LED SOLAR SIMULATOR IV CHARACTERIZATION SYSTEM

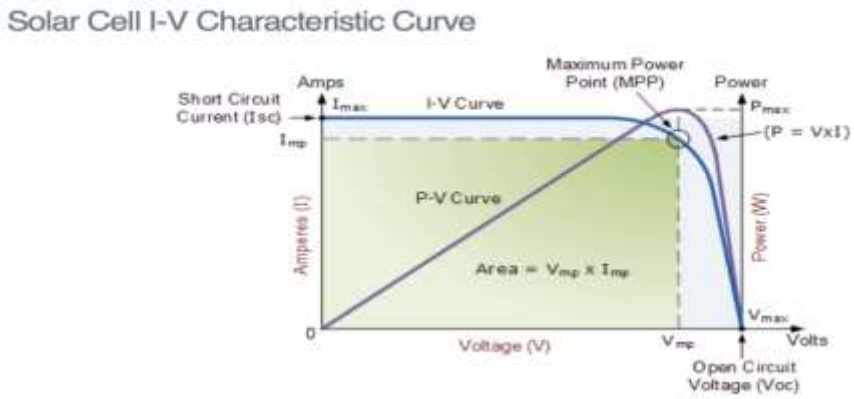
SM-X15

SOLAR SIMULATOR IV CHARACTERIZASYON SYSTEM

HOUSING OF SOLAR SIMULATOR ARE DESIGNED ACCORDING TO REQUESTED REQUIREMENTS

System icludes (as in Image)

1. Led Solar simulator
2. Sample Holder
3. Reference cell
4. Software
5. Sourcemeter



TECHNICAL DATA AND CALIBRATION RESULTS

SPECTRAL MATCHING TO SUN

Solar Simulator

I-V Characterization System, Sourcemeter

Sample Holder

Connections

SOFTWAREs

Solar IV characterization Software

Solar Photo Transient Current Software

SPECIFICATIONS

- Spectral Match: Class A (0.75–1.25, 400–1100 nm)
- Spatial Uniformity: Class A (≤2%)
- Temporal Instability: Class A (≤2% long-term, ≤0.5% short term)
- Irradiance: 1200 W/m² (adjustable 500–1200 W/m²)
- Wavelength Range: 400–1100 nm (upgradable to 350–1800 nm)
- LED Lamp Type
- Lamp Lifetime: ≥10,000 hours
- Beam Size: ≥ 100x100 mm (configurable)
- Power Supply: 230 VAC, 50 Hz
- Integrated with IV curve tracers for module performance testing.
- User-friendly control software for irradiance adjustment, spectrum tuning, and data logging

- Efficient internal cooling control (15 – 85 ° C)

- Tabletop or rail-mountable with adjustable sample stage
- Supplied with reference cell and calibration certificate traceable to international standards

Solar Physics Sourcemeter

Solarphys Tech
Voltage range: -20 V to +20 V
Voltage resolution: 0.001 V
Current range: 50 pA to 250 mA
Sample Holder
Connection probes: two probe connections
Probe IV Tester
Sample holder for solar cell
Movable probe tip

- Calibrated Reference solar cell to calibrate output to 1 SUN

Calibration procedure: (400-500nm, 500-600nm, 600-700nm, 700-800nm, 900-1100 nm which meets Class AAA specification for IEC 60904-9, JIS C 8912, and ASTM E 927-05 standards.

Software

I-V measurements

P-V measurements

lnI-V measurements

Isc-P (irradiance) measurements

Sample Holder

Integrated Software for Solar Simulator and Sourcemeter Control

Solar IV Characterization software

After the testing of samples, the results should be provided in a Tabulated format as well as plotted automatically.

Solar Cell I-V Characterization System

This system analyze all photovoltaic and photoconducting characteristics of all solar cells such Dye sensitized solar cells, Quantum dots solar cells, Organic solar Cells, Perovskite Solar Cells, Solar Silicon Solar cells, Thin films solar Cells under 1000 W/m^2.

This system is a complete current-voltage (I-V) and power-voltage (P-V) measurement environment.

SOLAR SIMULATOR SYSTEM

- Solar spectral spectrum is observed on the screen of the solar simulator controller when the measurement is performed.

- The illumination area of the device is circular with a diameter of 100 mm

SOURCEMETER

- The sourcemeter must have a sourcemeter. The sourcemeter have an automatic current range and the current range should be in the range 50pA-250 mA.

- The voltage range of the sourcemeter is ranging from -20 V to +20 V.

- The intensity controller of solar simulator is 0- 1000 W/m^2,0-1 SUN

- The solar simulator measures the IV characteristics of all solar cells (Dye sensitized solar cell, perovskite Solar Cells, Quantum dots solar cells, Organic solar cell, Silicon solar cells) and be able to perform the IV characteristics of the batteries under computer control.

- The solar simulator measures the current-voltage characteristics of the solar cell under 1 SUN

- The current-voltage (I-V) characteristics of the solar cell are measured with the software in the system. The solar cell's open circuit voltage V_{oc}, short circuit current I_{sc}, filling factor FF, maximum current Imax, maximum power P_{max} and efficiency η, series resistance R_s, shunt resistance Rp and characteristic resistance R_{ch} should be measured automatically. •

- A reference solar cell should be given with the solar simulator.

- The probe holder of the device should be measured in a way that the measurements of the solar cell

SPECIFICATIONS OF SOLAR SIMULATOR SYSTEM

The device comply with the ASTM E 927-05 for uniformity classification, temporal stability and spectral match

Light illumination intensity range is adjustable 1000 W / m^2

Device is automatically measure;

a. open circuit voltage (Voc)
b. short circuit current (Isc)
c. fill factor (FF)
d. voltage at Pmax (Vmax)
e. current at Pmax (Imax)
f. maximum output power (Pmax)
g. shunt resistance (Rsh)
h. series resistance (Rs)
i. solar cell characteristics resistance (Rch)
j. photoresponse (RR)
k. solar cell efficiency (n)

SOLAR PHYSICS TECHNOLOGIES

Certificate Compliance 07.09. 2024

Product: Solar Simulator Model: SM 10x SN: 112

Applicable Standards: ASTM E 972-10, EIC 60904-9, JIS C 8912

Spectral Fit

Spectral Match

Band/Band	Class A limits	Error	Status
400-500nm	%25	-4.30%	Pass
500-600nm	%25	2.20%	Pass
600-700nm	%25	1.02%	Pass
700-800nm	%25	-2.50%	Pass
800-900nm	%25	-1.80%	Pass
900-1100nm	%25	3.40%	Pass

Non-uniformity

Area	Class A limit	Non-uniformity	Status
40 mm diameter	**2%**	1.8%	Pass

Irradiance instability

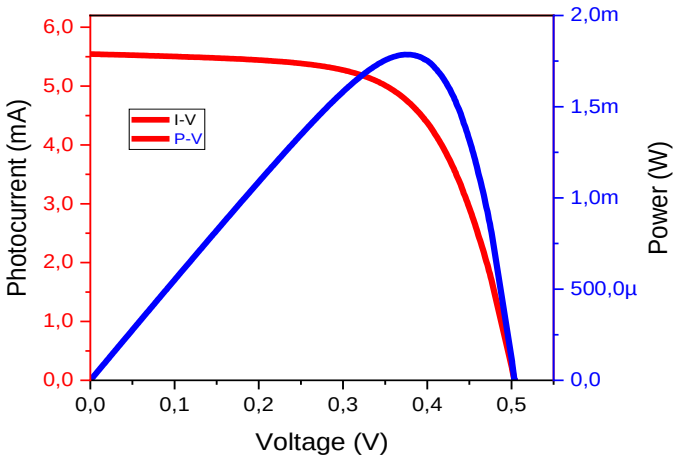
	Periyot/Period	Instability	Class A limit	Status
STI	0.5s	0.36%	0.5%	Pass
LTI	10Min	0.98%	2.0%	Pass

Approved by SOLAR PHYSICS TECHNOLOGIES

LED SOLAR SIMULATOR IV CHARACTERIZATION SYSTEM

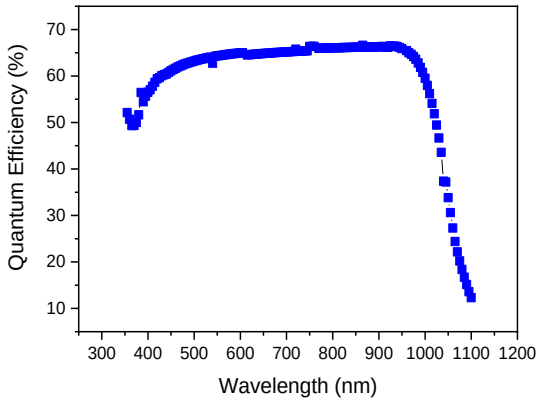
This photovoltaic reference cell is designed for calibrating the irradiance of solar simulator used in testing solar cell or when assessing the performance of photovoltaic devices to determine the |-V characterization. The calibrated reference cell consists of a 10mm x 10mm monocrystalline silicon photovoltaic cell encased in a 100mm x 100mm enclosure with a KG3 filter. All our measurements are done according to the following IEC standards: IEC 904-1, IEC 904-2, IEC 904-7, IEC 904-8, IEC 904-9, IEC 60891, ASTM 1021, ASTM E973M. The calibrated solar reference cell includes a certificate of calibration, compatible set of connecting cables, and is certified in the following parameters:

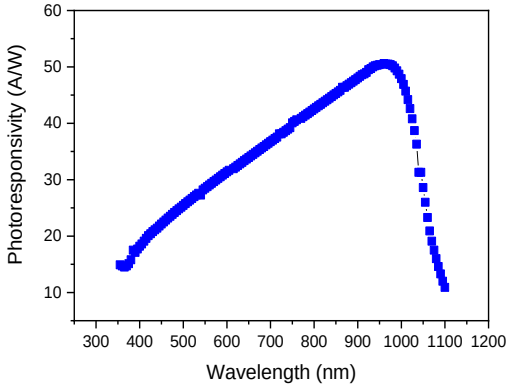
Calibration condition: 1000 $Wm/^2$ (1 sun), AM1.5G, 25 °C



Enclosure dimensions: 100mm X 100mm X 10mm

Operating temperature 10 °C-40 °C





a) Quantum Efficiency spectra of Reference solar cell b) Photoresponsivity spectra of solar cell

Calibration Report

Photovoltaic parameters under 1 SUN

I_{sc}(mA)	V_{oc} (V)
5.56	0.51

The certification is accredited by NIST to the ISO-17025 standard and is traceable both to the National Renewable Energy Laboratory (NREL), and to the International System of Units (SI).