WIND POWER GENERATION TRAINER

Product Overview

The Wind Power Generation Trainer is designed to demonstrate the practical application of wind energy systems for educational and research purposes. The system enables students to investigate various parameters of wind power generation under controlled laboratory conditions.
A three-phase AC permanent magnet generator, driven by a DC gear motor, simulates the wind turbine's operation at different wind speeds, allowing performance evaluation irrespective of external weather conditions. The setup includes dedicated measuring instruments, control modules, and inverters for both **on-grid and off-grid** operation modes.

Minimum Technical Specifications Required (like or better than):

- The unit demonstrates the practical application of such a combined system for student to conduct the investigation of wind power generation.
- Three phase AC permanent magnet generator is used for the wind power generation, which is driven by a DC gear motor to simulate the wind turbine working under different wind speed. By this way to achieve system performance inside the laboratory irrespective of outside conditions.
- Dedicated instrumentation includes, AC/DC voltmeter and ampere meters for investigation of system efficiency and characteristics.
- Both on grid and off grid type inverters are provided for the different energy applications of wind power generation system.

Note: Specifications are subject to change, Photos shown above are Indicative, Actual Product can Vary.

Training Content

- Wind power generator simulated wind speed experiment
- Wind power generator output open circuit voltage experiment
- Wind power generator output circuit current experiment
- Storage battery DC discharging experiment
- Wind power generator to battery charging experiment
- Wind controller electrical energy conversion experiment
- Wind controller braking experiment
- Wind power generator V/I output characteristic curve experiment
- DC resistive and inductive load experiment
- AC resistive and inductive load experiment
- Integrated load experiment
- Controller integrated load and electricity consumption measurement
- Connect wind power generator to electrical grid

Configuration

1. Mobile Aluminum Experiment Stand

- 3 H-shaped profiles for panel organization
- Universal castors of two lockable, with dia 100mm, up to capacity 80kg/pcs.
- Two-floor storage cabinet with double doors
- Tabletop divided into two parts: one with grooved aluminum profile for quick installation of wind power generation unit, another concave surface for accessory placement
- Wide type drawer of size 800mm x 460mm
- Table and upper frame part separable for easy delivery
- Overall dimensions: 860mm x 500mm x 1580mm (approx.)

2. Wind Power Generation System

- Speed sensor: 24VDC, NPN type
- Flexible coupling for shaft connection between generator and motor
- Aluminium mounting supports & plate available to be mounted on tabletop
- Wind power generator: three phase AC permanent magnet generator, power 300W, 12VAC, speed 750r/min
- Driving motor: DC gear motor 400W, 3000r/min adjustable, reduction ratio 3, no-load output max. 1000r/min

3. Power Supply Control Module

- Input mains circuit breaker 10A

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- Output AC220V socket x2 with cover
- Output AC220V through 4mm socket with indicator / short circuit protection
- RCCB 6A connected with AC/DC rectification unit
- Output DC24V through 4mm socket with indicator / short circuit protection
- On-grid module: 4mm sockets to inverter output, 3-core socket to power grid, circuit breaker 6A
- Standard size available for frame insertion

4. On-Grid Inverter (300W)

- DC input range 10.5–28VDC, MPPT voltage 12–24VDC
- DC max current 20A, AC max output 330W
- AC output range 230VAC (190–260VAC)
- Frequency range 50Hz/60Hz auto control
- Power factor > 97.5%, Peak efficiency 95%, stable efficiency 92%
- Protection: islanding, short circuit, reverse connection, low voltage, over voltage, over temperature
- Standard size available for frame insertion

5. Off-Grid Inverter (300W)

- Pure sine wave inverter 300W
- Output DC5V through USB
- Peak power 600W
- Protection: overload, short circuit, reverse connection, low voltage, over voltage, over temperature
- DC12V to AC220V, with indication
- Standard size available for frame insertion

6. Wind Controller Module

- Controller 300W 12V, wind generator braking voltage 14.5/29V
- Wind power generator speed display meter
- RUN/STOP control button
- Multifunctional meter for three-phase current, voltage display
- Standard size available for frame insertion

7. Driving Module

- DC brushless driver: AC220V, 400W, current 0.3–2.4A adjustable, 3000rpm
- Rotary switch for motor power ON/OFF control
- Rotary knob for motor (wind) speed control

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- With all terminals led to colorized 4mm safety socket
- Standard size available for frame insertion

8. Storage Battery (12V)

- 12V12AH maintenance free sealed lead acid battery
- Stand-by use: 13.5…13.8V
- Cyclic use: 14.5…14.9V
- Initial current: 3.6A max.
- With all terminals led to colorized 4mm safety socket
- Standard size available for frame insertion

9. Meter Board 1.0

- Voltmeter digital AC 0…450V
- Voltmeter digital DC 0…300V
- Ammeter digital AC 0…3A
- Ammeter digital DC 0…5A
- Single phase electronic type energy meter, segment code LCD
- With all terminals led to colorized 4mm safety socket
- Standard size available for frame insertion

10. DC/AC Load Module

- DC12V LED lamp
- AC220V illuminating lamp
- DC12V fan motor with mesh cover
- AC220V fan motor with mesh cover
- With all terminals led to colorized 4mm safety socket
- Standard size available for frame insertion

11. Accessory

- Safety whole sealing cable: Conductor cross section: 16AWG tinned copper wire, 3kV, 20A, with axial socket
- Experiment guide book

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