

AAA Class Solar Simulator

IV Characterization System

FYTRONIX-8000

The **FYTRONIX-8000** is an advanced **AAA-class solar simulator system** engineered for **high-precision photovoltaic characterization**. The system enables **repeatable and accurate measurement** of **I-V (current-voltage)**, **I_{photo}-V (photocurrent-voltage)**, and **P-V (power-voltage) characteristics** of solar cells under standard test conditions (STC).



Solar simulators are manufactured in various style according to requested specifications

System Overview

The **Solar Simulator IV Characterization System** is a high-precision photovoltaic characterization platform designed for accurate **I-V and P-V measurements** of solar cells. The system complies with **IEC 60904-9** and **ASTM standards**, offering **AAA-class performance** in spectrum match, non-uniformity, and temporal stability.

System Includes

- AAA Class Solar Simulator
 - Precision Sourcemeter
 - Calibrated Reference Solar Cell
 - Sample Holder
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Key Specifications

Solar Simulator

- **Class:** AAA
- **Light Source:** Plasma Lamp
 - Superior spectral stability compared to Xenon lamps
- **Lamp Life time:**
 - Plasma Lamp: **4000 hours**
 - Xenon Lamp (typical): **1000 hours**
- **Beam Size:** **40 mm diameter**
- **Spectral Match:** AM 1.5G
 - Typical deviation < 25.5% (within $\pm 25\%$, compliant with Class-A requirement)
- **Spatial Non-Uniformity:**
 - Class A, < **2%**
- **Temporal Stability:**
 - Class A, < **2%**
- **Solar Irradiance Intensity:**
 - AM 1.5G, **1000 W/m²**
 - Warranty: 2 years

Sourcemeater Specifications

- **Instrument Type:** Precision Sourcemeater
- **Current Range:** Automatic ranging from **1 nA to 30 mA**
- **Measurement Mode:** Source and measure current and voltage
- **Application Suitability:**
 - Optimized for **laboratory-scale solar cell characterization**
 - Ideal for low-current and high-sensitivity photovoltaic measurements

Measurement Characteristics

- **I–V Characteristics**

Measurement of current–voltage behavior to evaluate electrical performance of solar cells

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- **Iphoto–Voltage Characteristics**

Analysis of photo-generated current as a function of applied voltage under simulated solar illumination

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- **Power–Voltage (P–V) Characteristics**

Determination of output power versus voltage, including maximum power point (Pmax).

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Photovoltaic Parameters Measured

- Short Circuit Current (**I_{sc}**)
 - Open Circuit Voltage (**V_{oc}**)
 - Maximum Power (**P_{max}**)
 - Voltage at Maximum Power (**V_{max}**)
 - Current at Maximum Power (**I_{max}**)
 - Fill Factor (**FF**)
 - Series Resistance (**R_s**)
 - Shunt Resistance (**R_{sh}**)
 - Characteristic Resistance (**R_{ch}**)
 - Photoresponse (**RR**)
 - Solar Cell Efficiency (**η**)
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Reference Cell

- **Type:** Calibrated Reference Solar Cell
 - Ensures accurate irradiance calibration and repeatable measurements
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Stability & Cooling

- **System Stability:** Better than 1%
 - **Cooling System:**
 - Fan cooling system
 - Power-off delay function for enhanced lamp lifetime and thermal safety
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Software Features

The integrated software enables **fully automated photovoltaic characterization** via computer control.

Software Functions

- Real-time I–V and P–V curve acquisition
- Automatic calculation of all photovoltaic parameters
- Data storage and export
- User-friendly graphical interface
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Calculated Parameters

- Open Circuit Voltage (V_{oc})
 - Short Circuit Current (I_{sc})
 - Fill Factor (FF)
 - Voltage at Maximum Power (V_{max})
 - Current at Maximum Power (I_{max})
 - Maximum Output Power (P_{max})
 - Series Resistance (R_s)
 - Shunt Resistance (R_{sh})
 - Characteristic Resistance (R_{ch})
 - Photoresponse (RR)
 - Solar Cell Efficiency (η)
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Applications

- Research & Development laboratories
- Quality control of photovoltaic devices
- Academic and industrial solar cell testing
- Thin-film and crystalline silicon solar cell characterization

Certificate of Compliance

Date: 07.08.2025

Product Information

- **Product:** Solar Simulator
- **Model:** SOLAR TECH X-11
- **Serial Number (SN):** 112

Applicable Standards

This product has been evaluated and found to comply with the following international standards:

- **ASTM E72-10**
- **IEC 60904-9**
- **JIS C 8912**

Compliance Scope

- **Spectral Fit:** ✓ Compliant
- Conforms to spectral distribution requirements for **AM 1.5G** solar simulation
- Meets Class-A spectral matching criteria as defined in the applicable standards

Statement of Compliance

The Solar Simulator **SOLAR TECH X-11** has been tested and verified to comply with the above-mentioned standards and fulfills the required criteria for **spectral fit performance** in photovoltaic measurements.



Authorized Signature:

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Date: 07.08.2025

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