

irNDT

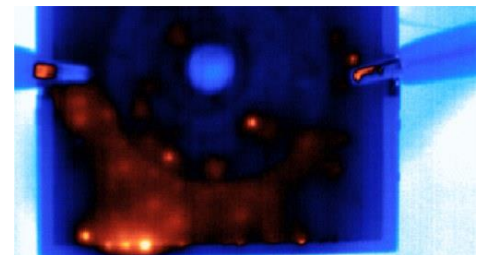
Solar-Check

Turnkey *ir*NDT Solar Cell Inspection

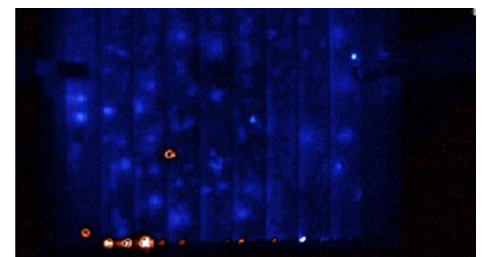
MoviTHERM Solar-Check is a turnkey infrared non-destructive testing (*ir*NDT) system developed for solar cell inspection that includes an infrared camera, excitation source, and image processing software. The built-in lock-in thermography (LiT) measurement technique responds to thermal responses from the solar cell at the exact excitation frequency, thereby dramatically improving the overall sensitivity of the system to micro-Kelvin levels. Additionally, the LiT technique is not susceptible to the adverse effects of reflections or thermal diffusion significantly enhancing the appearance of defects. Solar-Check can be used for all common IR solar cell testing methods including crack detection, shunt detection, emission analysis, and carrier density measurements.

Features

- Non-contact *ir*NDT
- Lock-In Thermography Analysis
- Functional Circuit Analysis (Power Dissipation, Shorts, etc.)
- Effective on low emissivity targets
- Multiple Lens Options for Wide Angle and Close-up imaging



IR image of 60x60mm silicon solar cell showing shunt defects (orange areas) under steady state reverse bias conditions.



Same 60x60mm cell with Lock-in technique applied. Note the elimination of reflections and thermal diffusion interferences for easy fault identification.

Key Benefits

NON-CONTACT TESTING

Active *ir*NDT thermography for common solar cell testing.

- ✓ Crack Detection
- ✓ Shunt Detection
- ✓ Emission Analysis
- ✓ Carrier Density Measurements

FLEXIBLE AND EXPANABLE

Upgrade a system by adding lenses, enclosures, stages, and IR cameras.

- ✓ Works with Cooled and Uncooled IR Cameras
- ✓ Multiple lens configuration for wide angle and close-up testing

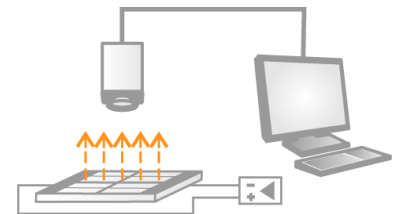
*ir*NDT MADE EASY

Complex analysis technology simplified for inspection.

- ✓ Effective measurement on low and varying emissivity targets
- ✓ No Surface Preparation Required
- ✓ Large and small area measurement
- ✓ Quick and reliable defect detection

How does it work?

Solar-Check works by means of Lock-in Thermography (LiT) which consists of applying a periodic pulsed electrical signal to the test device and monitoring the resultant temperature variation with a synchronized thermal camera. A computer captures multiple IR images and applies a processing algorithm to produce a surface map identifying localized hotspots. LiT produces images with greater resolution and temperature distribution over passive IR thermography.



Specifications

| Uncooled Infrared Camera Options | | Cooled Infrared Camera Options | |
|--|------------------------|---|-----------------------------------|
| Available Resolutions | 336 x 256 or 640 x 512 | Available Resolutions | 640 x 512 or 1280 x 1024 |
| Image Rate | 30 Hz / 60 Hz | Image Rate | 60 Hz / 120 Hz / 181 Hz / 1000 Hz |
| Thermal Sensitivity | < 30 mK @ 30°C | Thermal Sensitivity | < 20 mK @ 30°C |
| PC | | | |
| PC Type | | Office PC, Industry PC, Laptop (for mobile use) | |
| Supported Operating Systems | | Windows 10 Pro 64-bit | |
| Excitation Source | | | |
| Electrical Excitation | | 0 – 10V input, 0-70V output Programmable Power Supply | |
| IRX-Box | | | |
| Modulation Box for Synchronization of all Hardware and Software Components | | | |
| Enables Easy and Compact Measuring Setups | | | |
| irNDT-Software | | | |
| Evaluation Modules for Lock-in, Photovoltaic Cell Inspection | | | |
| Graphical User Interface for easy creation of customized solutions without programming skills | | | |
| Integrated MS Excel Report Generator for easy set-up of inspection reports, export of inspection data to Matlab, sorting of inspection parameters in workspaces, and storing of result images include measuring parameters | | | |
| Integrated VB Script-Engine for the creation of macros for solving automated inspection tasks | | | |
| Result Viewer App – Allows for calibrated spatial defect measurements | | | |
| Measuring and Analysis Properties | | | |
| Parameters for the Excitation Source | | <ul style="list-style-type: none">• Analysis Functions: Pulse, Sine, Trapezoid, Rectangle, User-Defined Function• Rectangle Width at Rectangle Modulation: 0.1 – 0.9%• Excitation Frequency: 1μHz – 50kHz | |
| Parameters for the IR Camera | | Recording Frequency, Integration Time, Temperature Range, Average Temperature, Detector Window, etc. | |
| Parameters for the Analysis | | <ul style="list-style-type: none">• Special Functions for Inspection of Photovoltaic Cells• Automatic Noise Reduction Functions and Compensation of exterior interferences in all analysis modules | |

*Specifications subject to change without notice. 11/2021

Get in Touch

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