

Advanced Photovoltaic Training System

RE
01005



Overview

The Smart PV Trainer is a versatile educational trainer designed to provide practical experience in both types of solar regeneration systems, namely, stand-alone and grid-connected under real operating conditions. The trainer includes all components of both stand-alone and grid-connected systems that allows the user to configure the system by mere connecting of cables. A touch screen computer equipped with an interfacing software.

Hardware

- Unit in the form of a vertical training bench of strong construction and 4 wheels to ease relocation.
- Energy Monitor Unit
- Load unit for solar module 1kOhm
- Off-grid inverter module 230V
- On-Grid inverter module 230V
- The trainer includes a large control panel that includes a schematic diagram of both systems, with 4 mm banana safety sockets at certain points throughout the systems that allow electric parameters to be measured.
- Solar charge controller 12/24V, 6A
- The light source can be tilted with respect to the PV

panel by an electric actuator controllable via knob on the control panel.

- Trainer includes halogen lamps to provide indication of AC current, while LEDs provide indication of DC current.
- The trainer also includes a resistive, inductive and capacitive load banks, where the loads can be connected to either the on-grid or off-grid systems by connecting cables.
- Analogue/digital Test and Measurement System with USB Interface for measure DC voltage, DC current, AC voltage, AC current, Power and power factor Measurements.
- Single-phase mains supply with switch, 16A Module
- AC circuit breaker is connected after the inverter for the AC loads.
- DC circuit breaker at the solar panel outlet.
- A single phase inverter 230 V used to convert the DC output from the battery to an AC power for internal and external loads.
- The touch screen computer can also be used to view educational multimedia content .
- Unit minimum dimensions are 1500x800 (LxW) including an adjustable PC holder/support.
- Set of Safety Connection cables 4mm
- Energy storage system
- All Necessary Accessories Required for Full Operation

Courseware

- Investigating various types of wiring and connection configurations for solar modules
- Installation of PV systems
- Testing the optimum alignment of solar modules
- Principles of bypass diodes
- Design and testing of a standalone PV system in direct operation
- Calculate the generated power of a PV system
- Measure the efficiency of the grid-connected inverter
- Investigate response of a PV system to mains failure
- Design and testing of a standalone PV system for the generation of AC voltage compatible with the standard electricity supply
- Design and testing of a standalone PV system in storage operation
- Investigating the module's response to shadow formation
- Recording the characteristics of solar modules