

# Photovoltaic Training Simulator

## IA1603

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OVERVIEW

## PHOTOVOLTAICS SOLAR ENERGY SIMULATOR



A Large number of PV systems are under performing due to poor site selection, system design faults, frequent equipment failure, low solar irradiation access, unplanned grid failure or equipment mismatching. Some of these issues are external and often not in the hands of the system designer but most of them are because of poor design practices, inadequate installation planning or incomplete understanding.

IAREEE focused mainly on the cognitive development of renewable energy, contribute to the transition to renewable energy sources, and stimulate scientific innovation younger generations.

Proceeding from this principle, IAREEE has developed their laboratory equipment's range aimed at different groups of trainees starting from schools and that it considers the future of the next academic energy and creativity that the seed you need to develop professionally and carefully twist.

Also comes youth training within the academic institutions, engineers and technicians out of their importance in the coming years in the transition to self-reliance on renewable energy, at the head of the targeted sectors with equipment and training, which aims, to simulate realism systems to a deeper understanding of the systems performance.

## FEATURES

The courseware includes student manuals and instructor guides with all the theory required to perform the hands-on experiments.

- All workstations, modules, and components are very sturdy to ensure a prolonged service life in a demanding environment such as a training laboratory.
- The modular design approach of the training equipment allows a large variety of courses performed using a small number of modules, without unnecessary duplication of equipment.
- All electrical components interconnected without electric shock hazard since all live parts of the connection leads are concealed and insulated. All
- Electrical symbols representing the components used in a laboratory exercise are clearly silk-screened on the front panel of the modules.



## TOPIC COVERAGE

- Testing the optimum alignment of solar modules.
- Recording the characteristics of solar modules.
- Learning about various types of wiring (Series and Parallel) and connection configurations.
- Battery Fundamentals.
- Investigating how bypass diodes operate.
- The Solar Panel (Photovoltaic Panel).
- Effect of Temperature on Solar Panel Performance.
- Storing Energy from Solar Panels into Batteries.
- Effect of Shading on Solar Panel Operation.
- Solar Panel Orientation.
- Solar Panel Performance versus Insolation.
- Voltage-current Characteristic of a Solar Generation.
- Effect of radiation on Voltage-current Characteristic.
- Radiation effect on pumping system.

EQUIPMENT SET, CONSISTING OF:

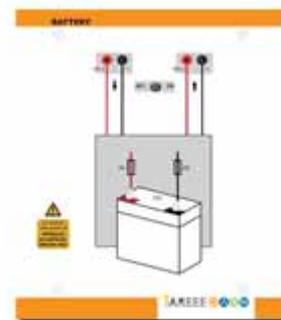
Mod.	Product Description	Part #	Qty
1	Photovoltaics Module	PVM01	1
2	Charger Controller Module	CCM01	1
3	Battery Module	BTM01	1
4	Inverter Module	INM01	1
5	AC/DC Loads Modules	LDM01	1
6	Solar Pumping Module	SPM01	1



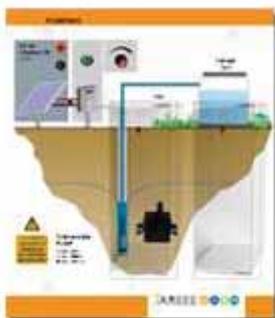
PVM01



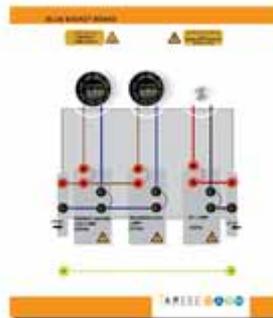
CCM01



BTM01



SPM01



LDM01



INM01

## MODULES DESCRIPTION



### **MODULE : Photovoltaic Module simulator PVM01**

For exact imitation of a PV module.

Output DC:

Voc = 24 V

Isc = 0 - 1,5 A

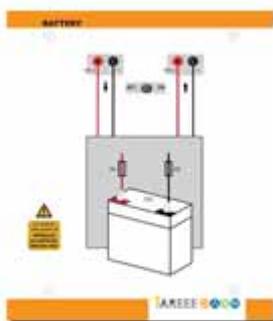
Pmax = 8 W.

- Short circuit current can be adjusted in four steps or
- Continuously.
- bypass-diode.
- Digital voltmeter, ammeter.
- Variable resistance to calculate max tracking point
- External PV



### **MODULE : Charger Controller Module CCM01**

- Solar PWM charging controller Controls the charging of the battery "BTM01" and loads, deep discharge control, visualization of operating status and key values.
- Nominal voltage 12 V DC, max. current 30 A DC.
- Digital voltmeter, ammeter



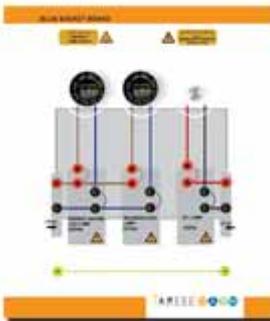
### **MODULE : Battery Module BTM01**

- For connecting a solar Lead Acid battery
- The battery can be switched off.
- bidirectional



**MODULE : Inverter Module INM01**

- DC / AC inverter / stand-alone operation
- Changes DC into sinusoidal AC to create a stand alone mains.
- input 12V DC / 3 A
- output 230V AC
- Pmax = 150 W.
- Digital, Wattmeter, Watt/hour, voltmeter, ammeter



**MODULE: AC/DC Loads Modules LDM01**

- AC/DC load connection For connecting with the mains two 230 V AC sockets for AC loads.
- For connecting DC loads in stand alone systems, one 12 VDC sockets for DC loads.



**MODULE : Solar Pumping Module SPM01**

- For connecting a solar dc pump to PV and investigate radiation effect.
- The Pump can be switched off.
- Potentiometer for variable speed control

## CHARACTRISTICS:

- No-load voltage: 24V
- Maximum short-circuit current: 4 x 0.5 A
- Light intensity adjustable from 20% ... 100%
- Bypass diode connectable
- Short-circuit proof
- Power AC : 150 VA
- PV Peak Power: 4 x 2Wp
- Displays: DC 6.5-100V 0-20A LCD Display Digital Current Voltage Power Energy Meter
- Multimeter Ammeter Voltmeter
- Solar Charge Controller : PWM 30A 12V 24V LCD Display USB 5V.
- AC Display: 100A Digital LED Power Panel Meter Monitor Power Energy Voltmeter Ammeter
- Operating voltage: 88 ... 264 VAC, 47 ... 63 Hz
- Dimensions: 800 x 940 x 400 mm (HxWxD)