

SOLAR ENERGY TRAINER KIT Model: SE-550/8-HYBRID



INTRODUCTION

- -Empower students and professionals with cutting-edge solar energy training.
- -The SE-550/8-HYBRID Solar Energy Trainer Kit is a complete, hands-on learning solution for understanding photovoltaic systems, battery storage, and hybrid inverter technology.
- -Designed with real-world components, it's ideal for classroom, laboratory, and outdoor field demonstrations.

SYSTEM TYPE

- Off-Grid Hybrid System Perfect for simulating both off-grid and grid-support solar power solutions.
- Suitable both education and real world application

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SYSTEM COMPONENTS

The system consists of:

- Off-Grid Inverter:

-Type: Hybrid Inverter (Off-grid only)

-Rated Power: 5 kW

-System Voltage: 48V DC

-Max Charging Current: 100A

-Supports solar-battery-load operation independent of grid

-Solar PV Modules:

-Quantity: 8 modules

-Rating: 550W each (Total: 4.4 kW)

-Type: Mono-facial

-Mounting: Movable frame with adjustable tilt

-Realistic clamping and orientation mechanism

-Hands-on exposure to solar irradiance ,panel alignment, and wiring

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- Battery Storage System:

Chemistry: LiFePO₄Voltage: 51.2VCapacity: 100Ah

- Safe, efficient, and long lifecycle

- External MPPT Charge Controller:

- Independent MPPT unit

Used for comparison with inverter's internal charging method

- Enables flexible PV-battery system studies

- Load and Output System:

- AC Load Bank with output socket
- DC Load Terminals
- Load switches, indicators, and safety protections
- Simulates real appliance usage and effect on system

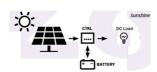
- Power Monitoring System:

- Bidirectional Power Cum Energy Meter
- Measures: Voltage, Current, Active Power, Energy (kWh), Power Factor
- Enables tracking of real-time system behavior
- Wifi Monitoring Module + Tablet

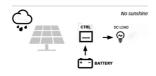
- Safety and Wiring:

- 4mm Banana Shrouded Connectors
- Fuse and Circuit Breakers for all critical paths

Operation Principle









KEY FEATURES

- -Fully operational with or without sunlight (battery simulation mode)
- -Real-time monitoring of power generation and flow
- -User-friendly layout for easy component tracing and wiring
- -Built-in protection: Overvoltage, short circuit, and reverse polarity
- -Designed for durability and mobility
- -Suitable for schools, universities, training centers, and government demos

EDUCATIONAL OBJECTIVES

- -Learn photovoltaic (PV) generation and battery storage principles
- -Understand MPPT functionality and performance optimization
- -Analyze grid-tied vs. off-grid system behavior
- -Experiment with real-time load behavior and inverter operations
- -Observe solar system efficiency under varying sunlight conditions
- Understanding Solar Energy Basics
- System Design and Integration
- Operating an Off-Grid Solar Energy System
- Fault Diagnosis and Troubleshooting
- System Monitoring and Maintenance

EXPERIMENTAL MODULES

- -PV Panel Output Analysis (V-I-P Curve)
- -Charging and Discharging Battery Cycles
- -Load Efficiency at Different Inverter Outputs
- -Solar-to-Battery vs. Direct Solar Load Supply
- -Hybrid Simulation: Grid + Solar + Battery Integration

MAINTENANCE & SAFETY

- -Always wear PPE when operating live systems
- -Regularly clean solar panels for peak performance
- -Check inverter firmware for updates
- -Ensure power is disconnected before servicing
- -Replace fuses and inspect terminals routinely

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