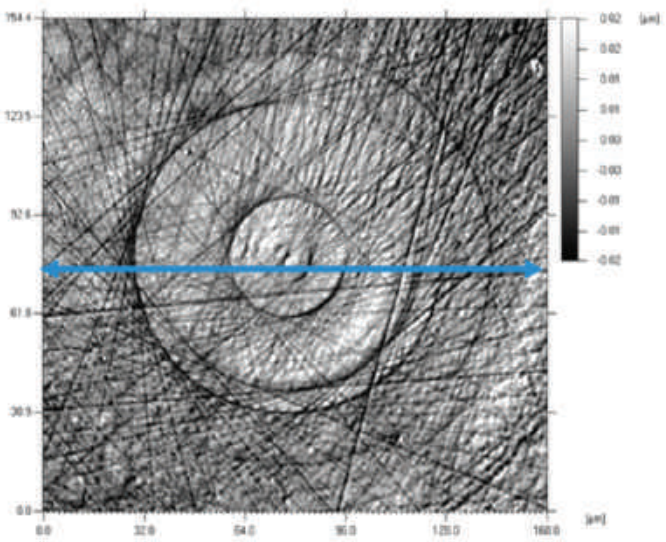


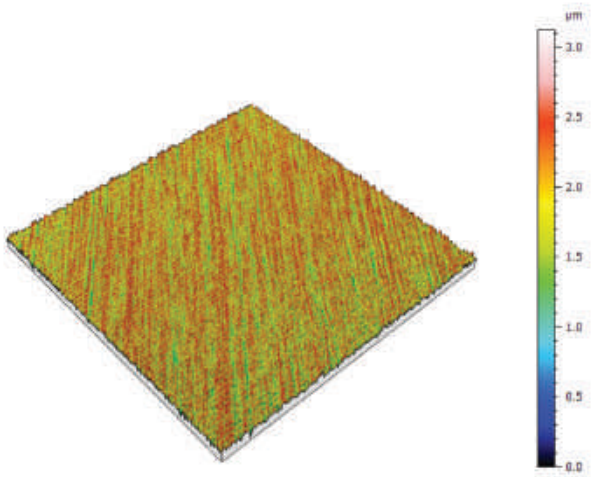
Application

Thin wafer Roughness Inspection



Parameters	Value	Unit	
Length	1000	nm	



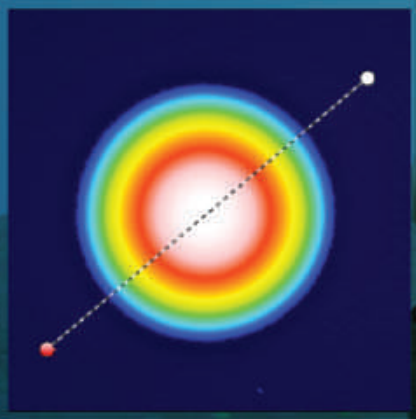


Ra = 0.005 µm
Rz = 0.038 µm

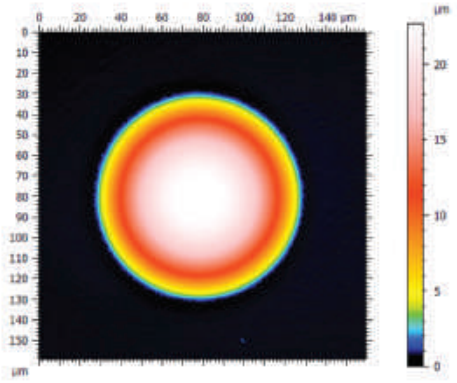
ISO 25178 - Primary surface			
F: [Workflow] Form removed (LS-poly 1)			
S-filter (λs): Gaussian, 0.8 µm			
Height parameters			
Sp	1288	nm	*Maximum peak height*
Sv	1801	nm	*Maximum pit depth*
Sz	3089	nm	*Maximum height*
Sa	263.0	nm	*Arithmetic mean height*

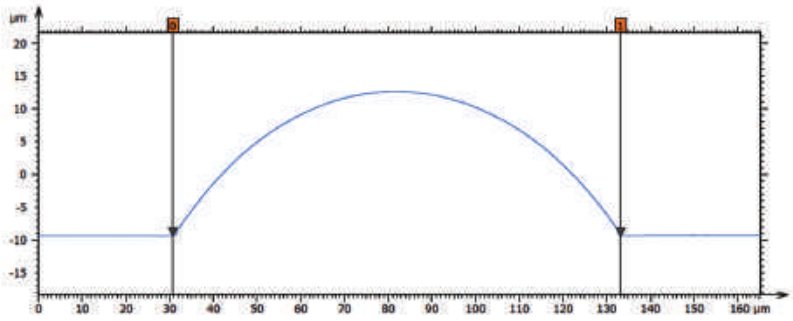
Application

Micro Lens Inspection

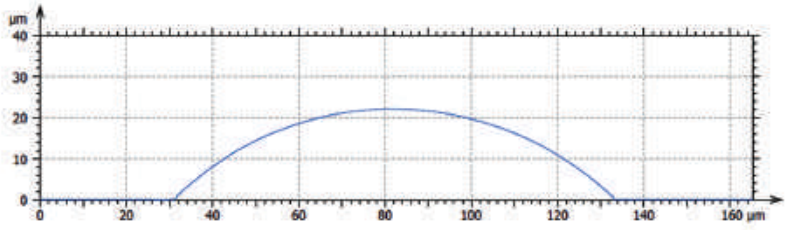


Extracted profile

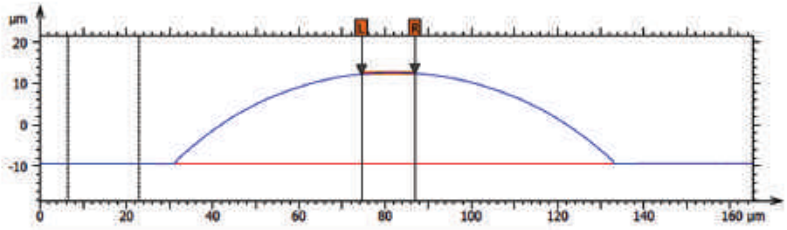




Parameters	0-1	Unit
Horizontal distance	102	µm
Radius	70.3	µm



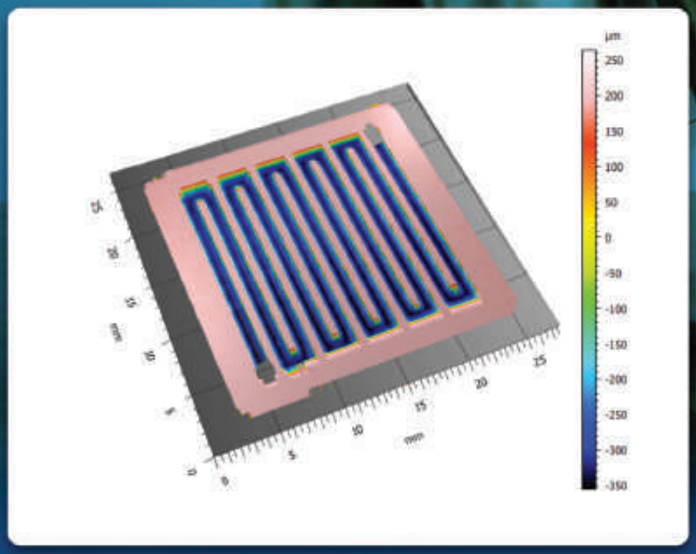
Parameters	Value	Unit
Length	165	µm



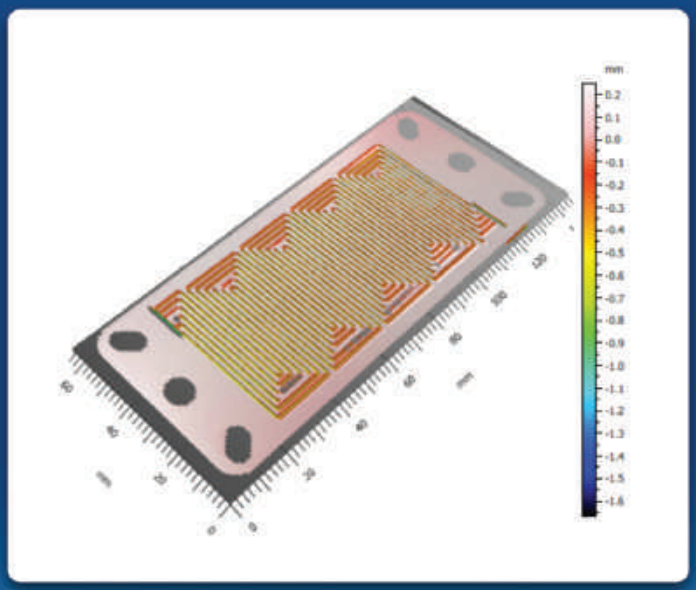
Parameters	Step 1	Unit
Width	12.4	µm
Maximum height	22.0	µm
Mean height	21.9	µm

Application

Fuel Cell Bipolar Plate Inspection



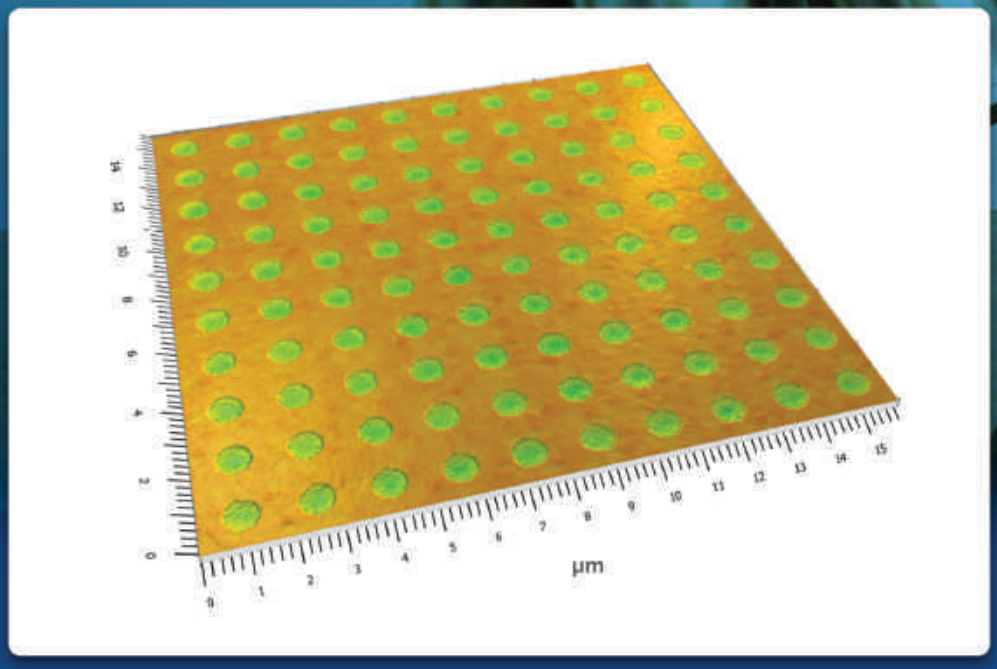
ISO 12781			
Flatness Parameters			
FLTt	14.24	µm	*Peak-to-valley flatness deviation of the surface*
FLTp	4.77	µm	*Peak-to-reference flatness deviation*
FLTv	9.47	µm	*Reference-to-valley flatness deviation*
FLTq	2.84	µm	*Root-mean-square flatness deviation*

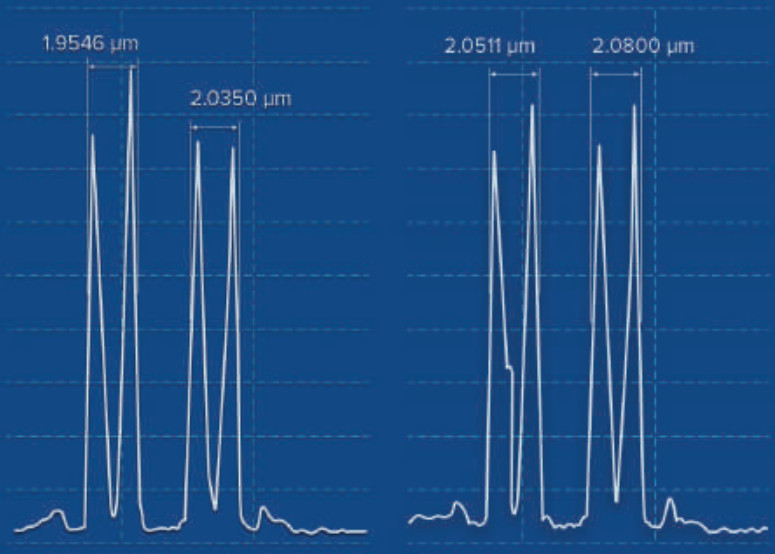


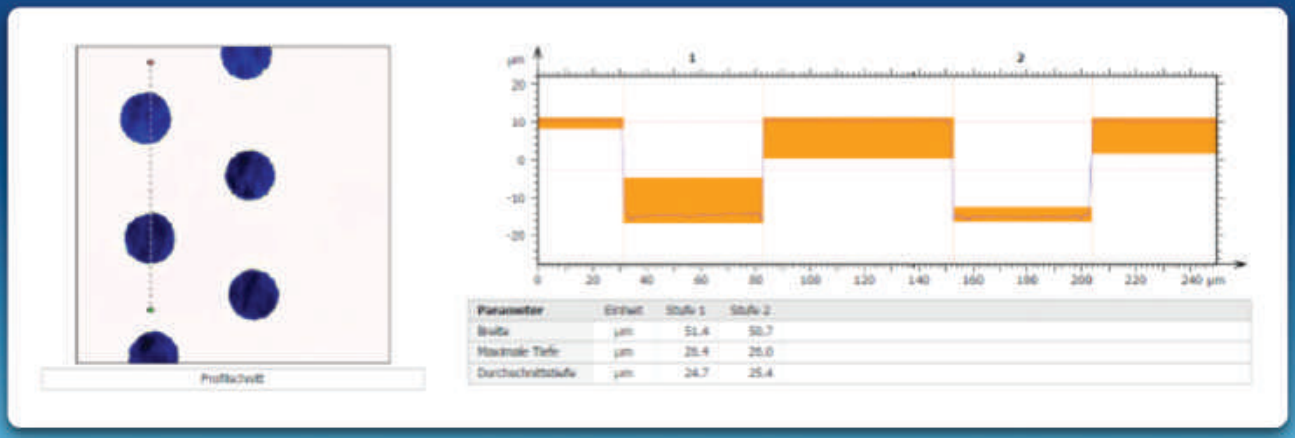
ISO 12781			
Flatness Parameters			
FLTt	192.42	µm	*Peak-to-valley flatness deviation of the surface*
FLTp	61.57	µm	*Peak-to-reference flatness deviation*
FLTv	130.85	µm	*Reference-to-valley flatness deviation*
FLTq	36.85	µm	*Root-mean-square flatness deviation*

Application

Micro Via Inspection

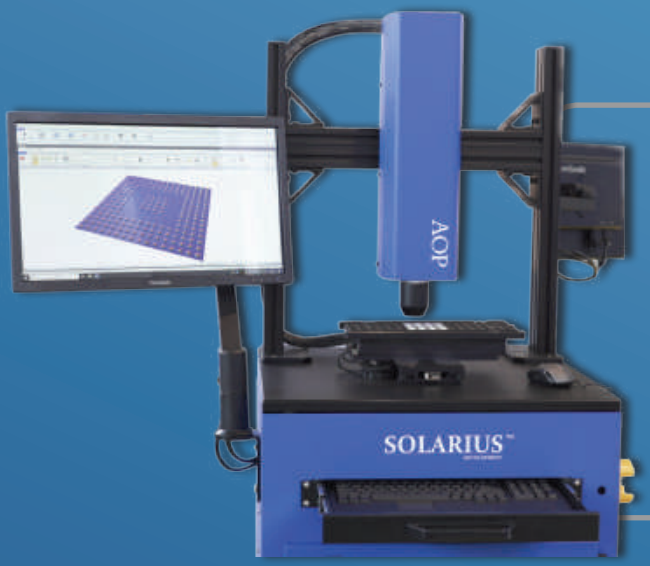






The Polaris

Features a comfortable and precise automated X/Y positioning unit with 150 mm x 150 mm travel range and height measuring range of 400m.



The Polaris Plus

A customizable standalone tool design for semi-production used. Customization are based on customers needs such stage size, measurement range, special fixtures, and dual sensors technologies.

Fully automated solution with multiple sensors technology.
Compatible with different sample handling requirement.

Technical Data **Polaris**

Incredibly fast **3D inspection** makes
Polaris unrivaled in price, accuracy, and speed.

Confocal Area Sensor

Objective	Numerical Aperture	Working Distance (mm)	Field of View (μm^2)	Spatial Sampling (nm)	Optical Resolution (nm)	Maximum Slope (°)	Vertical Resolution (nm)
10x	0.30	17.5	1,312 x 1,312	640	480	14	25
20x	0.45	4.5	656 x 656	320	320	21	8
20x ELWD	0.40	19.0	656 x 656	320	360	24	12
50x	0.80	1.0	270 x 270	132	180	42	3
50x LWD	0.80	2.0	270 x 270	132	180	42	3
50x ELWD	0.60	11.0	270 x 270	132	240	37	5
100x	0.90	1.0	135 x 135	66	160	51	2
100x LWD	0.90	2.0	135 x 135	66	160	51	2
100x ELWD	0.80	4.5	135 x 135	66	180	42	3
150x	0.95	0.3	87 x 87	42.5	150	71	1
150x LWD	0.90	1.5	87 x 87	42.5	160	51	2

System Configuration

Setup	**Desktop system**
Lateral measurement range / travel range	**150mm x 150mm / 100mm x 100mm**
Load capacity	**max. 10kg**
Vertical travel range	**up to 100mm**
Dimensions [WxDxH]	**580mm x 500mm x 1,020mm**
Weight	**65kg**
Supply voltage	**0.100-240V, 50-60Hz**
File formats	**SUR, TXT, CSV**
Computer	**Desktop PC incl. monitor**
Software	**SolarScanNT, SolarMap, customized analysis software***

***Customer and application specific**

SIMP

System Configuration

Available Senor Technologies	Confocal point, line & area sensors Interferometric point & area sensors Triangulation point & line sensors Focus variation and fusion technologies
Standards applicable	SEMI, GAMP, FDA (optional)
SECS/GEM features	E4, E5, E30, E37, E39, E40, E87, E90, E94, E116, E84 AMHS
Hardware features	Single / dual arm robots, ionizers Class 1 FFU modules, AGV adapters Edge grip, needle, bernoulli end effectors Air/N_2 burst modules for warpage wafer
Media Supply	CDA, Vacuum, N_2 (optional) 220V 16A 50Hz, single phase
Lateral Working Range	400mm x 400mm
Vertical Working Range	400µm to 10mm
Lateral Resolution	0.042µm up
Vertical Resolution	0.1nm up

SIMP compatibility

Handling **Module**

SIMP compatibility

Load Port **Configuration**

Cassette LP ISO RIGHT

Cassette LP with Tilting Mechanism ISO LEFT 1

Foup LP-300 ISO RIGHT

Open Casette-200-LDR

Open Casette LP (ISO LEFT)

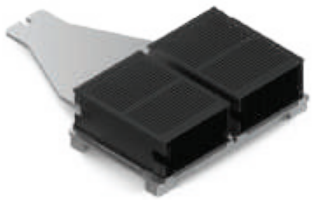
Open Cassette-150

SMIF LP with Open Clear Pod and Cassette 1

SIMP compatibility

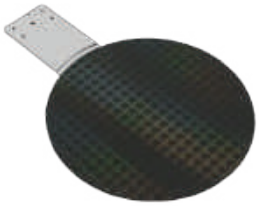
End Effector

1	Bernoulli End Effectors
2	Electrostatic (ESC) Grip End Effectors
3	Edge Grip End Effectors
4	Porous Chuck End Effectors
5	Vacuum Grip End Effectors
6	End Effectors with Friction Pads

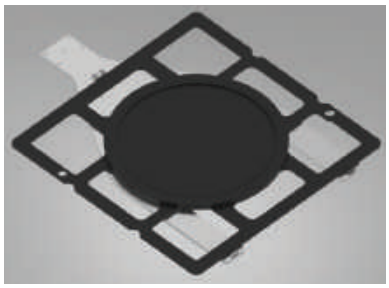


Customized End Effector 1

End Effector - 150, 200mm 1



End Effector - 200mm
300mm 1



Panel End Effector 1

TAPE FRAME END
EFFECTOR 1

Solarius Asia
Solarius Trading (Shanghai) Limited

Unit C102, Block, Li Fung Plaza,
2000 Yishan Road
Shanghai 201103, China

inquiry@solarius-asia.com

Solarius Europe
Solarius GmbH

Nünningstr. 13
D-45141 Essen
Tel: +49 (0) 89 1800 6254

info@solarius-europe.com

Solarius USA
Solarius Development Corp.

1300 Fulton Pl,
Freemont CA 94539
+1-844-524-1023

sales@solarius-inc.com

SOLARIUS™

www.solarius-global.com