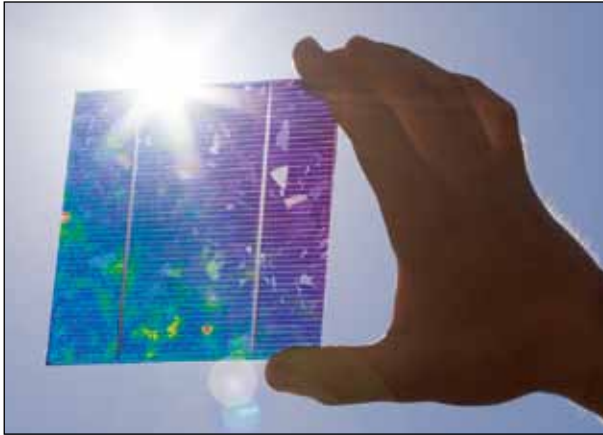


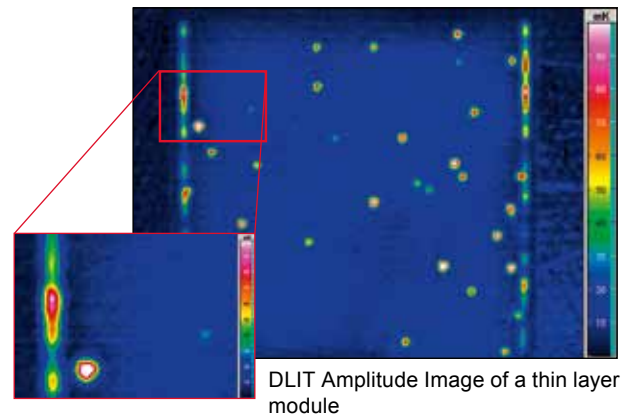
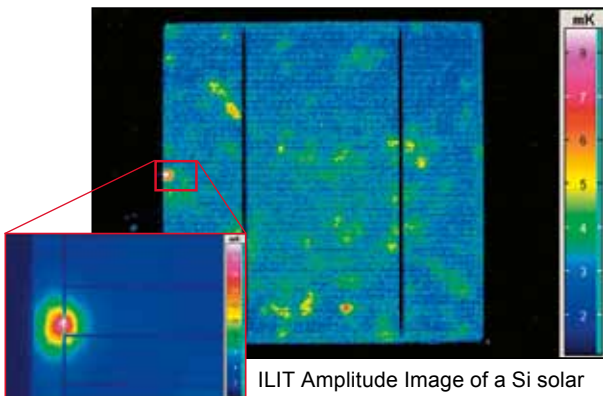
Lock-In Thermography

Solar cell and solar module testing using PV-LIT (ILIT) and VomolIT (DLIT)



Lock-in thermography allows solar cells as well as complete solar modules already to be checked during the manufacturing process based on shortest measurement times (routine test) or as part of an extensive and detailed testing process with individual measurements e.g. in a test laboratory (individual testing).

The use of non-contact (PV-LIT) or contact (VomolIT) activation of the object being measured results in local warming being induced at faults (shunts) which can then be detected and displayed by means of a high-performance thermographic camera and the use of a lock-in procedure.



The modular test bench offers the following benefits:

- Identic standard configuration for fault detection based on contact and non-contact activation
- PV-LIT: illumination with an LED array – no laser necessary
- Optional accessory for fixation and tempering of the object being measured
- Laboratory operation and serial testing possible
- Easy handling of the samples due to horizontal operation position
- Exchangeable lenses for overview and detail views
- High-performance software for recording the measurements and for saving, analysing and comparing all measurement data
- Testing of varying sizes of solar cells and solar modules



Contact activation



Non-contact and contact activation in measurement cell

Lock-In Thermography

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Technical specifications

Measuring cell

Infrared thermographic camera	High-end camera - ImageIR® or VarioCAM® hr head
Detector (uncooled)	(640 x 480) IR pixels
Detector (cooled)	(320 x 240) / (640 x 512) IR pixels InSb snapshot array
Spectral range	(3 ... 5) μm or (7.5 ... 14) μm
Infrared image frequency	Up to 250 Hz (full image)

Contactless illumination source (PV-LIT)

Illumination source, standard	Infrared LED panels (~ 220 W)
Illumination source (optional)	Spectral selective LED panels for IR-insensitive solar cells

Contact illumination source via tactile spikes (VomoLIT)

Electric solar cell contact	For electric BIAS operation and VomoLIT up to 600 V
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Sample holder (chuck)	(250 x 30 x 250) mm (W x H x D)
Thermochuck (optional)	Fluid cooling and heating Vacuum fixation
Objective of the infrared thermographic camera	Customer specific (microscope to wide angle)
Dimensions	(500 x 1050 x 500) mm (W x H x D)
Weight	55 kg (without camera and chuck)

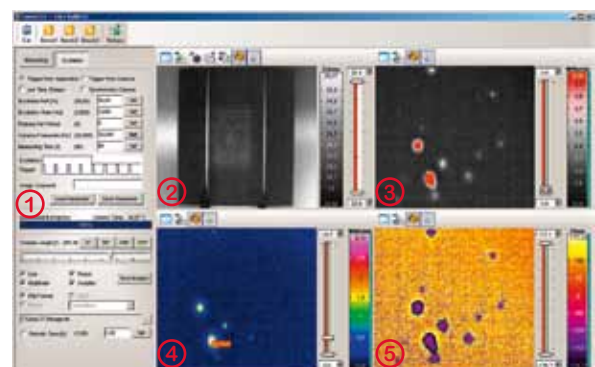
Evaluation unit

Dimensions	(553 x 589 x 600) mm (W x H x D)
PC	19" industry PC
Power supply	230 VAC / 110 VAC
Weight	74 kg (incl. PC)

Design and specifications are subject to constant further development and enhancement; the right to make changes necessary in connection with technical advances is reserved

Software

- Operational software with comprehensive analysis options in laboratory conditions
- Software add-on for automatic error classification based on parameter settings
- Intuitive user interface for easy operation
- Real-time display of the object being measured in various states
- Multifaceted memory options for image data and measurement results
- Alternative 0°, 90° or freely set phase angle image for representation of complex intensity information



- ① Settings
- ② Live Image
- ③ Complex Image
- ④ Amplitude Image
- ⑤ Phasing Image