greateyes DISCOVER WHAT THE EYE CAN'T SEE

01 LumiSolarOutdoor System Electroluminescence (EL) Inspection for Solar Modules directly on-site

I01 Electroluminescence (EL) Inspection for Solar Modules directly on-site

DISCOVER WHAT THE EYE CAN'T SEE



Electroluminescence Imaging System Battery based Power System or Line-powered System

Schematic measurement set-up

The award-winning¹ LumiSolarOutdoor system allows to investigate the quality of solar modules on-site, defects can be identified quickly. The modules do not need to be demounted from their superstructure. Measurements can be performed directly in the solar park or at the PV installation after twilight or during the night.



In contrast to other systems the LumiSolar-Outdoor system does not require a dark box or enclosure. It is the first system capable of performing measurements in the open air. That saves costs and time as solar modules can stay in their places. Moreover damages due to transportation are prevented. There are two versions of the LumiSolar-Outdoor system available. A battery powered equipment allows to measure single solar modules without the need of an external power supply. If an external power supply is accessible, a complete string of solar modules can be measured in a stepwise procedure using the line-powered Lumi-SolarOutdoor system.

Line-powered

LumiSolarOutdoor

Battery powered LumiSolarOutdoor

Application	Electroluminescence Inspection of	Electroluminescence Inspection of
	single Modules directly on-site	Strings directly on-site
mage Size	1024 x 1024 Pixel, 16 bit	1024 x 1024 Pixel, 16 bit
mage Output Data	BMP, JPEG, RAW Data or text File	BMP, JPEG, RAW Data or text File
Vleasurement Time	~2 sec for c-Si Solar Modules	~2 sec for c-Si Solar Modules
vlin. Distance Camera⇔Module	0.5 m	0.5 m
Гур. Distance Camera⇔Module	3 - 5 m	3 - 5 m
Outdoor Light Conditions	Night Sky, late Twilight Time	Night Sky, late Twilight Time
Nodule/String Power Supply	max. 750 W (from Battery)	10 kW
Number of Measurements	200-500 with single Battery Charge	not limited, Line-powered Operation
Fotal System Weight	40 kg	65 kg

The battery based version of the Lumi-SolarOutdoor system does not need any external power supply. A battery generates the electricity to power the solar module.

LumiSolarOutdoor Software

Save, Quicksave, Load Images Supported File Formats: BMP, JPEG, TXT and Raw Data Single Image Mode, Video Mode Automatic Background Subtraction False-Color-Representation of Images Intensity Slices in x, y Direction Linear/logarithmic Scaling Zoom functions / Image Viewer Remote Control of Module Power Supply



The line-powered version is designed

The modules are biased by a remotely

For this purpose an external three-phase

to measure strings of modules in a

stepwise procedure.

operated power supply.

power connection is required.

¹⁾ The LumiSolarOutdoor system was awarded the 3rd prize – Innovation Award 2012 at the Bad Staffelstein Photovoltaics Symposium.

Features of the LumiSolarOutdoor System

Inspection Capabilities:	Shunt Detection Micro-Cracks Identification Finger Defects
	Dead Cells Broken Cells Hotspots Inhomogeneities and Impurities
Areas of Application:	Pre-delivery Inspection at the Manufacturer Receiving/Pre-delivery Control at the Retail Company
	Final Inspection before Installation of the Solar Modules Documentation Purposes
	Acceptance Tests Direct Inspection of Solar Modules in the Park Inspection of Rooftop PV
	Installations Failure Analysis of defect Solar Modules
Advantages of the System:	No need to demount Solar Modules (saves time & costs) Direct outdoor Measurements possible
	Excellent Sensitivity and Image Quality Quick Measurements (~2 sec for c-Si Solar Modules)
	No dark Box or Cover needed Mobile Solution, no Transport Vehicles needed
	Battery based System allows independent Operation
Successfully tested on various	Monocrystalline Silicon (mono-Si) Polycrystalline Silicon (poly-Si) Amorphous Silicon (a-Si)
Solar Module Types:	Copper Indium Sulfide (CIS) Copper Indium Gallium Selenide (CIGS) Cadmium Telluride (CdTe)
••••••	Heterojunction with Intrinsic Thin Layer (HIT)

greateyes DISCOVER WHAT THE EYE CAN'T SEE

greateyes GmbH Rudower Chaussee 29 12489 Berlin phone:+49 30 6392 6237 fax:+49 30 6392 6238 www.greateyes.de info@greateyes.de

All rights reserved. © 2006-2014 greateyes GmbH.