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UV-Rad-1525-V-LC

Based on Solaronix' exclusive light engine, our solar simulation equipment delivers a perfect and continuous artificial sunlight 24/7, allowing for accurate stability and performance assessments of solar

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UV-rad 1525-V-LC Specifications

The UV-rad 1525-V-LC is a complete UV tester unit having a total sample area of 1.5x2.5m.
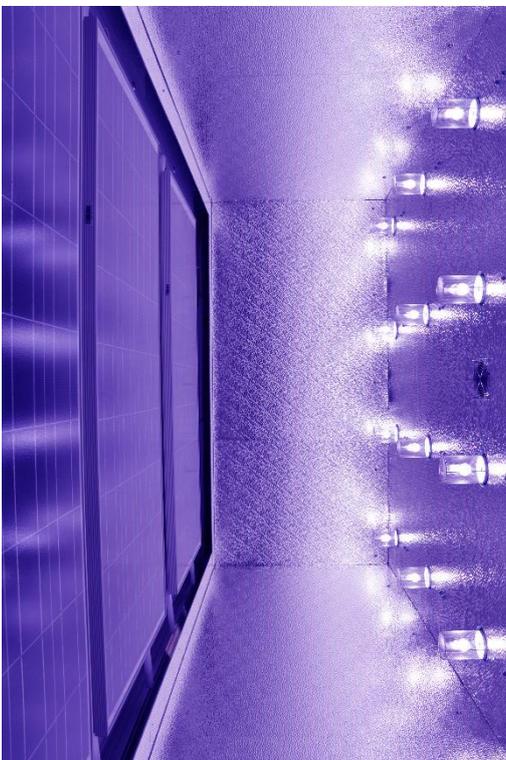
- A high efficiency Lumixo plasma light engines array fitted with bulbs giving a UVA and UVB sun spectrum. No light emission under 280nm.
At the heart of our simulators stand Solaronix' exclusive Lumixo light-engines (Xenonless xenon lamp), 1kW electrode-less discharge lamps with a lifetime up to 20'000 hours. All parts of the light engines can be refurbished or replaced.
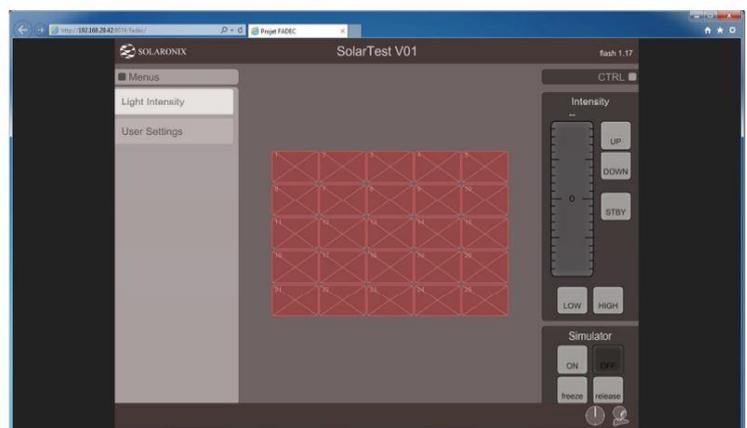
- A reflector box homogenizing the diffuse light from the light sources, in a way to ensure uniformity and proper spectrum on the sample area. The reflector box consists of a mechanical structure and its cabling elements dedicated to the light-engine array. The samples (PV modules) are installed on a vertical frame inside the equipment, accessible by hinged doors allowing easy access to the sample. The sample sits in a vertical air blade cooling the module from the bottom to the top.

- At the test plane of the sample, an instrument capable of measuring the UV light irradiation produced by light-engines is provided. The instrument wavelength ranges between 280nm to 385nm with an uncertainly less than ±15%.
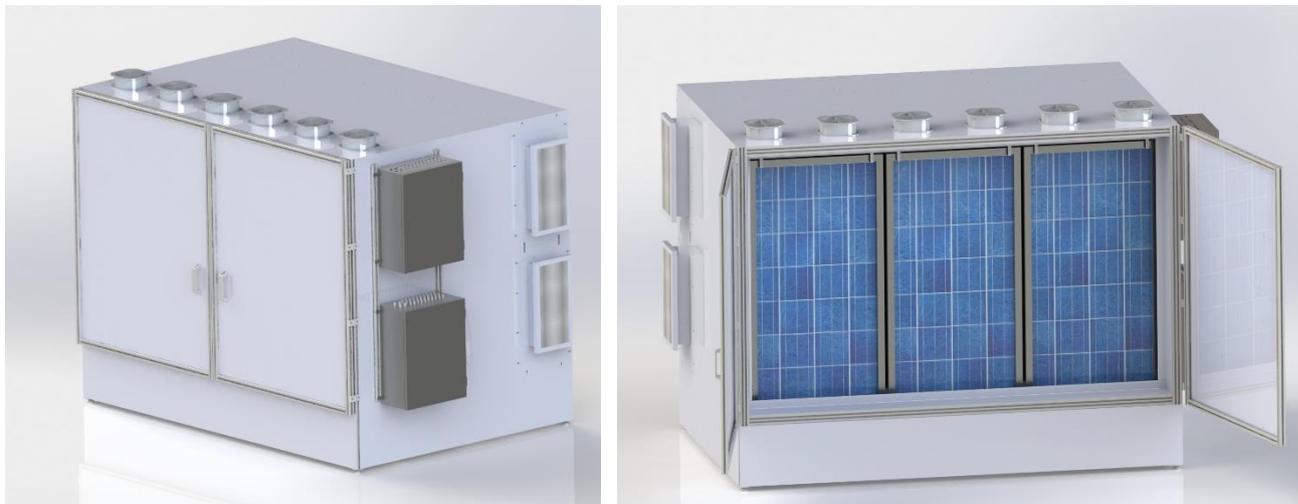
- The system has an air cooled sample holder to control the sample temperature during the illumination tests. The sample holder uses ambient air to maintain the PV module steady during illumination.

Illuminating chamber

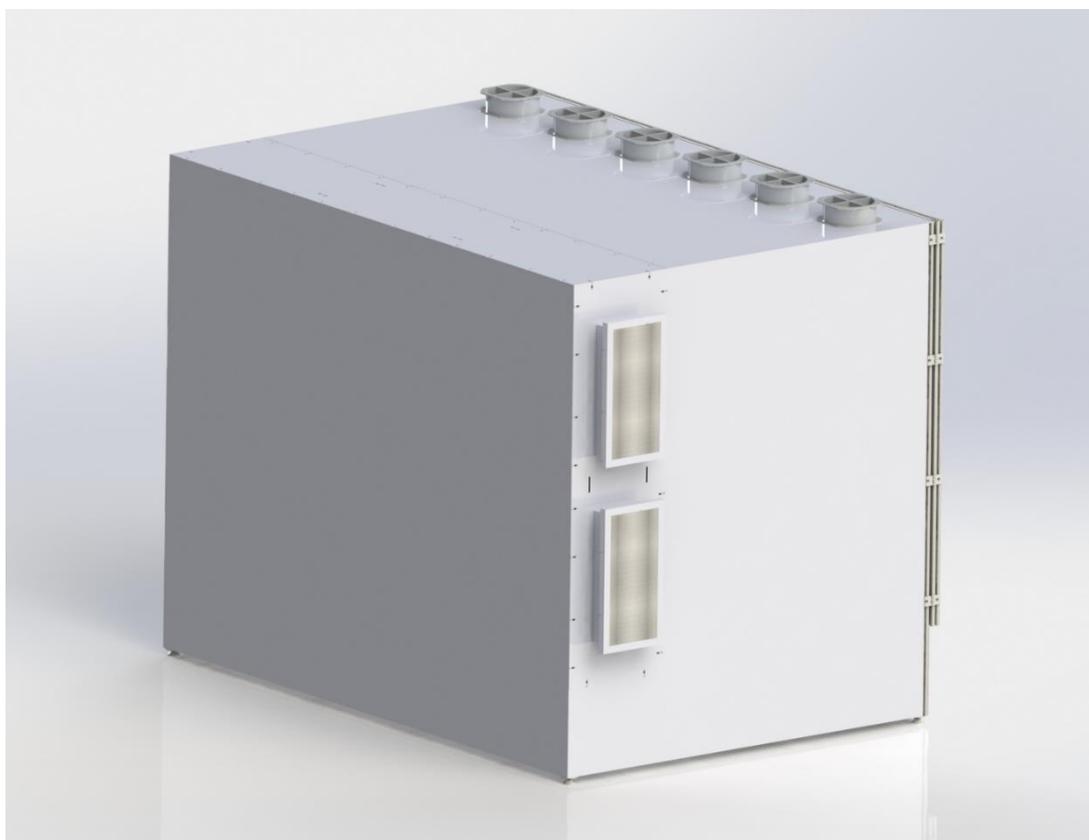Lamp array remote control

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UV-rad 1525-V-LC (front view)

UV-rad 1525-V-LC (back view)

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Illuminating unit specifications

Total active area: 1.5 x 2.5 m

Irradiance level: The nominal central irradiance measured is adjustable between 125 W/m2 (62.5% of maximum power) and 200 W/m^2 (100% of maximum power) in the wavelength range between 280 nm and 385 nm. The system is designed to provide total UV irradiation of 15 kWh/m^2 in the wavelength range between 280 nm and 385 nm, with at least 7.5 kWh/m^2 in the wavelength band between 280nm and 320nm according IEC61215-2:2015 (4.10).

Safety first: The light-engines are automatically switched OFF if an operator opens the sample access doors during operation. The safety lock is made by Sick i110 model.

Non-uniformity over the sample area:
The non-uniformity adjustment and characterization is provided by Solaronix; the specification is less than ±10% non-uniformity (minimum ± 15% as per IEC 61215-2:2015 & IEC61646:2008) on the complete sample area.

Temporal stability (within 200-250 W/m^2 operating range):
The irradiance stability (LTI and STI as per IEC 60904-9:2007) is defined as per IEC 60904-9:2007, 5.4.1.3.c. The system is built to ensure a < ± 1% temporal stability.

Spectrum (within 150-200 W/m^2 operating range)

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Warm up time for stabilization of irradiance: ~150 s
Maximum angle subtended by the light source (including reflected light) in the test plane: 90°

Changes that may require verification of the classification:
Any lamp unit or power supply replacement may change the irradiance non-uniformity specification.
Any change of the system settings in the operating software may change the irradiance non-uniformity specification.
Temporal stability and spectrum should not be affected by such changes.

Operating conditions:
Ambient temperature +25°C ± 2°C
As no dust filter is provided on the air cooling system, the system has to operate in a clean environment, i.e. with no dust or fumes emitting process nearby.

Maximal power requirement: 30kW, nominal 20kW, 400VAC 50Hz; 3P/N/PE.

Required flow of cooling air:
System consumption (intake): max 12'000 m^3/H at 25°C, taken from the ambient air.
System exhaust: max 12'000 m^3/H at 45-50°C, rejected into ambient.

Light engines

The UV-rad 1525-V-LC uses 20 plasma lamp based light engines, which not require any bulb changes.

The advantages of plasma lamp are:

- UV Sun spectrum according IEC61215-2:2015 & IEC61646:2008 **without filter**
  o Reduce maintenance cost
- Life time up to **40'000 hours** (warranty 20'000 hours)
  o Reduce maintenance cost
- No shift spectrum
  o Increase quality test
- No light flux reduction
  o Increase quality test

Sample holder specification

The PV modules are installed on a vertical frame inside the equipment, accessible by hinged doors allowing easy access to the sample. The sample sits in a vertical air blade cooling the module from the bottom to the top. The air blade velocity is regulated to ensure that the PV module is kept at +50°C ±10°C requested by the light soaking test according the norm IEC61646:2008.

The sample holder uses ambient air of the room. The room must be kept at 25°C ±2°C to ensure the proper cooling of the PV modules.

The temperature measurement repeatability of regulation loop is better than ±1°C for the regulation loop to respect the norm IEC61215-2:2015 & IEC61646:2008. The temperature measurement accuracy of the regulation loop is better than ±1°C to respect the norm IEC61215-2:2015 & IEC61646:2008.

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Sample area: 1.5 x 2.5m

Cooling capacity:
The system has demonstrated its ability to cool down a crystalline silicon solar panel down to 60°C ± 5°C.
The temperature measurement accuracy is ±2°C and the repeatability of regulation loop is better than ±0.5°C for the regulation loop to respect the norm IEC61215-2:2015 & IEC61646:2008.

Operating conditions:
Ambient temperature +25°C ± 2°C

Measurements capabilities
The system is compliant to produce the next measurements:

- UV preconditioning test (MQT 10) IEC61215-2:2015 (4.10) & IEC61646:2008 (10.10)
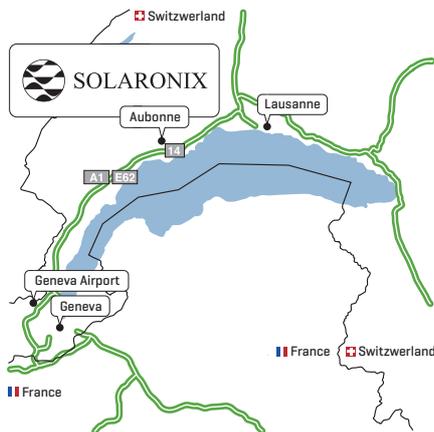
Size of equipment
Simulator with doors closed: 3m (width) x 2m (depth) x 2.2m (height)
System overall footprint, including access areas: 5m (width) x 4.2m (depth) x 3.3m (height)
Weight: ~1300 kg (whole equipment)

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