RENEWABLE ENERGIES

PHOTOVOLTAIC SOLAR PANEL MEASUREMENT TRAINER

DL SOLAR-PV

Didactic system for the theoretical and practical study of photovoltaic solar panels.

With the photovoltaic solar panel measurement trainer, it is possible to perform experiments indoor and outdoor to determine and measure the characteristics of different types of photovoltaic panels and connections.

The system is provided with connecting cables, instruments and an experiments and learning activities manual.

TRAINING OBJECTIVES

- Solar panels under a variety of effects.
- Short-circuit current of a PV panel.
- Open-circuit voltage of a PV panel.
- Current at maximum output of a PV panel.
- Voltage at maximum output of a PV panel.
- Relationship between panel tilt, illuminance, short-circuit current and electrical output: Relationship between panel tilt and irradiation, Relationship between the solar panel output voltage and the irradiation, Relationship between the solar panel short-circuit current and irradiation.
- Determining the efficiency of a PV panel.
- Comparing different panel types.
- Series and parallel connections: Series connection of two solar panels, Parallel connection of two solar panels.

TECHNICAL SPECIFICATIONS

- One polycrystalline inclinable photovoltaic panel: approx. 90W, 12V, complete with a cell for measuring the solar irradiance and a temperature sensor.
- Two monocrystalline inclinable photovoltaic panels: approx. 85 W, 12V, complete with a cell for measuring the solar irradiance and a temperature sensor.
- Two Sun simulators consisting of halogen lamps to provide energy to the photovoltaic modules for indoor use.
- One active DC load used in the renewable energies laboratories configurable as constant resistance or constant current.
- One multifunction Photovoltaic panel measurement module with 2 solar irradiance and solar panel temperature meters, 2 DC multi-meters (current, voltage and power) and Modbus RTU serial communication for remote data acquisition. It includes diodes to connect the solar panels in series and parallel and a potentiometer to control the power of the sun simulator modules.
- Temperature and solar irradiance sensor module.

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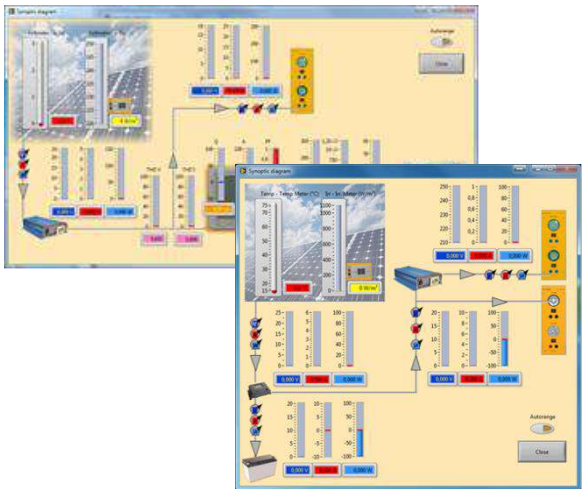

The Photovoltaic Solar Panel Measurement Trainer is supplied with a software developed in LabVIEW that communicates with the main components of the modular system via RS485 serial communication using Modbus RTU protocol to perform data acquisition and processing.