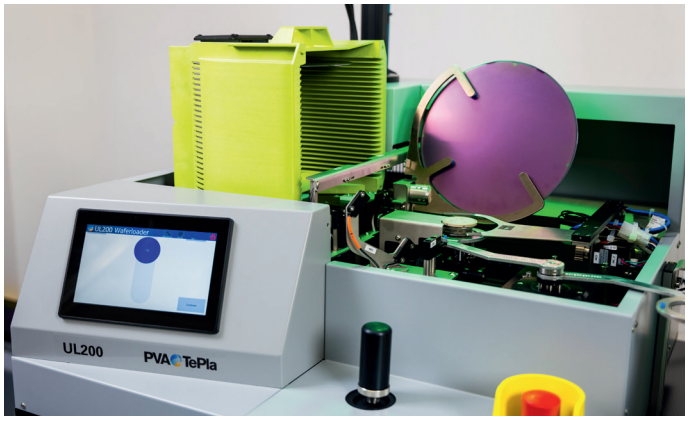
CUSTOMIZED SOLUTIONS

Superior Wafer Inspection

Your Gateway to Superior Wafer Inspection



Streamline your wafer inspections with the Fully Automated Wafer Inspection Solution from Evident. Eliminating the need for an operator, the universal wafer inspection platform provides automated sample handling, imaging and analysis to deliver unparalleled precision and efficiency in your semiconductor wafer inspections.

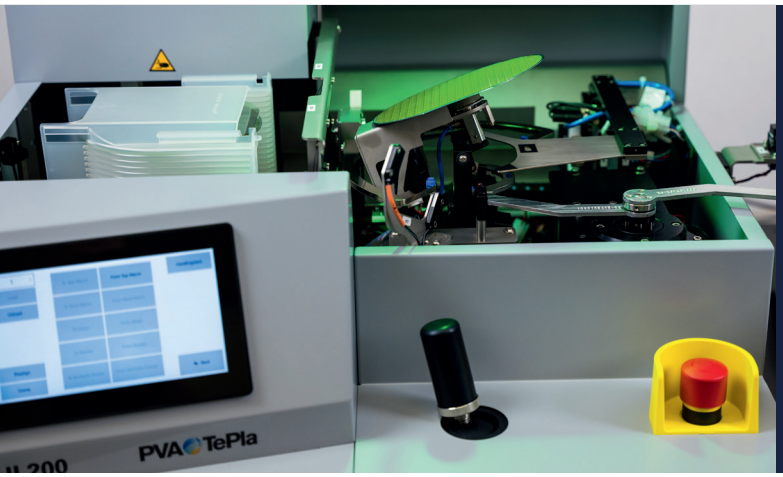


EVIDENT

Your Gateway to Superior Wafer Inspection

Combining the power of the **fully motorized MX63 microscope** with a bespoke **Universal Wafer Loader** for precision wafer handling, the hardware features are designed for robust wafer analysis and smooth process automation. Supported by Evident's proprietary **PRECiV software** and **TruAI™ Deep-Learning Technology**, the Fully Automated Wafer Inspection Solution can be tailored to a diverse range of inspection needs.

Dedicated Wafer Handler



- **Easy to use and supports all common wafer sizes and types**
- **Tailored wafer handling configurations for specialist applications**
- **Integrated tracking and safety features Image acquisition/image analysis**

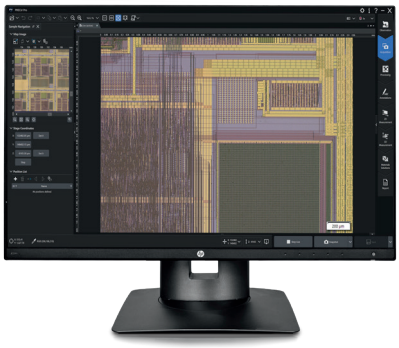
Fully Motorized MX63 Microscope



Auto-capture high-resolution sub-micrometer wafer images with fully motorized MX63

Tailored Inspection Software

PRECiV™

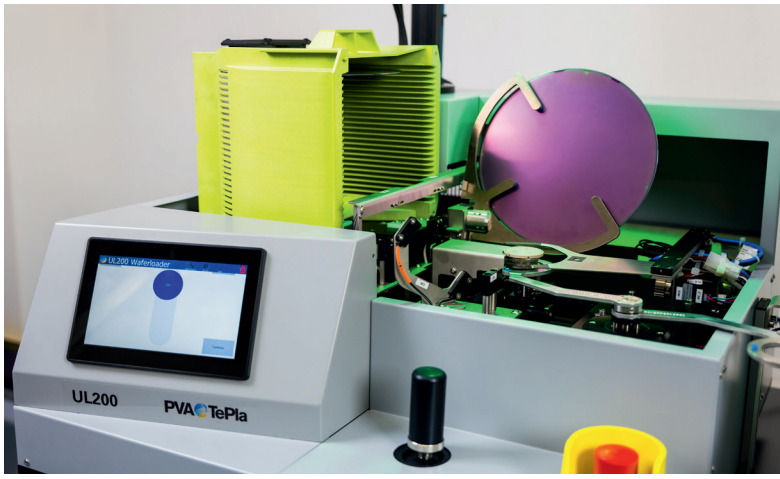


- Measure critical wafer dimensions
- Particle analysis
- Deep learning AI software for automated wafer analysis
- Inspection reports can be exported in Excel, word, pdf, CSV, XML, TXT formats

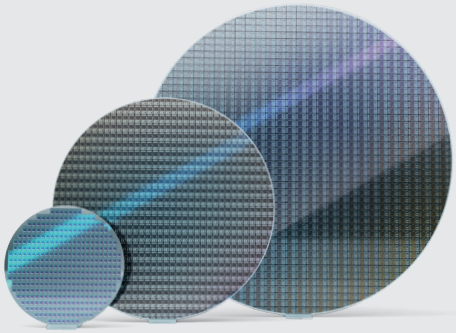
PVA SPA UL200 Autoloader

Universal Wafer Loader for MX63 Microscopes
Traditional manual wafer inspections can be laborious and susceptible to errors, often proving to be a bottleneck for manufacturers.

Automating wafer inspections not only eliminates the need for an operator, but also improves reliability and accuracy of testing, making for a more robust QC/QA measure. With this in mind, we have developed the transformative **Universal Wafer Loader**, designed to set a new standard in wafer inspection efficiency and reliability.

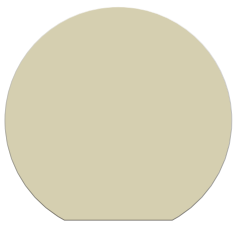


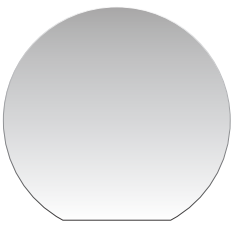
Compatible with motorized MX63 microscopes, The Universal Wafer Loader is a one-stop solution for handling a diverse range of wafer types, sizes, and materials. This modular system features state of the art sensors and specialized grippers, designed to handle wafers varying from the most delicate ultra thin wafers up to extra heavy Germanium wafers. User-friendly, easy to maintain, and fully automated, it delivers the performance you need to automate wafer inspections with confidence.

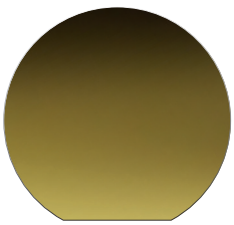


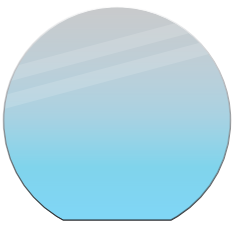
Wafer Sizes
There are two variants of Universal Wafer Loader, specialized for handling smaller or larger wafers. The “Small” variant is designed to handle wafers of 4”– 6” in diameter, while the “Large” variant is adapted to handle 6”-8” wafers.

Wafer Types
The Universal Wafer Loader is equipped to handle a diverse range of wafer materials, including standard silicon (Si) wafers, plus Silicon Carbide (SiC), Sapphire, Gallium Nitride (GaN), and Glass wafers with thicknesses ranging from 175um to 5,000um.


Silicon carbide


Saphire


Gallium Nitride


Glass Wafer

Datasheet with Specifications

Wafer Loading Options

Wafer size	75/100mm, 100/150mm or 150/200mm
Wafer bow	Up to 5mm bow
Wafer material	Silicon, gallium arsenide (GaAs), sapphire, glass
Max. wafer weight	Up to 200 g
Max. wafer thickness	Standard wafers up to 5 mm Thinwafer / TAIKO wafer starting at 50 µm
Wafer throughput	Up to 25 wafer per 4 min

System values

Connection type vacuum at the Loader	6 mm soft-polyurethane tubing
Maximum operating pressure vacuum connection	-60 KPa to -80 KPa
Connection type vacuum to X-Y-Table (from Loader)	4 mm x 0.75 Soft polyurethane tubing for up to 2 supply circuits
Sound emission in operation	<70 dB (A)
Rated voltage	230 V
Rated frequency	50-60 Hz
Rated power	Max 0,5 kVA
Fuse	2x T 6A 250 V (above the entry of the mains connection cable)
Pre-fuse	10 A T
Protective low voltage	12 V DC for panel PC 24 V DC for sensors and actuators
Ingress protection level	IP 20
Length ca.	630 mm
Width ca.	630 mm + 50 mm swivel range of the Loader arm
Height ca.	400 mm without cassette
Weight (fully equipped)	45 kg



Tailored Wafer Handling Configurations

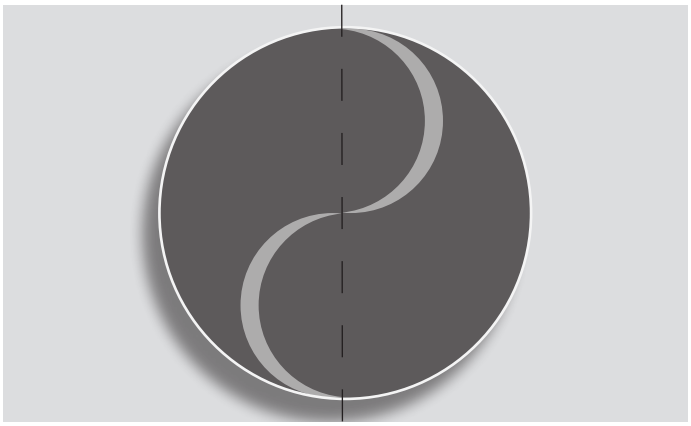
Thin Wafer Handling System

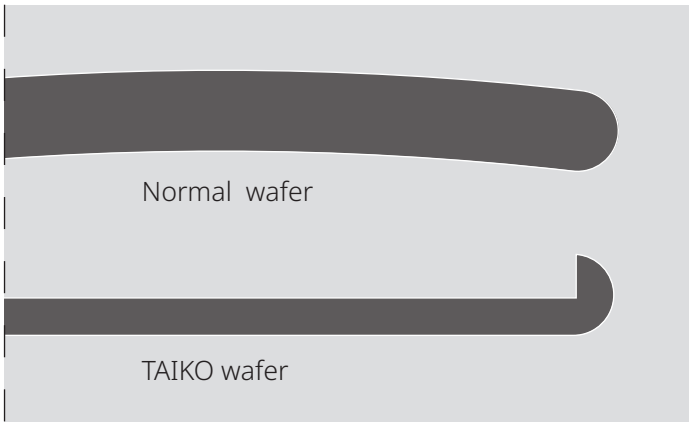


The Thin Wafer Handling System is tailored for wafers with thicknesses between 100µm and 450µm. This specialized end effector is designed to maximize precision in wafer handling and transfer. This configuration is compatible with 13-slot cassettes.

Note
Bow/warp can be up to +/-2500µm. This configuration is not compatible with the top and back macro inspection loaders.

Special TAIKO Wafer Handling System





TAIKO wafers are processed to leave a thick outer ring around the edge and a thinner center to prevent damage to the wafer during the dicing process. The center of a TAIKO wafer can be as thin as 50µm, which can make these wafers delicate to handle. The Universal Wafer Loader comes with specialized grippers that can automate TAIKO wafer handling with ease. Standard grippers are not applicable for TAIKO, special custom grippers needs to be ordered for TAIKO wafers.

Manual Microscope Inspection





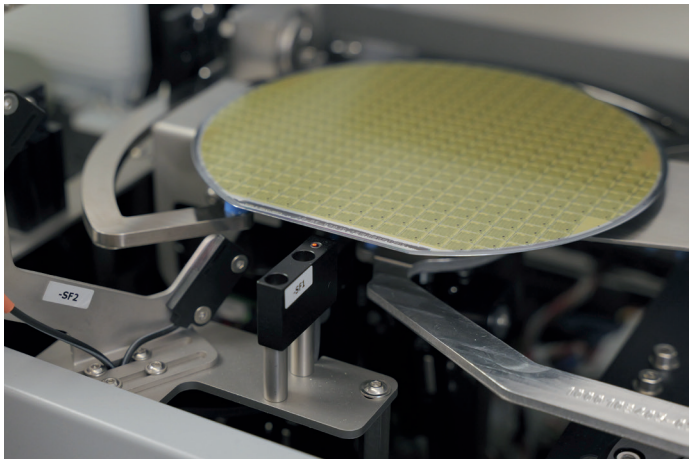
For users who favour manual adjustments, the Universal Wafer Loader can be equipped with a stage transfer sensor, allowing for the integration of the loader's advanced features with a manual stage setup.

Automate Wafer Inspections with Confidence

The Universal Wafer Loader comes equipped with cutting-edge features that safeguard wafer samples through each automated inspection step. Advanced optical sensors are placed throughout each critical component to ensure precision in every wafer handling and inspection step. Along with easy sample tracking and SECS/GEM connectivity, the Universal Wafer Loader ensures safety in automation while securing the integrity of your inspection process.

Moveable Wafer ID Reader





The moveable wafer ID reader reads wafer ID barcodes via Optical Character Recognition (OCR), and Data Matrix Code (DMC). The reader is mounted on a motorized stand which can move to the programmed positions.

Cassette RFID Reader





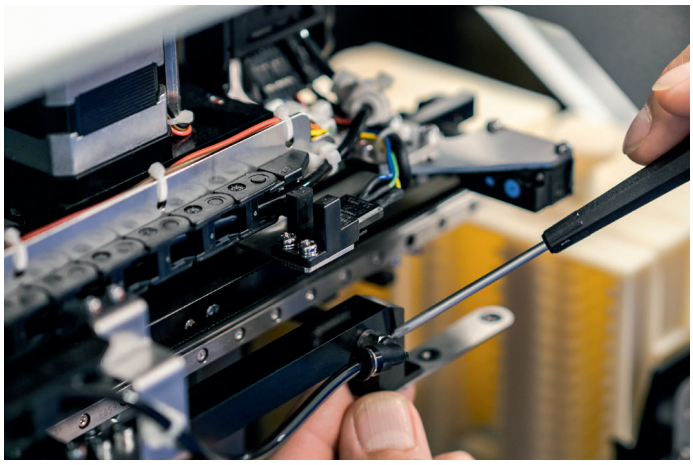
Also integrated into the loader, is the HERMOS RFID reader. This component reads the identification code from the cassette RFID chip. This information is useful for lot tracking, assuring that a specific batch number and wafer slots are assigned to every sample. For automatic inspection applications, the cassette ID details can be stored along with the wafer details and the inspection results.

Automate Wafer Inspections with Confidence

SECS / GEM Connection

The 200 SECS/GEM connection is available as online local mode which transmits information to a SECS host but does not receive remote commands. This includes the SEMI E5, E30, E37.1, E84 norme.

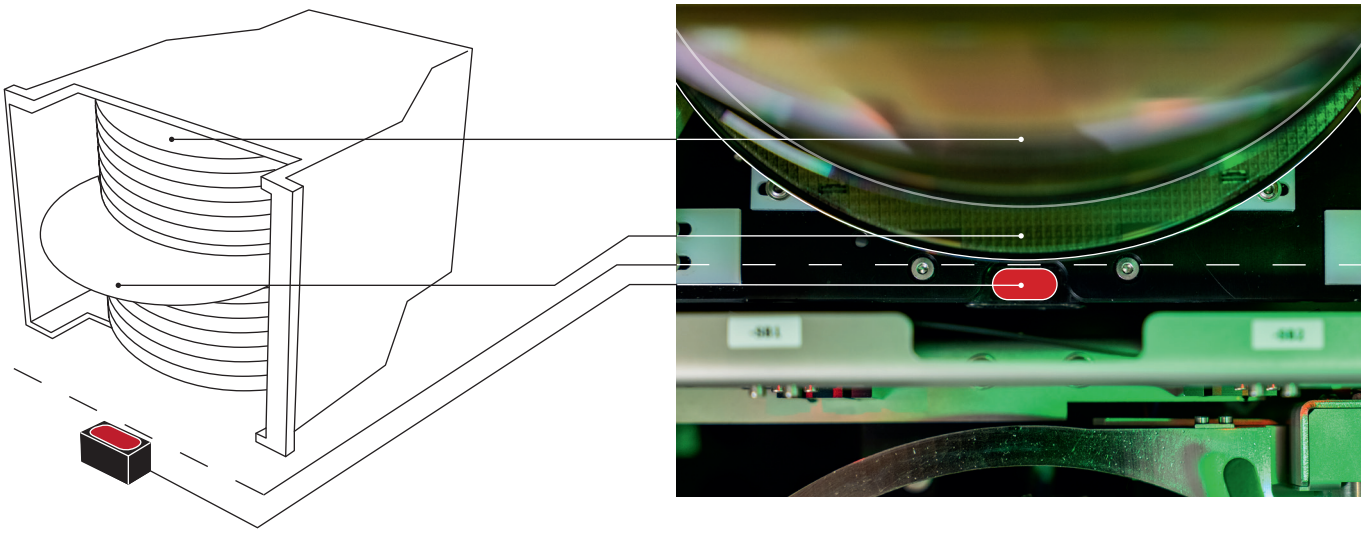
Easy to Use and Service



For rapid and efficient operation, the Universal Wafer Loader is equipped with a high-resolution touchscreen, offering users a friendly and intuitive interface. The switchable language feature caters to a global user base, enhancing accessibility.
The Universal Wafer Loader intelligently adjusts handling speeds to accommodate different cassettes or wafer types to maximise efficiency. Minimize downtime with encoded grippers, designed for simple end-user replacement, significantly reducing the need for service technician calls. An integrated VNC capability facilitates remote service, allowing technicians to quickly resolve issues from any location.

Wafer Protection

If a wafer is not well seated in its cassette, it can lead to wafer damage during loading and inspection. The Universal Wafer Loader's advanced sensor technology ensures that all wafers are in the correct position at the start and the end of the inspection process.



Fully Motorized MX63 Microscope

MX63 industrial microscopes are crafted with wafer inspections in mind, delivering unparalleled quality and precision. Featuring fully motorized X, Y, and Z movements, this user-friendly system facilitates automated inspections for a broad range of wafer samples. Seamlessly integrating with PRECiV software and the Universal Wafer Loader, it offers a comprehensive solution that automates the entire wafer inspection process—from sample input to report generation.
Modular by design, the MX63 microscope is tailored to adapt to diverse inspection needs. We provide specialized stages, meticulously engineered to securely accommodate wafers, ensuring optimal positioning and handling during inspection.

Optimized Workflows with Encapsulated Z-axes, Motorized X-Y Stages, and Sample Holders

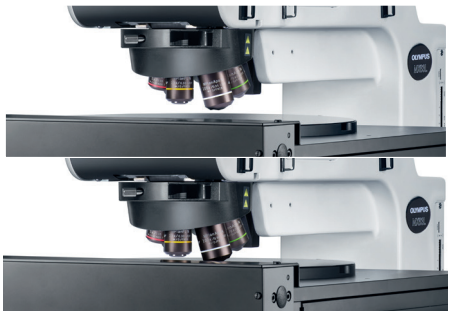
Our range of motorized axes and sample holders enable you to unleash the full potential of your MX63 microscope system.



Motorized Z-Axis

The new motorized z-axis offers high repeatability and accuracy.
The encapsulated design has a superior weight limit of 30kg compared to 15kg for the handling-coupling drive. This enables the integration of heavy-duty stages and testing of large samples.
The operation of the Z-axis, as with all motorized stages, is directly controllable through PRECiV™ software, enabling functionality such as software autofocus.

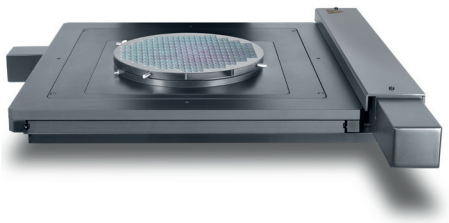
Specification	Standard	Encoded Axis
Travel Range	26mm	
Accuracy	±3µm	±1µm
Resolution (step size)	0.01µm	
Load	30kg	



Motorized X-Y Stages

The autoloader can be combined with either a motorized or a manual stage based on requirement. The motorized stage works in combination with the PVA SPA round chuck which has a vacuum attachment that enables precise wafer positioning during transfer. The right round chuck needs to be ordered based on the wafer size used for inspection.

Specification	Standard	Encoded Axis
Accuracy	±3µm	±1µm
Resolution (step size)	0.05µm	



Advanced Software Tailored to Your Wafer Inspection Needs

In addition to the Universal Wafer Loader and motorized MX63 microscope, fully automated wafer inspections are made possible thanks to Evident's proprietary **PRECiV software** and **TruAI™ deep learning technology**. Our software has been expertly crafted to enhance and automate a wide range of wafer inspection tasks, providing seamless support across your entire automated inspection workflow.

The automated inspection process consists of:

Image Acquisition



Rapid multi-position image acquisition and automated wafer navigation to key points of interest with fully motorized MX63 microscope

Image/ Data Analysis



PRECiV™

Perform wafer measurements, particle analysis and more with PRECiV

Detect wafer impurities and defects by thresholding, or via trainable TruAI™ neural networks

Results Output



Generate inspection reports and export to your chosen format (Excel, word, pdf, CSV, XML, TXT and more)

Designed to accommodate the unique demands of wafer inspection applications, PRECiV offers a range of preset configurations to align with your specific needs. Read on to discover software features that can elevate your wafer inspections.

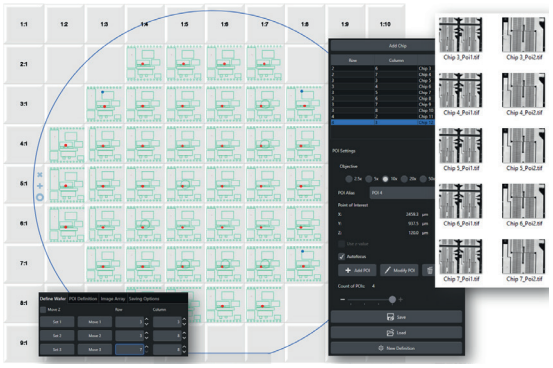
Note
Can't find what you're looking for? Our Customized Solutions Team can create customized solutions based on your requirements.

Coordinate based Printed Wafer Inspections

Improve the precision and speed of your printed wafer inspection process with PRECiV. Simply pre-define points of interest to enable automated, targeted image acquisition. Alternatively, you can import CAD files directly into PRECiV to setup the wafer navigation protocol.

Image Acquisition

Wafer Navigation with PRECiV



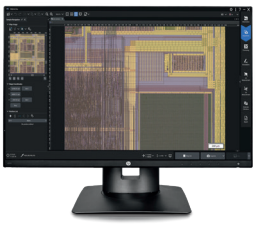
- Identify points of interest based on rows and columns
- Perform 3-point optical alignment on the printed wafer
- Navigate to points of interest in each wafer chip and acquire images for measurement

CAD File-Based Wafer Navigation



- Upload 2D/3D CAD files to PRECiV as input for wafer image acquisition protocol
- Optical alignment based on user input

Image/ Data Analysis



PRECiV™

Following Image acquisition, perform wafer measurements with PRECiV measurement features.

Results Output

txt xml docx csv pdf xlsx

Once you have performed your key wafer measurements, PRECiV generates comprehensive inspection reports that can be exported in your desired file format.

Bare Wafer Inspections

Bare wafer inspections typically involve capturing and processing a large number of images. For repetitive inspections where images may appear identical, PRECiV software can intelligently identify and save only those with critical data during image acquisition, significantly reducing storage needs and manual oversight.

Unlock particle analysis based on manual thresholding with PRECiV, or enhance impurity detection with trainable TruAI™ deep learning neural networks.

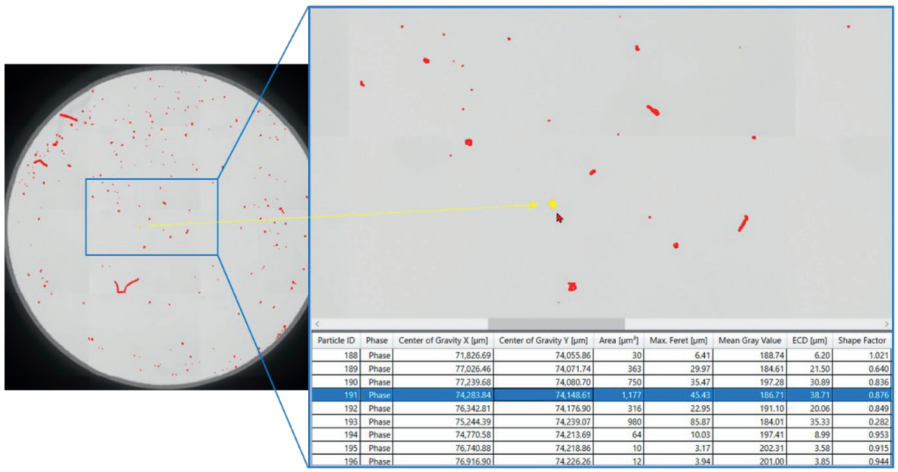
Image Acquisition



- Fully motorized MX63 with laser autofocus unlocks rapid automated image capture
- Images are automatically stitched together and prepared for thresholding/AI analysis

Image Analysis Thresholding Method

PRECiV™



Particle ID	Phase	Center of Gravity X [µm]	Center of Gravity Y [µm]	Area [µm²]	Max. Feret [µm]	Mean Gray Value	ECD [µm]	Shape Factor
188	Phase	71,826.69	74,055.86	30	6.41	188.74	6.20	1.021
189	Phase	77,026.46	74,071.74	363	29.97	184.61	21.50	0.640
190	Phase	77,239.68	74,080.70	750	35.47	197.28	30.89	0.836
191	Phase	74,283.84	74,148.61	1,177	45.43	186.71	38.71	0.876
192	Phase	76,342.81	74,176.90	316	22.95	191.10	20.06	0.849
193	Phase	75,244.39	74,239.07	980	85.87	184.01	35.33	0.282
194	Phase	74,770.58	74,213.69	64	10.03	197.41	8.99	0.953
195	Phase	76,740.88	74,218.86	10	3.17	202.31	3.58	0.915
196	Phase	76,916.90	74,226.26	12	3.94	201.00	3.85	0.944

PRECiV identifies impurities based upon user-defined phase threshold, shape, and size parameters.

CiV can be harnessed for threshold-based particle analysis of bare wafers. Customize your bare wafer inspections with user-defined phase threshold parameters, shape and size limitations and more. Once your parameters are set, PRECiV performs phase analysis, particle counts, and size distributions simultaneously during the inspection workflow.

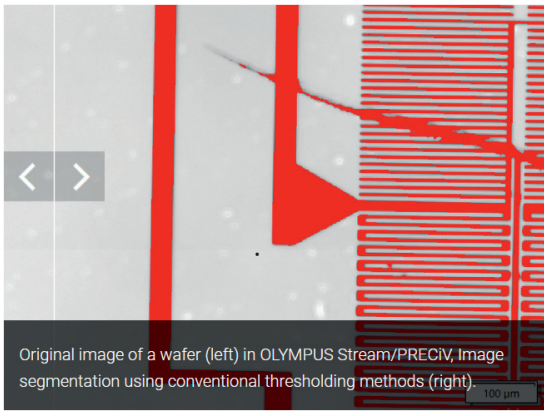
TruAI Inspection

Image Analysis TruAI

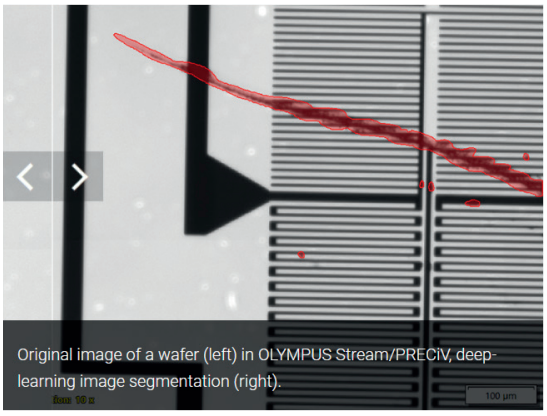
Enhance Impurity Detection - PRECIV Software with TruAI™

Compatible with PRECiV, TruAI™ deep learning software from Evident is a game-changer for wafer inspection image analysis. Unlike thresholding methods, which sometimes struggle to differentiate between defects and structures, TruAI™ features image segmentation capabilities to accurately identify and measure defects, enhancing the precision of your wafer inspections.

Traditional segmentation methods, which focus on intensity values and color can be time-consuming, and a bottleneck for manufacturers. TruAI™ streamlines this process, achieving high-precision segmentation based on morphological features without the manual labor. By learning from trained wafer inspection images, TruAI's neural network can apply its refined segmentation methodology to future datasets to automate image analysis like never before.



Original image of a wafer (left) in OLYMPUS Stream/PRECiV, Image segmentation using conventional thresholding methods (right).



Original image of a wafer (left) in OLYMPUS Stream/PRECiV, deep-learning image segmentation (right).

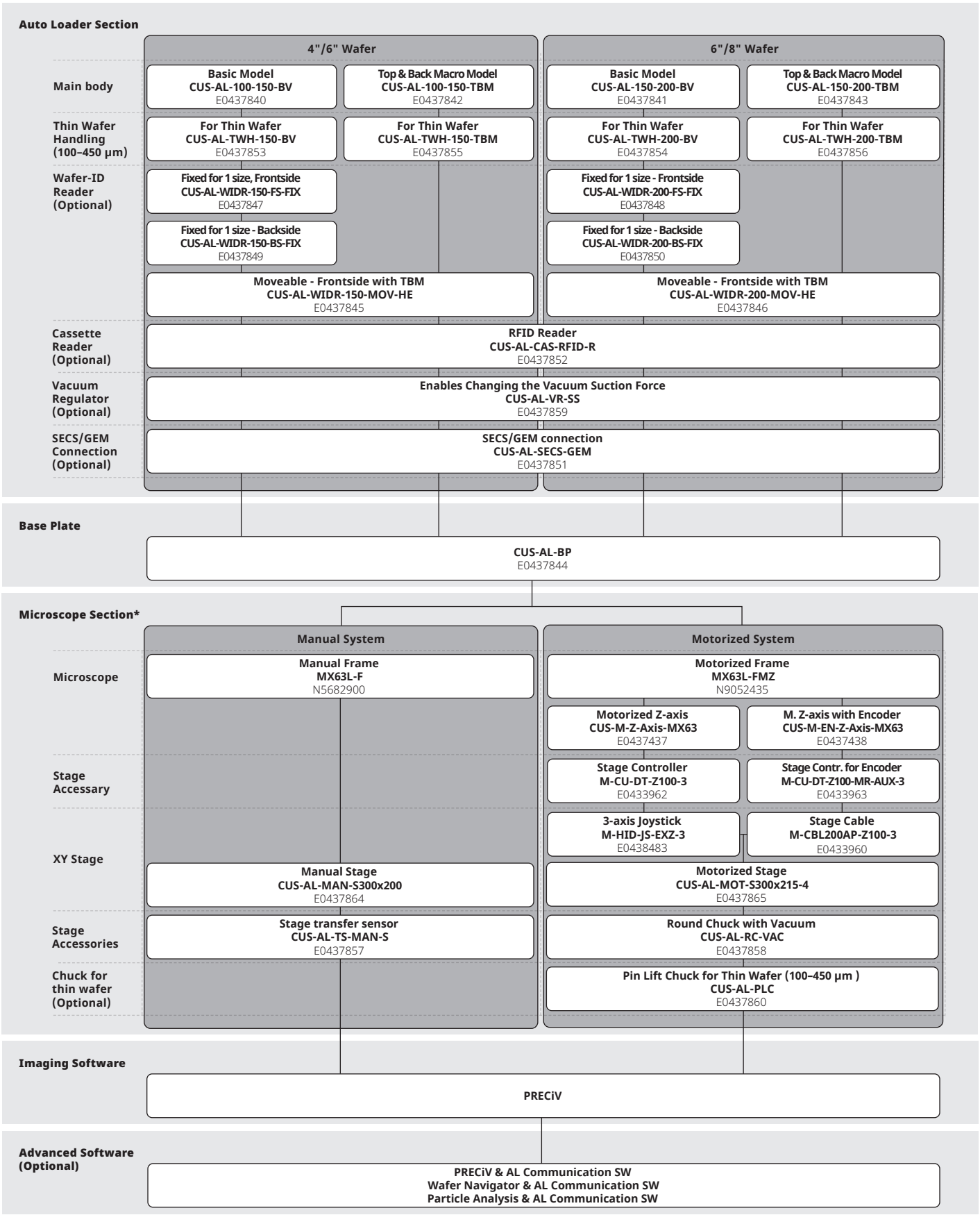
- Precise wafer defect/contaminant detection
- Easily train, review, and edit robust neural networks for automated image analysis
- Efficient image labelling and training using an intuitive interface
- Easy import and export of neural networks

Results Output

Once you have performed your bare wafer analysis PRECiV generates comprehensive inspection reports that can be exported in your desired file format.

txt xml docx csv pdf xlsx

System Diagram



Loader for 3"/6" wafer is available on request.

Fully Automated Wafer Inspection Solution

www.EvidentScientific.com

Specifications, design, and accessories are subject to change without any notice or obligation on the part of the manufacturer.

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OLYMPUS