Off Grid Renewable Energy Trainer Wind Power: Design, Components Selection & Integration
Model: RE201-WH-300

Overview

The Wind Power Trainer is an educational tool designed to teach users about wind energy generation and system integration. The design suitable for HAWT or VBWT wind turbines system according to user preference study. It features a wind turbine, along with components for energy storage and monitoring. This trainer allows hands-on experimentation with wind power technology, including installation, performance analysis, and energy management. Ideal for students, educators, and renewable energy enthusiasts, it provides a practical understanding of how wind energy systems operate and their role in sustainable energy solutions.

Learning Outcome

1. Understand the need of carbon free energy and the functions of wind turbine
2. Understand the wind power system diagram and connection
3. Understand the basics of electrical generators and mechanical-to-electrical energy conversion.
4. Study Wind energy flow and power generation
5. Analysis, size and installation of wind power system
6. Battery Charging and BMS System
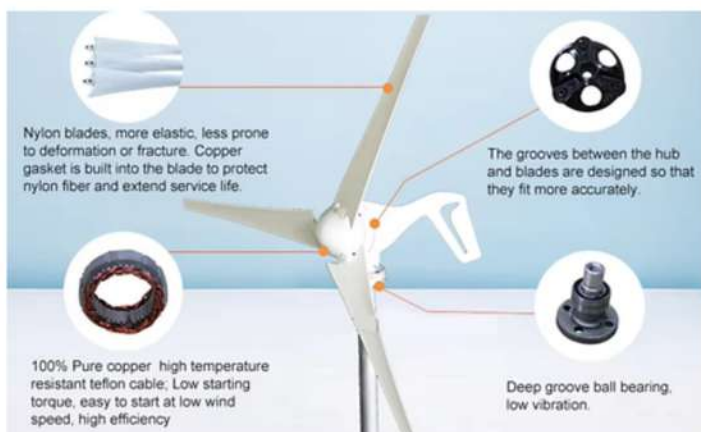
Technical Specification

Wind Turbine Trainer Structure

- Enclosed safety housing constructed by MS Steel powder coated finished
- Heavy duty castor wheel lockable
- 1 side transparent plastic material for viewing and study.
- Axial blower and wind turbine are detachable for vary experiment study.
- AC Electrical power 220-240V
- Rear BRC wire guide rail access door for service /installation /maintenance
- Inner LED light tube
- Battery storage
- Electrical Control panel

Electrical Control Panel

- PLC CPU unit
- Digital VA display meter
- AC 3P MCB; AC 2P MCB
- 2P MCB + Fuse protection unit
- Operation Start button
- Emergency Stop button
- Rotor speed RPM proximity sensor
- Wind speed anemometer sensor
- Operation status indication lamp
- MPPT Wind Turbine Controller
- Light switch + 3 Pin power socket
- Transparent door for viewing

Axial Blower/Wind Turbine

Technical Specification

Blower Fan & Control

- Axial Panel fan unit
- Air Flow 40,000 CMH
- Voltage 220Vac/3PH/50Hz
- Power 1.1KW / 6P
- 1P AC 220-240V VFD unit
- Output 3P AC220-240V

12V Wind Turbine

- Rated power : 300W
- Peak output : 400W
- Rated 12V system
- Start up wind speed 2 m/s
- Max speed : 45 m/s
- Number of blades : 3
- Material: Nylon reinforce composite
- Generator type: 3P PMA
- Working Temp range: -40 to 60C
- Output 3P AC220-240V
- Weight: 7.5kg

Nylon blades, more elastic, less prone to deformation or fracture. Copper gasket is built into the blade to protect nylon fiber and extend service life.

The grooves between the hub and blades are designed so that they fit more accurately.

100% Pure copper high temperature resistant teflon cable; Low starting torque, easy to start at low wind speed, high efficiency

Deep groove ball bearing, low vibration.

MPPT Controller Unit

- Applied battery voltage : 12V
- Rated power : 400W/12V
- Rated power terminal -:25A
- Brake voltage: 15V
- Display: LCD
- Communication mode: RS232/RS485
- Software monitoring DAQ

DC-AC Inverter

DC/AC Converter unit

- Rated power: 800W / peak power: 4000W
- Input voltage: 24V
- Output voltage: 220V
- Applicable range of rated voltage of electrical appliances: 200~240V
- Output waveform: Pure Sine Wave
- Waveform frequency: 50Hz
- Product size: 24.5*10.3*6CM
- Net weight: 0.95KG

Battery

Training & Documentation

1 day product functionality training

Warranty

12 months against manufacturing defects only

Delivery

6-8weeks

Technical Specification

Battery Storage 12V system

- Capacity Range: 100Ah (25°C)
- 2. Voltage Class: 12V
- 3. Number of cycles (25°C):
- * 30% DOD: 1700 cycles (12V/6V) 2000 cycles (2V)
- * 50% DOD: 800 cycles (12V/6V) 1000 cycles (2V)
- * 100% DOD: 400 cycles (12V/6V) 500 cycles (2V)
- 4. Low self-discharge rate: ≤ 2% / month (25°C)
- 5. Design life: Floating Life

Brand : SKILLLAB
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