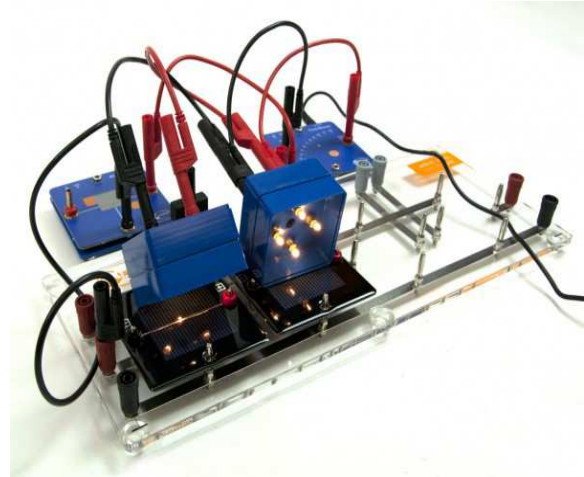


# SOLAR PV TRAINING SYSTEM



## FEATURES

- Solar PV Training System is a comprehensive training system for understanding of photovoltaic in the fields of renewable energies with optimal tools for wide range of experiments from the physical fundamentals of photovoltaic, to the analysis of the components of PV-Systems, up to the design of complex PV-Systems on a laboratory scale.
- The experiments are designed to be equally employed for training of engineers, PV-installers, in-service training of technicians in-service training of technicians & for apprenticeship.
- Due to the modular setup, the very detailed specific characteristics of single components can be analyzed, such as the switching threshold of series or shunt regulators.
- Because of the integrated manual mode, the included MPP tracker enables a descriptive understanding of the really important principle of the MPP tracking.
- With the help of the PWM regulator the principle of pulse width modulated charging can be demonstrated. In addition, an inverter displays the generation of alternating current out of a solar panel current.
- The product is completed through a variety of different electrical consumables such as a super bright LED or a light bulb, which can be used to compare their efficiency & a radio, which can be powered to the solar panel.

## EXPERIMENTS

- **Electrical Engineering**
  - Measurement of voltage current, and power Ohm's law
  - Series connection of resistors (voltage divider)
  - Parallel connection of resistors (current divider)
  
- **Photovoltaic Basics**
  - Series and parallel connection of solar cells
  - Power dependence on the surface area of the solar cell
  - Power dependence on the angle of incidence
  - Power dependence on level of illumination
  - Power dependence on level of illumination under load
  - Internal resistance dependence on level of illumination
  - Shading effect on solar cells
  - Dark characteristic curve of solar cells
  - I-V-characteristics, MPP and fill factor of solar cells
  - Dependence of the I-V-characteristics of solar cells on level of illumination
  - Dependence of the I-V-characteristics of solar cells on temperature
  - Characteristic curve of solar modules
  - I-V-characteristics of partly shaded solar modules
  - Temperature coefficient of solar cells
  
- **Photovoltaic System**
  - Components of an off-grid system
  - Possible operating conditions of off-grid systems
  - Working principle of shunt and series regulators
  - Comparison of PWM- and series regulator
  - Load characteristic of PWM regulators
  - Working principle of a MPP tracker
  - Characteristics of a MPP tracker
  - Working principle of deep discharge protection
  - Working principle of an inverter
  - Determination of the output voltage progression at an inverter

## COMPONENTS

- Base Unit
- Solar module 0.5 V, 420 mA
- Solar module 5.22 V, 380 mA
- Diode module
- Potentiometer module
- Shunt regulator module
- Motor module
- Light bulb module
- LED module (high brightness)
- Deep discharge protection module
- Series regulator module
- Capacitor module
- Radio module
- DC/ AC-Inverter
- MPP-Tracker
- PWM regulator
- Resistor plug element 33 Ohm
- Resistor plug element 100 Ohm
- Resistor plug element 10 Ohm
- Solar module 0.5 V, 840 mA
- Resistor module (triple)
- Lighting module (with safety sockets)
- AV-Module
- Power Module
- Solar cell cover set (4 pieces)
- Propeller
- Aluminum case
- Safety test lead, 25cm, red
- Safety test lead, 25cm, black
- Safety test lead, 50cm, red
- Safety test lead, 50cm, black
- Safety short-circuit plug, with mid socket
- Lamp housing
- Illuminant 80W