

## SOLAR CELL EXTERNAL QUANTUM EFFICIENCY MEASUREMENT SYSTEM (IPCE)

### OVERVIEW

IRASOL's IPCE-020 is an optimized LED-based system that is economic and compact, well suited for lab-scale solar cell characterization. In IPCE-020 innovative design, the quasi monochromatic light is provided using single wavelength LEDs that cover spectral range from 370 nm to 940 nm. This results in a compact and easy-to-use system. It is low-weight and requires no optical bench or optical alignment and setup.

The intensity of LED light is considerably important in solar cells in which the current collection efficiency depends on light intensity. IPCE0-20 is well-suited for new-generation solar cells including perovskite and dye solar cells, but it can be safely used for other types of solar cells.



### FEATURES

- Automated IPCE measurement for lab-scale solar cells
- LED-based light source with 19 individual wavelengths
- Covering spectral range from 370 nm to 940 nm
- Containing a calibrated reference cell installed on the system
- Small, low cost and robust system
- Long-life LED light source (compared to conventional Xe lamps)
- No need for optical bench and optical alignment
- Ideal for perovskite and dye solar cells, as well as other types of solar cell

## SPECIFICATIONS

IPCE-020 Technical Specifications	
Wavelength Points (nm)	370, 400, 420, 450, 465, 505, 530, 570, 595, 610, 625, 660, 700, 730, 765, 800, 845, 895, 940
Reference Cell	Silicon PN photodiode (area: 0.073 cm <sup>2</sup> )
Power Supply	12 VDC, 2A (Input: 100-240 VAC)
Computer Interface	USB 2.0
Solar Cell Active Area	0.01 to 0.5 cm <sup>2</sup> (0.05 to 0.3 cm <sup>2</sup> is preferred)
Minimum Requirement for Solar Cell Sample	$J_{sc}$ (@AM1.5) > 1 mA/cm <sup>2</sup> (depends on cell area and wavelength)
Dimension (LxWxH)	61 cm x 30 cm x 19 cm
Weight	9.4 Kg

## HOW IT WORKS

In IPCE-020 a full LED light source is utilized. Each category of LEDs produces quasi-monochromatic light which is used for the measurement.

There are 19 types of LEDs with the same number of wavelengths covering 370-940 nm range.

Measurement method for the IPCE-020 system is schematically shown in the following scheme. For each run of measurement, the short circuit current of the reference cell is measured first to determine the light intensity for each wavelength. After this stage, the sample is pushed above the LED lamp and short circuit current measurement is made for the sample.

