

Lightricity empowers sustainable IoT sensors through light energy harvesting technology. The Lightricity indoor light simulator, **LightBox**, is the perfect tool to provide a reliable and realistic performance comparison of solar cells under indoor light.

Features

- Calibrated benchtop apparatus for the characterization of solar cells under indoor light
- SA compliance with the most recent standard IEC TS 62607-7-2:2023
- Automated acquisition of Current-Voltage and Power-Voltage curves
- Fine control of illuminance between below 10 lux and 50k lux intensity
- Array white LED panel with excellent light uniformity and operating lifetime up to 10'000 hours
- White LEDs with energy efficiency class A (cheap to run) and minimal warming up (ready to use)
- Lab-free: compatible with most common source meters¹ via GPIB-USB interface
- Closed looped illuminance control ensured by 4 lux sensors
- Temperature monitored at up to 3 different points
- Warranty of 1-year (extension available upon request)

¹ Default compatibility with Keithley 2400/01, Keithley 2600, Keysight 2900 and OSSILA P2005A2. SMU customisation available.

Product Description

There are two variations of the LightBox, LightBox STD and LightBox XL. The products have different dimensions but otherwise share many similarities.

LightBox 1.0 - dimension $100 \times 105 \times 85 \text{ mm}^3$, total weight 220 grams, 5×5 array of white LED light



LightBox XL – dimension $185 \times 195 \times 85 \text{ mm}^3$, total weight 570 grams, 11×11 array of white LED Light



Technical Specifications (including IEC TS 62607-7-2:2023 standard classification)

| | LightBox STD | LightBox XL |
|---|------------------------------------|----------------------|
| Outer dimensions (mm) / weight (g) (including legs and connectors) | 100 × 105 × 85 / 220 | 185 × 195 × 85 / 570 |
| LED array | 5 × 5 | 11 × 11 |
| Correlated colour temperature (CCT) | From 2200 to 6500K (default 5000K) | |
| Colour rendering index (CRI) | From 70 to 90 (default 70) | |
| Illuminance range ^{2,3} | <10 to 50,000 lux | <10 to 40,000 lux |
| Light uniformity at DUT ⁴ | ~ 95% | ~ 95% |
| Spectral coincidence at 200 and 1000 lx (5000K CRI70) | SA | SA |
| Spectral coincidence at 50 lx (5000K CRI70) ⁵ | A | A |
| Temporal stability | SA | SA |
| Spatial uniformity (from DUT area to centre) | SA (Ø10 – 30 mm) | SA (Ø10mm – 50 mm) |
| Recommended max DUT sample size ⁶ | 5 cm × 5 cm | 10 cm x 12 cm |

² Light intensities < 200 lux reached with neutral density filter, included in LightBox 1.0 and XL

³ Upper limit depends on LED CCT and CRI

⁴ Light uniformities tested in lab for both LightBox STD and XL

⁵ with neutral density filter

⁶ DUT stage customisation available upon request

LightBox Software

A LightBox Windows software application (perpetual license, Windows 10/11) is included for users to operate the LightBox for collecting, displaying and exporting (in csv file format) the data. In the software, the setting of source meter can be controlled and the light intensity varied from <10 to 50,000 lux. It can take single sample and batch sample measurements, and lux sweep measurements. Add-ins for novel materials R&D (i.e., back and forward IV scan, voltage scan speed and back and forward IV) and for light soaking investigations (i.e., MPP tracking, and Isc and Voc stability) are available upon request.

| Outputs | Extracted PV parameters | Other parameters |
|--|---|---|
| Current-Voltage I(V) Power-Voltage I(V) | Short-circuit current: I_{sc} (A) Open-circuit voltage: V_{oc} (V) Current at maximum power point: I_{mp} (A) Voltage at maximum power point: V_{mp} (V) Power at maximum power point: P_{mp} (W) Fill Factor: FF (%) Power conversion efficiency (%) | Shunt resistance (Ω) Series resistance (Ω) |