



WAFER TOPOLOGY MEASUREMENT SYSTEM

The Solar Cell Wafer Topology Measurement System is a complete system for geometry and two-sided sawmarks measurements.

Shadow measurement techniques combined with Scorpion Vision Software® are the key elements of this unique system. The wafers are measured with low noise, high sensitivity, high repeatability and high resolution.

The sawmarks measurement system is a standard instrument and can easily interface to any production line system.

TO BE MEASURED

- Two-sided wafer sawmarks
- Wafer geometry; dimension and corner chamfer measurements

ENVIRONMENT

- Wafer sizes 125, 150, 156 and 210 mm
- Continuous or stopped wafers
- Wafer rate up to one wafer per second
- Wafer speed 200-300 mm/second
- Classifies wafer in A, B and Recycle categories with user defined limits
- Scanning with user defined output



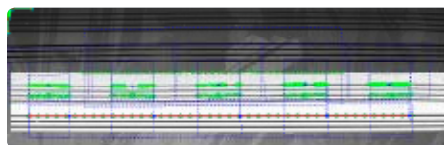
APPLICATION AREA

Quality control of Solar Cell Wafers

WAFER SAWMARKS

The measurement system is placed above and below the production line conveyor, along the wafer side edge. The system consists of glass plates with lines producing shadows, as well as cameras and a light source.

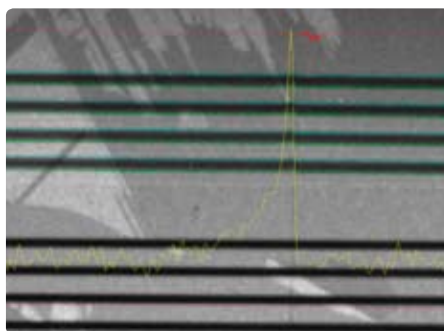
Sawmarks are measured using a patent pending shadow measurement technique, cancelling the effects of the crystal pattern. The shadows and the surroundings are captured by camera images for the top and bottom surface. The number of cameras depends on the required resolution of the measurements.



Line located on wafer within 1/40 pixel (1 µm)

Advanced image processing algorithms work on the shadow images to identify sawmarks with high accuracy.

The operator can verify how the sawmarks develop over the wafer. Large sawmarks will often have a large gradient towards the edge of the wafer.



A typical sawmark across a solar cell wafer.

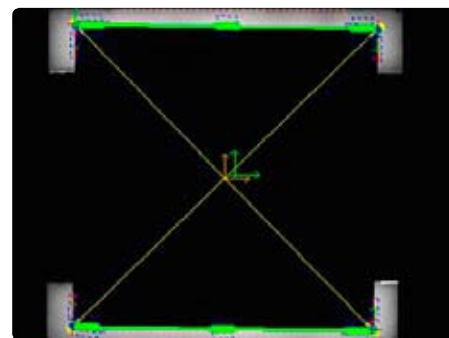
WAFER GEOMETRY

The wafer dimension and corner shapes are measured.

The wafer dimension is determined based on these measurements:

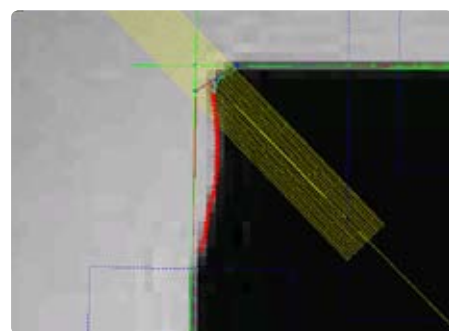
- The distance between parallel edges measured in two places
- Length and angle of each edge
- Corner measurements

The resolution is better than 0,01 mm on all length measurements.



Wafer dimension

The length and angle of all corner grindings are measured.



Corner measurements



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COMPLETE WAFER INSPECTION SYSTEM

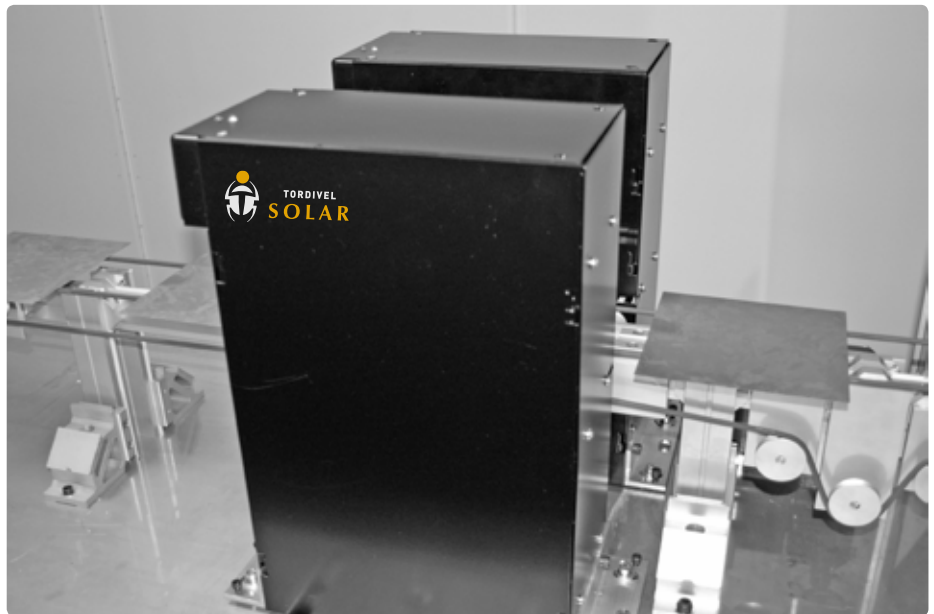
The high precision, reliable and compact topology solution is built on the Scorpion Vision Software platform with 2D and 3D machine vision capabilities.

The interface to the automation and data collection system is highly flexible.

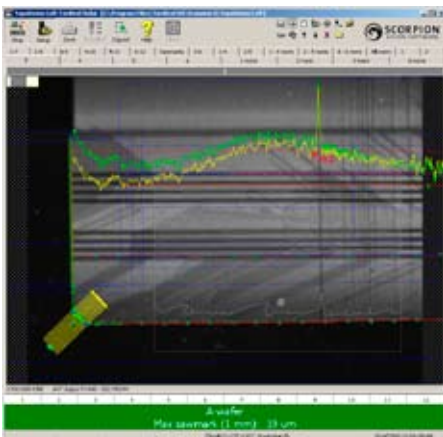
The system includes off-the-shelf world class hardware components such as area- and line scan camera technology.

FLEXIBLE INTERFACES

- TCP/IP, RS-232, Profibus or other industry standard interfaces for delivery of inspection results and system status
- OPC support
- Logging of inspection results
- Statistics presentation - Pareto Graphs



Wafer Topology Measurement System for geometry and sawmarks measurements.



Corner defects and sawmarks found

MEASUREMENT SPECIFICATIONS

GEOMETRY

- Corner shape – length and angle of all four corner grindings
- Wafer dimensions
- Length, width, diagonals, squareness

SAWMARKS

- Sawmarks are measured with a profile resolution of 20, 40 or 70 μm . This means that narrow marks with a width of 100 μm are detected.
- One sided or two sided measurements
- The maximum sawmarks detected with a 1 mm window is measured from 4 - 100 μm with 1 μm repeatability.

TECHNICAL DATA

Computer System

- 19" Sony TFT 1280 x 1024
- Industrial IPC, Quad Core
- 2 Gbyte memory
- Raid 1 - Dual SATA 160 Gbyte HD

Software

- Windows XP SP2
- Scorpion Vision Software® with Solar Cell Wafer Topology Measurement module

System Dimension

- Width: 400 mm
- Length: 336 mm
- Height: 400 mm

Language Support

- English, German and Norwegian



Scorpion Vision Software® is a registered trademark of Tordivel AS. www.scorpionvision.com

See our System Measurement Specification for details on measurement values and accuracy.

FOR MORE INFORMATION:

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