

GP NANO-D .SCAN

INLINE VISION INSPECTION MODULE FOR
MICRO-CRACK DETECTION



CONSULTING



CELL TECH



MODULE TECH



INSPECT



WAFER



TEXTURE



DIFFUSION



EDGE ISOLATION



AR COATING

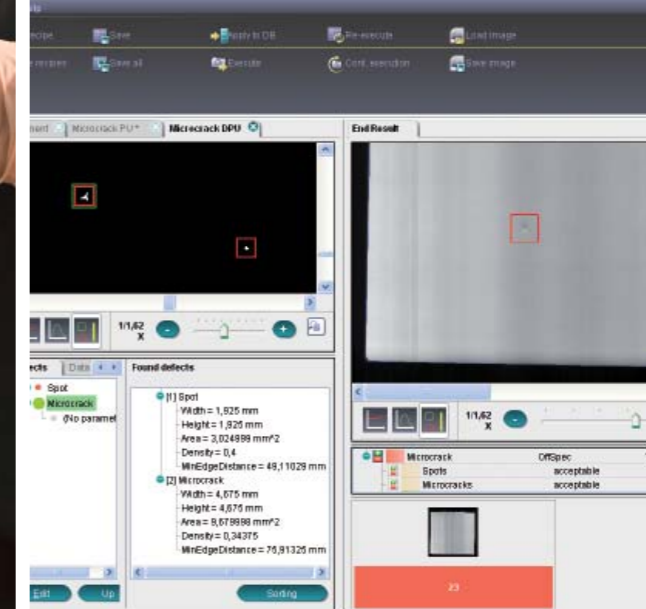
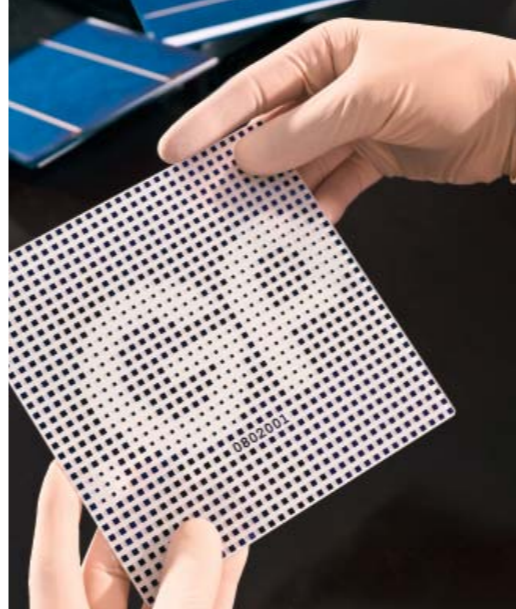


GRID



FINAL CLASSIFICATION





GP NANO-D .SCAN

FIND OPEN AND CLOSED CRACKS WHEREVER THEY ARE: INSPECT FOR CRACKS ON WAFERS AND FRONT-PRINTED CELLS!

SITUATION

Decreasing wafer thickness is a clear trend in photovoltaic industry, leading to increasing problems with wafer breakage. At the same time, handling systems are sped up and forces during acceleration are always increasing. These impacts are likely to cause micro cracks in a wafer, and then even the lowest stress leads to breakage during processing.

DESCRIPTION

The GP NANO-D is an inline optical inspection system designed for detecting cracks and micro cracks on raw wafer material before breakage occurs. Used as incoming or outgoing control, the GP NANO-D helps revealing processing problems in a wafer line as well as handling and transport problems in a solar cell production. Wafers with cracks are sorted out to increase up-time and yield of the process equipment.

Driven by our long-term experience with solar cell processing and metrology, and valuable input from our customers, the GP NANO-D presents the state-of-the-art in microcrack detection. Software and hardware are designed to meet the requirements for gigawatt factories and large turn key suppliers.

SYSTEM FEATURES

The detection of micro cracks is based on the scattering of light in the cracks. That means that no difference exists between open or closed cracks. The proprietary detection is not influenced by grain boundaries in as-cut multi-crystalline silicon. Textured, SiN coated wafer and even partially metalized cells could also be measured.

FUNCTIONALITY	
Samples to be measured	Mono- and multicrystalline wafers, acidic textured, SiN coated, metalized (frontside busbar and/or rear-side busbar, no full area metallized) square or pseudo square
Wafer sizes	100 ... 156 mm
Camera model	> 1K-IR / Linescan > Optional 2K-IR / Linescan
Minimum defect size (width)	1 µm / 0.1 µm
Measured features	Open and closed microcracks, holes
Limiting factors	> Non-textured wafers only > Position tolerance 3 mm
Maximum belt speed	500 mm/s / 200 mm/s
Minimum cycle time	1 s

The high image acquisition speed on the fly and the fast detection algorithms allow for 100% control at throughputs of 1 wafer/sec and more. Whatever size, no matter if mono- or multicrystalline silicon - if there is a crack, the GP NANO-D will find it!

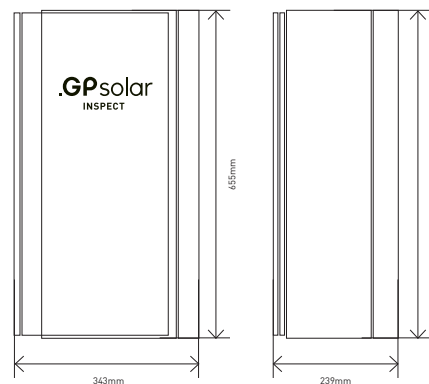
SYSTEM SPECIFICATION	
Machine interface (automation)	> Parallel I/O > Parallel I/O (combined with RS232 for WaferID info) > Profibus
Data interface (to factory network or automation)	XML via TCP/IP
Controller PC	> 19" industrial PC models with 4 HU > Optional integrated UPS and RAID
Power Module	19" module for 24V power supply (illumination and camera)
System dimensions (W x H x D)	343 mm x 655 mm x 239 mm

THE GP NANO-D HARDWARE ON A GLANCE

- > .Scan linescan camera housing with optimized design for best maintenance access
- > Measurement on-the-fly, no wafer stop necessary
- > Advanced camera holder
- > 19" Industrial controller PC with optimized air flow for high performance and reliability
- > Integrated UPS and RAID on demand
- > Separate 19" power rack for 12V/24V supply

SOFTWARE ON A GLANCE

- > Modular software packages, structured in functional tasks - choose between full service or full control
- > Central recipe management and "copy exact"
- > Classification based on fast database access - virtually no limits in classification
- > Classification on a database - test changes offline before going online in production
- > Intuitive graphical user interface
- > Automated calibration routines and self verification
- > Wide range of protocols for automation handshake and MES connectivity



front view

side view

ARTICLE NUMBER	DESCRIPTION
04.11.0002	GP NANO-D .Scan inspection module 1K-IR linescan camera for on-the-fly measurement, 19" controller PC, GP Com Card PIO, GP basic line software package (automation control, statistics functions and classification following predefined recipes)
CONTROLLER PC AND HARDWARE OPTIONS	
04.11.0309	GP Com Card Profibus
04.11.0304	19" TFT for GP Vision System
04.11.0305	GP 19" Power Rack 12V/24V
04.11.0306	UPS system (integrated in controller PC)
04.11.0307	RAID-system, hot-plug harddrive (integrated in controller PC)
SOFTWARE OPTIONS	
04.11.0402	GP Soft View Tool .net Visualize results and status of any system anywhere
04.11.0403	GP Calibration Set Vision with calibration mask Configure, check, verify and calibrate your GP NANO-D
04.11.0408	GP Central Recipe Tool .net Distribute recipes from one system to the other ("copy exact")

Note: some of the mentioned features are optional. All technical details are subject to change without prior notice. Only technical specifications in quotations and duty books are binding.

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