

# 13. Renewable energies

## Micro solar plant bench for OFF-GRID location

### Training objectives

- Connecting the photovoltaic panels to study the various series/parallel combinations.
- Grasping the various constituent elements of a photovoltaic generation chain in isolated locations.
- Measuring the energy levels at the various points of the installation.
- Studying the battery charging and discharging constraints.

### Presentation

This bench can be used to implement a solar power generation chain, from the photovoltaic panels to the 230 V AC receivers.

### Description

#### Photovoltaic structure

photovoltaic structures (ref. MD3BPPV) can be linked together to constitute the generation field.

Each structure can be swivelled to determine the best exposure. Each structure consists of panels containing six photovoltaic cells.

Each panel is equipped with MC4 connection systems; it is necessary to know how to connect them (in series or in parallel\*) depending on the electrical constraints of the conversion chain.

The connection is made via a coupling box connected to the main box via a 10 m cable (thus enabling studies to be carried out indoors).

By linking two structures, it is hence possible to provide a wider range of connections and higher power generation level.

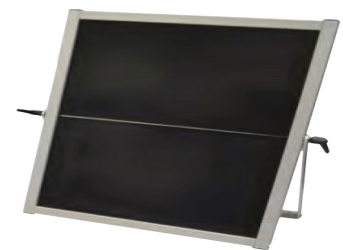
#### Conversion box

This is equipped with: a regulator, a battery, an inverter, two selectable 230 V AC loads and protection and measuring equipment.

The regulator powers the 12 V DC battery and the 12 V DC/ 230 V AC inverter.

The inverter provides power for two 6 W or 11 W LED lamps.

Measurement points and ammeters are used to display and measure the charge and discharge current.



Photovoltaic structure



Conversion box and coupling box

### References

Description	Reference No.
Photovoltaic structure for micro-solar plant bench	MD3BPPV
Conversion box for micro-solar plant bench	MD3BPSOLI

Note: With each conversion case (ref. MD3BPSOLI) two quantity of MD3BPPV shall be procured.

### Decision aid

#### Sectors concerned

- Electrical
- Energy

#### Designated skills

- Analysis
- Checking
- Studying

#### Themes studied

- Renewable energies
- Measuring
- Energy storage

\*Minimum two numbers of solar panels required for series or parallel combination.