



JENOPTIK-VOTAN™ Solas 100/200

Structuring of thin film photovoltaic modules

JENOPTIK | Lasers & Material Processing
JENOPTIK Automatisierungstechnik GmbH
Konrad-Zuse-Strasse 6
07745 Jena
Phone +49 3641 65-2570
Fax +49 3641 65-2571
E-Mail: automation.marketing@jenoptik.com
Website: www.automation-jenoptik.com

Various machines and technologies for
structuring thin film photovoltaic modules

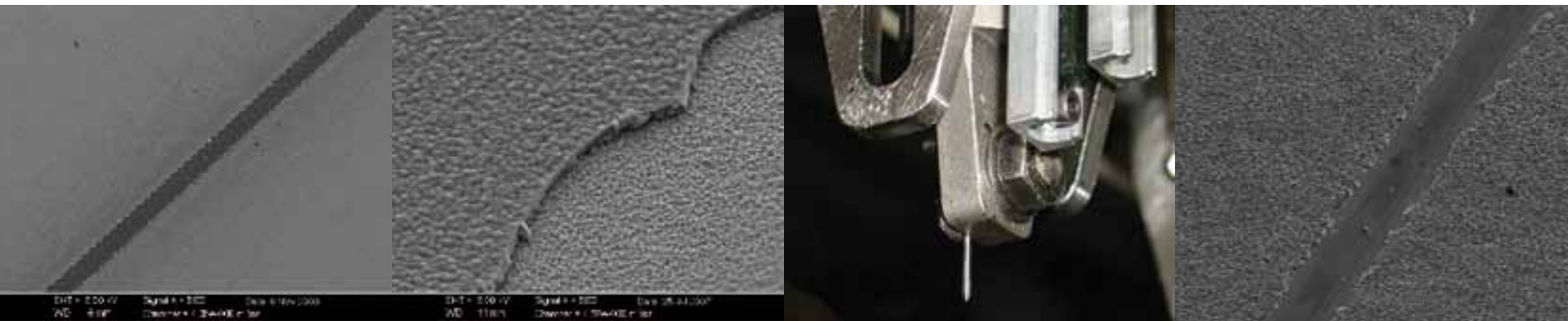
Laser and mechanical structuring of
different layers P1, P2 and P3.

Structuring of CIS/CIGS/CIGSSe, a-Si/ μ c-Si
and CdTe



JENOPTIK-VOTAN™ Solas 100/200
for laser structuring

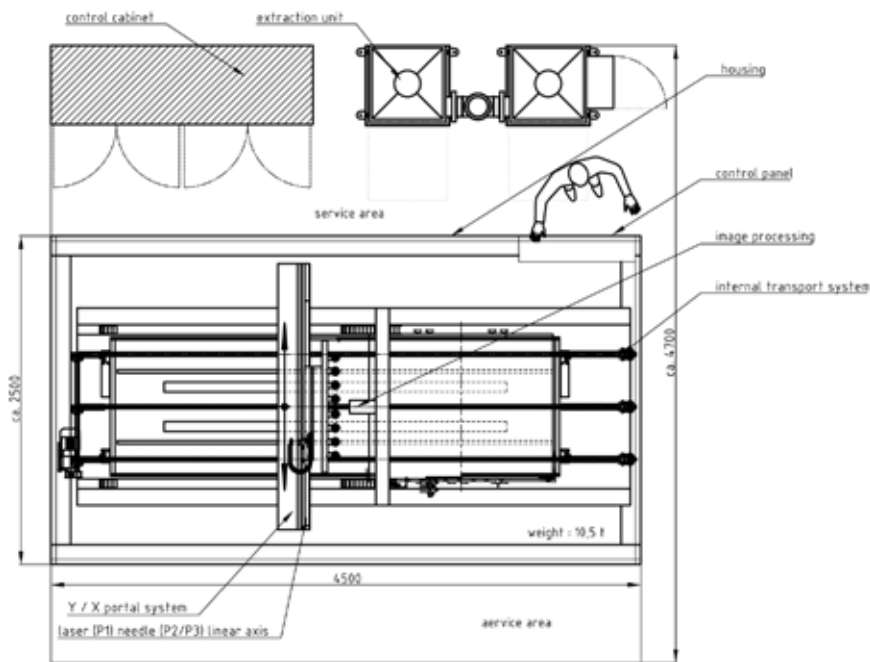
- ablation with laser (1064 nm, 532 nm)
- different optical arrangements for various groove widths
- groove width from 15 µm - 100 µm
- multiple parallel processing heads – up to 16 heads parallel on one tool
- structuring speed up to 2,0 m/s
- resistance measurement for P1
- high positioning accuracy
- high throughput
- various on- and offline process monitoring solutions
- minimal or zero micro-cracks in the layer material
- no damage of glass, no delaminating, low lift off



P1 structuring with laser P2 structuring with laser (SEM picture) JENOPTIK-VOTAN™ Solas needle unit Mechanical structuring

JENOPTIK-VOTAN™ Solas 200
for mechanical structuring

- multiple scribing tool – up to 20 parallel needles on one tool
- transmission and reflection measurement
- camera system for needle wear, groove analysis, precise alignment
- automatic alignment after tool change
- each needle can be positioned separately. This allows adaptation to various cell widths and to compensate temperature differences.
- the automatic needle realignment minimizes set-up time and ensures a stable process.
- Various measurement systems provide you with a quality controlled process.
- Profit from the fact, that there is no “jumping”, no damage of layer 1
- compensation of temperature differences of the glass substrate
- one scribe per groove method



Specification of JENOPTIK-VOTAN™ Solas 100/200

Motion system	
Working area	900 mm x 600 mm up to 1600 mm x 1200 mm
Substrate thickness	2 mm - 6 mm
Positioning accuracy	± 2 µm (working axis)
Repeatability	± 1 µm
Motion speed X-axis	max. 3 m/s
Motion speed Y-axis	max. 1 m/s
Path straightness	≤ 5 µm
Path parallelism	± 10 µm
Laser structuring set-up	
Line width	15 µm - 100 µm (according to customer's requirements)
Mechanical structuring set-up	
Scribing force	0.25 N - 3 N
Groove width	> 30 µm
System function	
Optical recognition	resolution 2 µm
Transfer stations	2 input and output conveyors, 950 mm height; max. speed 60 m/min
Process flow direction	bidirectional
Dimension	
Footprint	ca. 4300 mm x 1900 mm x 2650 mm or 4500 mmx 2500 mm x 2650 mm
Working height	950 mm
Weight	8500 kg - 10500 kg

The right is reserved to make technical improvements at all times.

