PRODUCT CATALOGUE

We offer you a wide range of dedicated solar cell measurement tools and state-of-the-art measurement software.

Solar cell measurement tools

RERA SOLUTIONS
SOLAR MEASUREMENT

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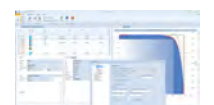
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We believe solar energy is the most promising form of renewable energies available today. Solar power is accessible all over the world and investments in solar energy are relatively low at limited risks. With our products and services, we support research in further improvement of solar cell technology. We aim to be THE expert in measuring solar devices. With our scientific background, our personal approach, our excellent service and top quality products we can make the difference.

Please contact us to discuss your solar measurement challenges.

Founder ReRa Solutions BV
Erik Haverkamp

RERA SOLUTIONS
SOLAR MEASUREMENT

Reference Cells

RR-1001 Shunted Silicon Reference Celll
RR-1002 Open Silicon Reference Cell

Description:

The standard crystalline Silicon Reference Cell is a high-quality sensor for the determination of solar simulator irradiance levels. ReRa uses the Radboud University Nijmegen PV Measurement Facility[*] to calibrate the cells indoor. The calibration is done against an established set of reference cells calibrated at NREL and Fraunhofer ISE. These references are measured each year at the International Spectroradiometer Intercomparison (ISRC) to ensure the quality. This all results in a lower cost reference cell that is perfectly suited for indoor applications.

[*] Laboratory is not accredited

Key features:

- Lower cost reference cell
- Calibrated against reliable reference set
- Irradiance and temperature readout
- Protective Quartz (standard) or Schott KG glass window
- Integrated with Tracer IV-software
- Open or shunted version
- Several filter options (KG# window) to match any spectral response
- Including full calibration report (IV-curve plot, Isc, Voc, I, Vmpp, Fill Factor and Efficiency)
- Including cables to connect cell by using 4 wires
- Including protective suitcase

Models:

- RR-1001: Shunted Silicon Reference Cell
- RR-1002: Open Silicon Reference Cell

Options:

All reference cells can be ordered with a KG3 or KG5 window for measurements of specific cell materials.
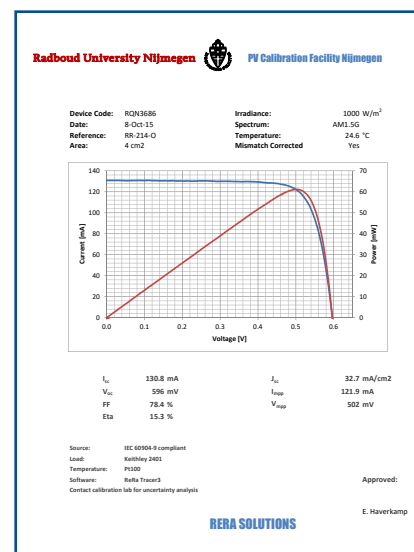
Specifications Silicon Reference Cell:			
Material:	Mono crystalline silicon	Temperature sensor:	Pt100 class A (4 wire connection)
Area:	20 x 20mm	Socket Solar Cell:	LEMO ERA.0S.304.CLL
Dimensions:	105mm x 74mm x 16mm	Socket Pt100:	LEMO ERA.0S.304.CLL
Weight:	270 g	Parameters:	Isc, Voc, Impp, Vmpp, Fill Factor, Efficiency
Operating Temperature:	10°C .. 60°C	Calibration:	AM1.5G, 25°C, 1000Wm-2
Environment:	Indoor usage	Typical Isc:	130 mA
Solar Cell Connection:	4 wire	Error Isc:	± 2%
Protective window:	Quartz, KG3, KG5 (or other filters)	Optional:	
		Shunt:	1 Ohm

Reference Cells

RR-1004 Shunted GaAs Reference Cell
RR-1003 Open GaAs Reference cell

Description:

As one of the few suppliers ReRa offers true III/V GaAs Reference Cells. This high quality unfiltered GaAs Cell is mounted in a standard (IEC-60904-2) compliant housing. It provides a much better spectral match for CIGS, organic and other high bandgap materials compared to KG5 filtered silicon reference cells. The GaAs cell is a high-quality precision sensor for the determination of solar simulator irradiance levels. ReRa uses the Radboud University Nijmegen PV Measurement Facility* to calibrate the cells indoor. The calibration is done against an established set of reference cells calibrated at NREL and Fraunhofer ISE. These references are calibrated each year at the International Spectroradiometer Intercomparison (ISRC) to ensure the traceability.

* Laboratory is not accredited

Key features:

* True III/V GaAs Reference Cell manufactured for ReRa
* Calibrated against reliable reference set
* Irradiance and temperature readout
* Protective Quartz window
* Integrated with Tracer IV-software
* Open or shunted version
* Including full calibration report (IV-curve plot, Isc, Voc, I, Vmpp, Fill Factor and Efficiency)
* Including cables to connect cell by using 4 wires
* Including protective suitcase

Models:

* RR-1004: Shunted GaAs Reference Cell
* RR-1003: Open GaAs Reference Cell
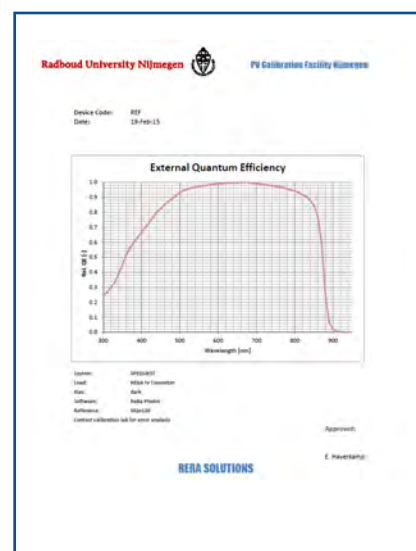
Specifications GaAs Reference Cell:			
Material:	GaAs (Gallium Arsenide)	Temperature sensor:	Pt100 class A (4 wire connection)
Area:	20 x 20mm	Sockets	PV cell and Pt100 2 x LEMO ERA.0S.304.CLL
Dimensions:	105mm x 74mm x 16mm	Parameters:	Isc, Voc, Impp, Vmpp, Fill Factor, Efficiency
Weight:	270 g	Calibration:	AM1.5G, 25°C, 1000Wm-2
Operating Temperature:	10°C .. 60°C	Typical Isc:	104 mA
Environment:	Indoor usage	Error Isc:	± 3%
Solar Cell Connection:	4 wire	Error Isc:	± 2%
Protective window:	Quartz	Optional:	
		Shunt:	1 Ohm

Probing Solutions

RR-3057 High Resolution Solar Cell Probe

Description:

The High Resolution Solar Cell Probe is a dedicated micropositioner to enable high quality current/voltage measurements on solar cells.
The High Resolution Probe is designed primarily for probing targets that are approximately 13 microns and larger at 80 TPI resolution (320 μm per 360° turn). It is available with a magnetic base in either left or right hand models. The 125 mm x 125 mm scanning area allows positioning on a broad range of solar cell samples. Each axis is spring loaded to prevent backlash, and the control knobs are conveniently placed at the rear of the micropositioner to allow one hand to control all three axes at the same time. The probe mount is electrically isolated from positioner body.

Optional: 4-wire Kelvin Configuration (RR-3057B)
The High resolution Solar Probe can be used in a true 4-wire Kelvin configuration. This means that the possible voltage drop over the current wire is eliminated by measuring the voltage at the sample directly. The wires are electrically isolated from the body. To measure a solar cell in 4-wire kelvin configuration a second Solar Cell Probe or a base plate with voltage sense is required. Please note that for this configuration, the optional 2-pin BeCu probe tip configuration is required (RR-3057B).

Key features:

- Dedicated micropositioner for high quality current/voltage measurements on solar cells
- High precision positioning
- Suitable for a broad range of solar cells
- 13 μm target
- Left-handed or right-handed models
- Suitable for substrate and supersubstrate measurements
- Standard configuration: incl. Tungsten probe, 25 um tip, 25mil shank
- Spring tip holder is a very robust holder that will accept any of the available probe tips with shank diameters ranging in diameter from 10 to 25 mils.
- No special tools are required for loading and unloading the tip from the holder.
- 45° angle
- Cable termination: 4 mm banana plug
- Including solid case

Models:

- RR-3057R , incl. Tungsten probe tip, right handed
- RR-3057L , incl. Tungsten probe tip, left handed
- RR-3057RB: 2-pin BeCu probe tip, right handed
- RR-3057LB: 2-pin BeCu probe tip, left handed

Specifications High Resolution Solar Cell Probe:

		RR-3057A (standard)	RR-3057B (Optional)
Scanning area:	12.7 x 12.7 mm		
Body:	magnetic base		
Movements:	X,Y,Z		
Models:	Left (L)- and righthanded (R)		
Wire ending:	4 mm plug (banana)		
Configuration:		1-pin (RR-3059)	2-pin goid plated (RR-3058)
Needle material:		Tungsten	Hardened BeCu
Length probe tip holder:		max. 120 mm	
Probe holder:		Spring end mechanism	
Needle diameter:		635 µm	305 µm
Tip diameter:		25 µm	127 µm
Tip spacing:			254 µm
Typical use:		Probing large pads and geometries 25µm	Kelvin measurement

Probing Solutions

RR-3056 Solar Cell Probe
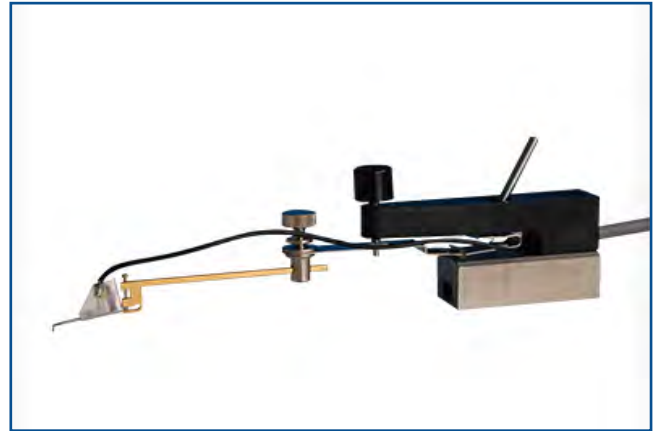
Description:

The Solar Cell Probe can be used for standard solar cell measurements. This probe uses standard a 4mm banana connector and is delivered with a steel block to connect its magnetic base. Because of its strong magnetic base, the probe can be easily used in both substrate and supersaturate configurations, since it can be mounted upside down. The probe is capable of handling 2 Ampere. A second sense pin is available to minimize resistance loss in the cable (4-wire kelvin probing, second probe or sample plate required). The small manual joystick allows for precision movements in both X and Y directions. The Z-adjustment is handled by a precision screw. This makes it possible to probe small pads.
The device is not suited for intensive usage (production environments).

Optional: 4-wire Kelvin Configuration
The Solar Cell Probe can be used in a true 4-wire Kelvin configuration. This means that the possible voltage drop over the current wire is eliminated by measuring the voltage at the sample directly. The wires are electrically isolated from the body. To measure a solar cell in 4-wire kelvin configuration, the 2-pin BeCu probe tip configuration is required (RR-3056B).

Key features:

- Standard configuration (RR-3056) : incl. 1-pin probe tip Tungsten
- Spring tip holder is a very robust holder that will accept any of the available probe tips with shank diameters ranging in diameter from 10 to 25 mils.
- No special tools are required for loading and unloading the tip from the holder.
- 45° angle
- Magnetic base
- Suitable for substrate and supersubstrate measurements
- Small manual joystick
- Cable termination: 4 mm banana plug
- Including solid suitcase

Models:

- RR-3056: Solar Kelvin probe (1-pin Tungsten)
- RR-3056B: Solar Kelvin probe (2-pin BeCu)

Specifications Solar Cell Probe:

|		RR-3056 (standard)	RR-3056B (Optional)
Scanning area:	2.54 x 4.57 mm		
Body:	magnetic base		
Movements:	X,Y (Z)		
Wire ending:	4 mm plug (banana)		
Configuration:		1-pin (RR-3059)	2-pin goid plated (RR-3058)
Needle material:		Tungsten	Hardened BeCu
Length probe tip holder:		max. 120 mm	
Probe holder:		Spring end mechanism	
Needle diameter:		635 µm	305 µm
Tip diameter:		25 µm	127 µm
Tip spacing:			254 µm
Typical use:		Probing large pads and geometries 25µm	Kelvin measurement

Probe tips

Depending on the type of measurement, we offer two types of probe tips:

1-pin Tungsten (RR-3059)
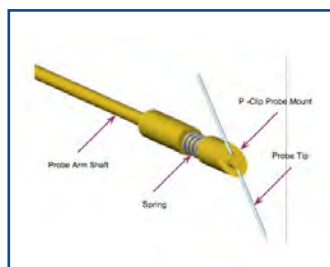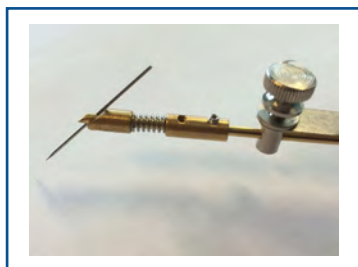
2-pin Hardened BeCu (required for kelvin measurements) (RR-3058)
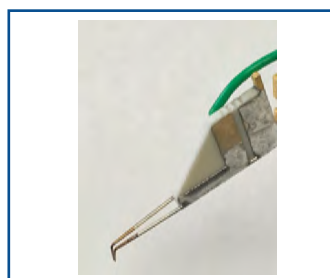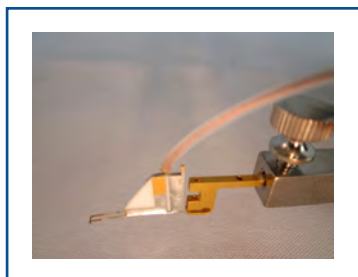
IV-Measurement Solutions

RR-1029 Solar Cell IV-Converter

Description:

The new Solar Cell IV-Converter is a dedicated source meter to measure and convert the output of a solar (reference) cell without the necessity of an external computer or other instrument.

Solar reference cells need to be kept into short circuit conditions to guarantee the best linearity. The active IV converter electronics inside this Solar Cell IV-Converter is designed for this purpose. As a solar reference cell is strongly temperature dependent, a correction is required to the calibrated value at 25°c. The instrument has the ability to measure the reference cell temperature and apply this correction. There are two types of silicon reference cells; shunted and non-shunted. A non-shunted reference solar cell has to be connected by means of 4-wires. This allows for the elimination of a voltage drop caused by higher currents. Reference solar cells that are shunted output a voltage signal, instead of a current. These cells can be connected to the instrument; however, voltage biasing will be disabled.

The instrument can be operated from the 4.3" touchscreen directly, while the USB connector on the instrument allows for PC control. The device integrates directly with ReRa Tracer IV-Curve software and a full LabVIEW driver can be downloaded for free. Note that the software is not required to use the instrument.

A BNC TTL shutter signal is available on the rear side of the Solar Cell IV-Converter to control a solar simulator shutter.

When the instrument is operated by Tracer IV-Curve software or the LabVIEW driver, controlled voltage biassing is enabled. This allows for full IV-curve measurements on solar (reference) cells. The curves are limited to ±200mA where the voltage range is ±5V, this is most of the time enough for smaller cells used in research and development. For many applications in the field of solar cell research the lower cost IV-Converter can replace for example a rather expensive Keithley Source meter.

The following data can be displayed for solar reference cells on the touchscreen:

All solar reference cells:
- Temperature (°C/F)
- Irradiance [Wm-2]
- Shutter state

Non-shunted solar cells:
- Short circuit current (Isc)
- Open voltage (Voc)
- Current / Voltage

Shunted solar cells:
- Voltage

Key features:

- Dedicated, stand alone instrument to measure solar (reference) cells
- Multiple parameters in display
- Storage of calibration values of multiple reference cells
- 4-wire Pt100 temperature sensor reading
- Visualization of complete IV-Curve (when combined with Tracer software)
- TTL output to control solar simulator shutter
- Large (4.3") touchscreen
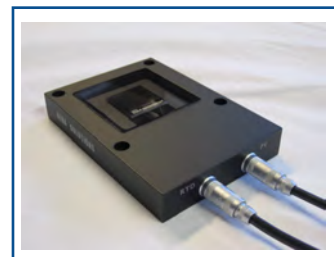
Specifications Solar Cell IV-Converter:	
Power supply input:	100 VAC ... 240 VAC, ±10 %, 47 Hz ... 63 Hz
Power supply output:	±15 VDC, ±5 %, +500 mA / −300 mA max.
Current range / resolution:	±200mA / 100 µA
Voltage / resolution	±5VDC / 0.5mV
Bias voltage range / min.	±5VDC, 5mV
IV-Curve measurement	100 simultaneous current/voltage points in <5 sec
Shutter output	0..5V TTL
Display	4.3" touchscreen

IV-Measurement Solutions

RR-3060 IV-System Basic

Description:

Our IV-System Basic is built around the well known Keithley 2401 Source meter. This proven instrument has all it takes to measure IV-curves (both dark and illuminated) on solar cells. The available current range has a minimum of 10 pA and a maximum of 1A, where the voltage ranges from 1µV to 20V. Unlike the more expensive Keithley sourcemeters that interface by USB, this instrument can only be controlled by a GPIB interface. In our basic IV-System we include a GPIB/USB interface to make sure there are no issues in getting the sourcemeter connected to a computer.

When measuring solar cells it is very important to use the mechanical shutter that is provided with most solar simulators. By using a shutter, the solar cell is only illuminated during the measurement, which prevents heating up of the solar cell material. We include a USB shutter controller that can be connected to almost any available solar simulator.

Another important parameter for solar cell metrology is the temperature. A high precision class A Pt100 temperature sensor including computer interface (USB) is included with this basic IV-System.

Note that the Tracer IV-Curve Software (RR-5006) is required to operate the IV-System Basic.

Key features:

- Tool for measuring IV-curves (both dark and illuminated)
- Current range min. 10pA and max. of 1A
- Voltage range 1µV to 20V
- Including GPIB interface
- Including USB shutter controller
- Including class A Pt100 temperature sensor with computer interface

Specifications IV-system Basic:	
Source meter:	Keithley 2401
Current range:	10pA – 1A
Voltage range:	1µV – 20V
Shutter controller	TTL
Pt100	4 wire class A

IV-Measurement Solutions

RR-3199 USB Shutter control

Description:

Our USB Shutter control for solar simulators is a simple USB cable that terminates in a Sub-D and/or a BNC connector. The output is a TTL signal to control the shutter supported by almost any solar simulator.

Most of the modern solar simulators are equipped with a mechanical shutter. The USB Shutter control is used to cover the light when the solar cell is not measured. This prevents the solar cell material from heating up which can be very important as a solar cell has a large temperature dependency. Only during the measurement the shutter should be opened.

The ReRa Tracer IV-Curve Software can control this shutter controller out the box, but there is also a LabVIEW driver available to create your own software.

RR-3067 Transimpedance Amplifier

Description:

The ReRa Transimpedance amplifier is a high precision instrument to measure the current generated by a photodiode or small solar cell.
It actively keeps the photodiode in short circuit conditions and converts the generated current linearly into a voltage.
The amplification is set by a fixed resistor that has a low temperature drift and high precision. The sensitive electronics is surrounded by an EMC housing to prevent noise from entering the feedback loop.

- Default sensitivity: 1V / 10uA
- Max. frequency: 1kHz
- Input: BNC 50Ω
- Output: BNC 50Ω
- Power supply: ±15VDC, 100mA, sold separately (RR-3068)

IV-Measurement Solutions

RR-3070 IV-System Pro

Description:

To measure PV modules, our IV System Pro is the best choice. As PV modules have much higher voltages and currents compared to single cells, different instruments are required. The RR-3070 comes in two models: multi-quadrant (RR-3070A) and single-quadrant (RR-3070B). A multi-quadrant system can measure the IV-curve in all 4-quadrants of the IV-domain, where the single-quadrant system is limited to the first quadrant.

Of course, the multi quadrant version can generate more information, but it is always limited by current/voltage ranges. At large voltages the current is low and vice versa. The single quadrant can both measure high voltage and high current, but will not work for dark curves.
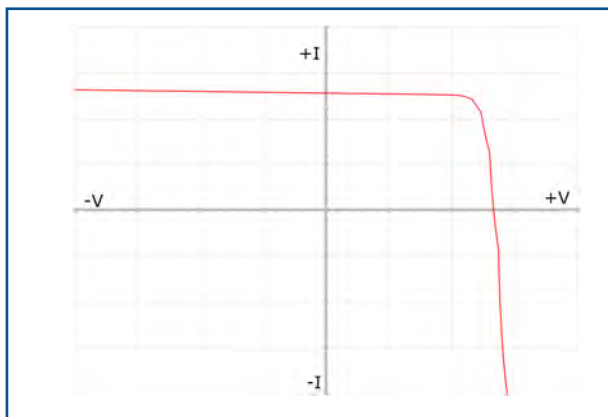
Multi quadrant RR-3070B
(All voltages and currents)
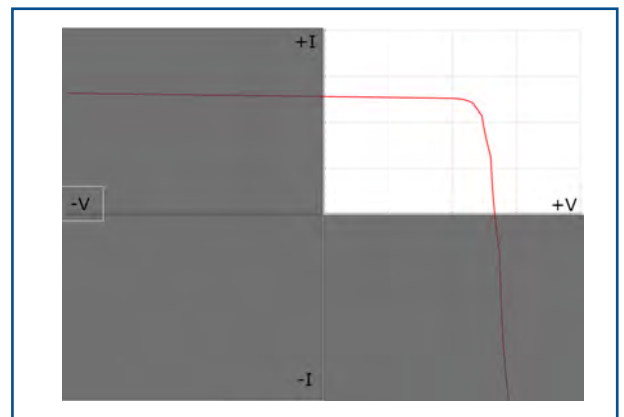
Single quadrant RR-3070B
(Only positive voltage and current)

The multi-quadrant IV system (RR-3070A) is built around the well-known Kepco Bob bi-polar power supply (±100V, ±4A).
The single quadrant IV system (RR-3070B) uses the Höcherl & Hackl PLI1430 with MPPT function (300V, 30A).

Both systems come with 3 Keysight Technologies 34465A DMMs to realize high quality data acquisition on current, voltage and reference cell. These proven instruments have all it takes to measure IV-curves (both dark* and illuminated) on modules. By using a reference cell during the measurement, each current voltage pair is irradiance corrected, eliminating the uncertainties caused by light fluctuations during the measurement. The system includes a ReRa control unit that is responsible for sweep generation and relay control.
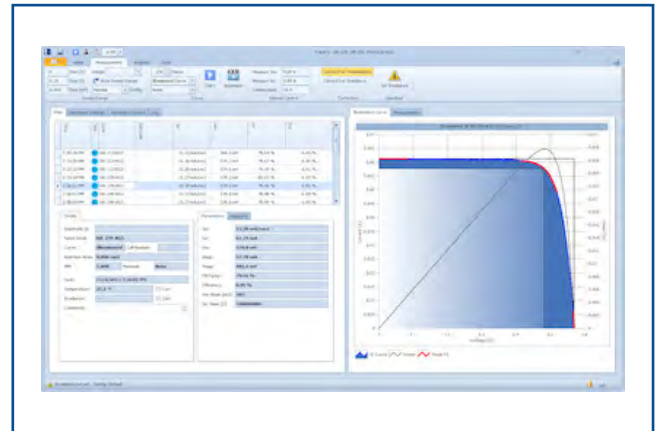
IV-Measurement Solutions

A USB shutter controller is included to connect to almost any available solar simulator. Another important parameter for solar panel metrology is the temperature. A high precision, class A Pt100 temperature sensor including computer interface (USB) is included with this IV-System Pro to connect on the rear of the PV module. Typical silicon reference cells are equipped with Pt100 temperature sensors. This temperature is also measured by the system, providing temperature correction on the irradiance for each point in the curve.

Note that the ReRa Tracer Software is required to operate the IV-System Pro.

Specifications IV-system Pro:		
	Mulit-Quadrant (RR-3070A)	Single Quadrant (RR-3070B)
Voltage supply range	± 100 V	300V
Current supply range	± 4 A	30A
Measurement range voltage/reference cell	± 100mV, ± 1V, ± 100V, ± 1000 V	
Measurement range current	± 1 µA, ± 10 µA, ± 100µA, ± 1mA, ± 10mA, ±100mA, ± 1A, ± 3A, ±10A	
Measurement accuracy for Voltage, Current and Irradiance	See Keysight Technologies 34465A for exact accuracy specifications	
Sweep time	100ms – 30s	
Points per IV curve	50 - 500	
Shutter controller	TTL- level, BNC connector	
Temperature input	2 x Pt100 4-wire	
Reference cell connection	2 x 4mm banana socket	
PV module connections	4 x MC4 sockets (separate voltage and current)	

Software Solutions

RR-5006 Tracer IV Curve software

Description:

Tracer IV-curve software is the all-in-one solution for the measurement and elaboration of IV-curves for solar cells and modules. Tracer is the core application developed by ReRa Solutions that will help you to characterize your solar cells and modules. Many institutes and laboratories all over the world work hard on the development of new materials and technologies for photovoltaic applications. One of the main techniques to characterize these devices is to measure its IV curve. An IV curve can be taken from a solar cell by changing the voltage while measuring the light generated current.

It seems logical for this measurement to use a standard power supply, because a power supply is normally used to provide a variable voltage and current. Unfortunately this would not work for solar cells. A solar cell generates current, so you will need to have a power supply that sinks this generated current instead of provide it. This can be done with a so called bi-polar power supply (or electronic load). This is a power supply that can sink and source current at both positive and negative voltages. There are many instruments on the market that can be used a such a bi-polar power supply. Some of them are just bi-polar power supplies while others integrate measurement and control capabilities as well.

Tracer will let you define and setup a system based on different instruments to measure your IV-curves. You can add multiplexers to automatically measure multiple cells by using one single measurement system, implement contact checking and measure monitoring solar cells.

Some examples of the supported hardware (please contact us for other possibilities):
- Keithley 2400 series
- Keithley 2600 series
- HACKL Electronic Loads
- Kepco BOB
- B&K Electronic Loads
- Toellner loads
- EKO MP-180 Curve Tracer
- National Instruments Data Acquisition
- MODBUS / Ethernet controlled instruments

Tracer natively supports the control of all Keithley 2400 and 2600 series SourceMeters. These instruments have proven their strength over time for the measurement of solar cells. They range from 0.1fA – 20 Amperes.

Tracer is developed with the latest Microsoft.NET Technology, which resulted in a modern 'Microsoft Office' look and feel. A stable operation on the Microsoft Windows platform is guaranteed.
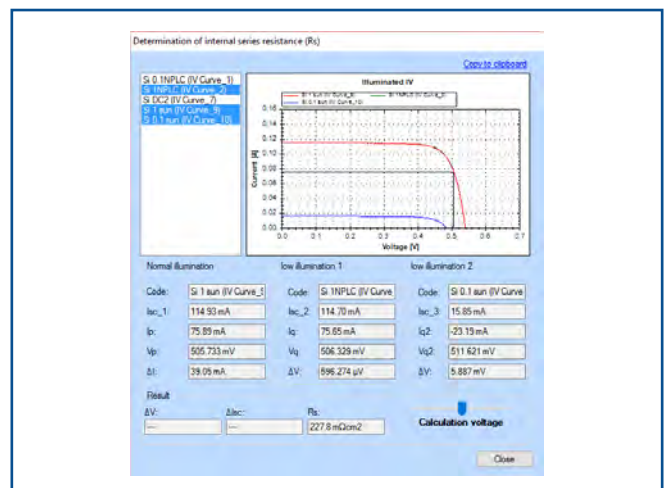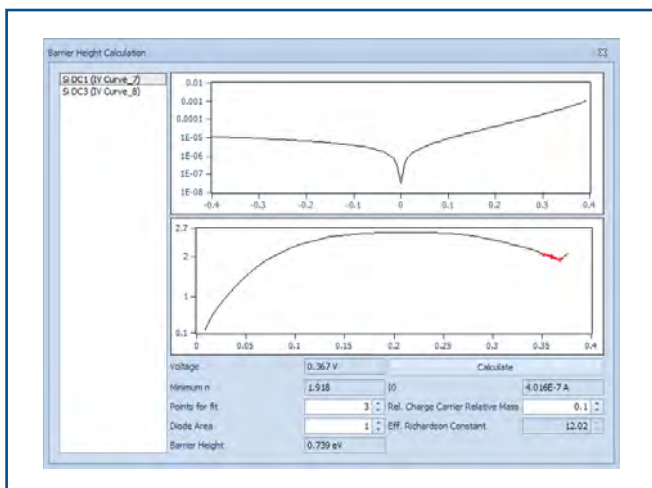
Tracer Configurator

Before you start working with Tracer, you will have to configure your system. This is done by the Tracer Configurator. A tool that completely defines the setup you want to use. Tracer intends to support most instruments available on the market to use as an IV-curve measurement system. You can use for example a Kepco Bop bipolar power supply, add 2 Agilent 34410A DMMs to measure voltage and current, use a National Instruments DAQ card to control the Kepco Bob and get that unused Keithley 2000 DMM to measure a pt100 sensor for the solar cell temperature. This is all defined in the configurator.

RR-5020 Tracer Support Contract

For the Tracer 3 IV Curve software, ReRa Solutions offers a yearly Support Contract.

This contract includes:

- Unlimited updates to all versions, even new major versions
- Bugfixes
- (max.) 2-hours online support where a ReRa employee takes over your computer to help you solve issues
- Possibility to send in requests for new features / improvements in the software which will be handled with a higher priority

Software Solutions

RR-5021 Tracer Analyser

Description:

Tracer Analyser, the lower cost version of the full Tracer IV-curve software, produces binary native project files with the IVP3 extension. These can be opened in Tracer (full edition) and in the Tracer Analyser. This lower cost version of Tracer cannot only read the files produced by the full version, but it can do more. It will do data elaboration, curve fitting, import, export and more. The only difference is that the Analyser cannot control any instruments. For a much lower price you have a full data analysis system for IV curves.

Comparison of the different features in between Tracer IV-Curve software and Tracer Analyser:

|	Tracer IV-Curve software (full) (RR-5006)	Tracer Analyser (RR-5021)
sc, Voc, Impp, Vmpp, FF	√	√
Rs, Rshunt, Gsh, Rs near Voc	√	√
Mathematical fit to 1-diode model	√	√
Mathematical fit to 2-diode model	√	√
Dark Curves	√	√
Log(I) over V	√	√
Import / Export ASCII/CSV files	√	√
Curve averaging	√	√
Curve editor	√	√
Temperature Coefficient determination	√	√
Database backend (MySQL compatible)	√	√
Database viewer	√	√
Graphical analyser	√	√
Material library	√	√
Hardware control	√	
Automatic measurements	√	
Control over HTTP (LabVIEW, Matlab, etc)	√	
Control over Microsoft .NET	√	
Device manager	√	
Reference Cell manager	√	

Services

SOLAR CELL CALIBRATION

Description:

Within our solar cell calibration facilities, we can (re)calibrate various types of solar reference cells. We can do the following calibrations:

- External Quantum Efficiency Calibration (300 nm - 1800 nm)
- Irradiance Calibration (1000 W/m² AM1.5G)
- Temperature Coefficient Determination
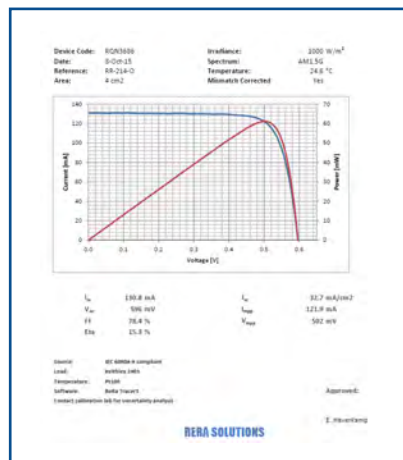
PHOTOVOLTAIC CONSULTANCY

Description:

Having many years of experience in Solar Cell (Photovoltaic) Measurement, ReRa Solutions can help you with all your photovoltaic issues.
We always try to find the best solution for your measurement challenges.

Please don't hesitate to contact us.

Special projects

Besides producing standard solar cell measurement products, ReRa Solutions is an expert in doing specialized solar cell measurement projects:

- **Quantum Efficiency Measurement systems**

In the last couple of years ReRa Solutions BV made various Quantum Efficiency Measurement Systems for different types of customers (Airbus, EMPA, University of Ulster, University of Cagliari, University of Sheffield, Bosch, etc.)

- **Demonstrator Perovskite Solar Cells**

For TNO Eindhoven (NL), ReRa Solutions has made a dedicated device for demonstrating the measurement of Perovskite/Silicon Solar Cell tandems.

- **Electrical loads**

For Solliance (NL), ReRa Solutions has developed 44 electrical loads for the project "The Reliable and Ultimate Solar cell and Module Test (TRUST)"

- **Sample holders**

For different institutes, ReRa Solutions has designed and produced various sample holders to be integrated in existing measurement equipment

- **Broadband Intercomparison (ISRC)**

Together with the Radboud University Nijmegen, ReRa Solutions yearly participates as measurement expert in the International Spectroradiometer Comparison (ISRC) which is organized by the European Joint Research Center (JRC) (www.intercomparion.eu).
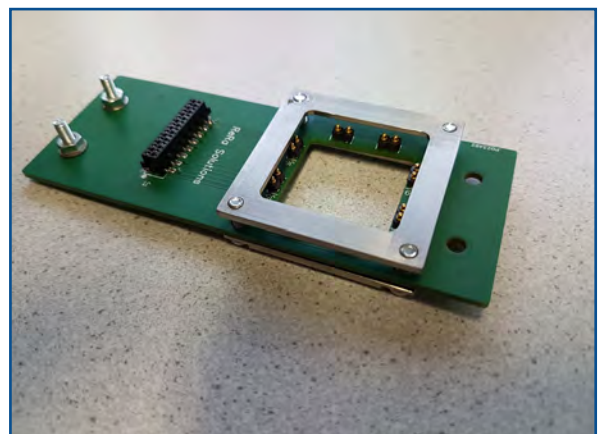
RERA SOLUTIONS
SOLAR MEASUREMENT

About ReRa Solutions:

In the last 9 years, ReRa Solutions evolved as an expert in the field of solar cell measurement. Starting as a spin-off of the Radboud University Nijmegen, ReRa developed several dedicated instruments and software for the measurement and calibration of different types of solar devices. Besides product development, ReRa offers consultancy and measurement equipment design for solar cell laboratories. This combination results in excellent measurement systems which finally improve the efficiency of solar cells and panels.
The knowledge of solar cell measurement interpretation is what makes ReRa unique.

Many institutes and laboratories all over the world already use the ReRa products to their full satisfaction.

Having a small, dedicated team, ReRa builds strong, personal and long-term relationships with our customers. Together with our customers, we always try to find the most suitable solution. Depending on the kind of projects, we will deploy our own team members or we hire external experts.

ReRa underlines the importance of broadening the use of solar energy in The Netherlands, ReRa is an official member of the Dutch Association for Solar Energy Holland Solar.

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