

# Photovoltaics Lab at Ioffe Physical Technical Institute “TECHNOEXAN” Ltd. an innovation company of the Ioffe Institute

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## FOUR-LAMP FLASH TESTER FOR MULTIJUNCTION CELL CHARACTERIZATION

### Installation function

The Installation is a measuring system for recording the I-V curves of the multijunction solar cells under illumination and in the dark. Photovoltaic conversion efficiency may be evaluated at I-V measurements of individual cells in a wide range of sun concentration ratios at variable spectral content.



*Base unit, on which are installed: the power supply (in the left part, behind opened door); illumination system and measurement unit (in the right part of the body).*

### Flash/Light Parameters

Illumination intensity without lamp filtering, over 2 cm x 2cm area.....more than 10000X;  
Light pulse duration of the flat part (at +/-2% stability).....1 millisecond;  
Spatial light uniformity across 2 cm x 2cm area at concentration.....:.....5%, or better;  
System light intensity stability:.....2% flash-to-flash over 1 hour, 3% over 4 hours;  
Repetition rate of light pulses (depending on lamp voltage).....as fast as 1 pulse per 10-15 sec.  
Independent intensity variation for all four lamps.  
Possibility to install glass filters of 50x50 mm<sup>2</sup> area (for instance, Schott glass filters, or interference filters) in front of the each of four lamps (filters are not included in delivery set).

### **Electronics & Computer Software**

Forward and reverse I-V characteristics under flash illumination and/or in the dark for cells with current up to 10A, voltage -5V/+10V (variable).

IV data collection - light and dark IV curves. Ability to do a full reverse/forward sweep during the flat pulse section.

Data collection: voltage sweep and control electronics by associated software; 16 bits of data measurement and collection.

Indication of the Light, Voltage and Current oscillograms, as well as the I-V curves.

Measurement and reporting of  $I_{sc}$ ,  $V_{oc}$ ,  $I_{mp}$ ,  $V_{mp}$ , FF, Efficiency.

Computer with Windows operating system, data collection and analyses software (English language interface).

Capability to save and print data.

LabView-based program included in delivery set with possibility to write customer's own programs.

### **Physical and Other**

Compact table-top design: base unit is 100x54x14 cm, on which illumination system and measurement unit in light-protective housing of 50x50x122 cm and power supply of 46x46x53 cm are arranged.

Total maximum weight is 120 kg.

Measurement unit and power supply set for 220V AC, total power consumption is up to 1 kW.

Computer PC compatible, with LCD monitor.

Installation CDs for software.

Lamp lifetime of much more than 10,000 pulses.

Spare xenon bulb set of 8 spare lamps.

### **Power supply**

One phase 220 V, 50-60 Hz, maximum power consumption of 1 kW.

### **Delivery complete set**

<b>Description</b>	<b>Qty</b>
<b>Basic unit:</b> <ul style="list-style-type: none"><li>Flash illumination system</li><li>Illumination system power supply</li><li>Measurement unit</li><li>Complete set of the support elements with light-protective housing</li></ul>	1 1 1 1
<b>Computer system:</b> Computer PC compatible, OS Windows 7, LCD monitor	1 1
<b>Software:</b> <ul style="list-style-type: none"><li>Program for automatic operation, and test report generation</li><li>LabView-based program for automatic operation</li></ul>	1 1
<b>Spare parts:</b> <ul style="list-style-type: none"><li>flash bulbs</li><li>fuses</li></ul>	8 4
<b>Technical description:</b> <ul style="list-style-type: none"><li>Instruction manual, electrical and optical diagrams, description of measurement techniques, recommendations on maintenance due to typical failures.</li></ul>	1