

Wind And Solar Trainer



Note :
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I. Equipment Overview

1. Introduction

1.1 Overview

This training system simulate demo wind and solar generate electrify process, enable Student to team wind and solar generate electrify. Wind driven generator is driven by fan, energy panel is driven by high work power metal halide. This trainer cultivate student hand on ability, it's suitable for engineering institute, technical schools.

1.2 Feature

- (1) This trainer use aluminum column structure, with inner integrated measurement meters, there is universal wheels at the bottom, it's easy to move.
- (2) It can do many experiment and training content.
- (3) Training workbench with safety protection system.

2. Capacity

- (1) Wind power generation, fan unit takes aluminum structure, fan adjusted in horizontal 90 degree, dimension 1500*1000*(L*W*H)
- (2) Solar energy generation set whole set takes aluminum structure, photovoltaic panel can be adjusted, simulator light source can be adjusted for 120 degree in vertical direction, dimension 1500*1000*1500mm(L*W*H)
- (3) Training workbench aluminum structure, aluminum hanging box unit, with universal wheels at bottom, dimension : 1400mmx700mmx1500mm (L*W*H)
- (4) Single solar energy cell plate : Rated peak value work power, 30wp
Short circuit current : 1,9A
Peak value current : 1,7A
Open circuit voltage : 18,5V



(5) Fan technical

Fan type	: Horizontal direction toward
Start speed	: 2,5 meters/second
Rated fan speed	: 10 meters/second
Maximum anti wind speed	: 40meter/second
Rated work power	: 200-500W
Wind direction adjust	: Auto adjust

(6) Battery technical specification :

Voltage	: 12V
volume	: 40Ah
Battery	: Lost electricity:10V±1V
executive standard	: GB/T 9535
Relative humidity	: 35-85%RH(Non-condensate)

(7) Work condition

Temperature -10~+40°C Temperature ≤80°C
Environment air . no corrosivity air, no fuel air, no large quantity OF CONDUCTIVE DUST

(8) Power

Consumption	: ≤5000W,
Work power	: AC220±5%,DC24V supply power , single phase three wires AC220±5%,50HZ
Work mode	: Continuous

3 system introduction

This system can be divided to four part: wind generating electricity system , photovoltaic power generation system , control system, inverter system. Wind generating electricity system consist of light source, photovoltaic cell plate,battery . Control system consist of wind and solar complementary. Inverter system is made of frequency inverter and load unit.

1. Simulate wind generating electricity set : this system select horizontal axis magnet synchronous generator, use fan to simulate wind, though adjust fan position to change wind strength and direction, to test generator effect in the same condition.
2. Simulator photovoltaic power generation system: this system use 4 places of 30W solar energy board, you can connect in series or in parallel according to different system pressure. Simulate solar light set consist of two metal halide, It can adjust the relative position with photovoltaic plate, to simulate solar light position, and demonstration.
3. Battery group: it consist of 4 pieces 12V4DAH seal battery group, you can parallel connect use as 12V4DAH system, you can also connect in series as 24V/10QAH system, and deep understand battery.
4. Controller hanging box: this hanging box use industrial type charger controller, it can control wind generator and photovoltaic generator to charge on battery , with LCD display board, you can check system technical parameter and can set by yourselves. It is with prevent over charge, over current
5. inverter hanging box: adopt 12V/24V voltage intelligent recognize frequency inverter, output voltage AC220V, continuously work power is 600W, peak work power is 1000W. Rotary efficiency >90%, low voltage automatic alarm.
6. Meter box: is display generation current, charge voltage charge current, Inverter voltage, Inverter current in real time.
7. Terminal load hanging box: it contains incandescent light bulb, energy saving and axle fan ,for load test 220V AC current from inverter .

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3.2 Training workbench

Training workbench use aluminum column structure hold, with universal wheels at bottom, two wheels are with brake, you can move and fix as you like. Desktop thickness is 25mm high density board, Surface with anti high temperature treatment, equip with three doors, with two drawers, the structure is beautiful.

3.3 Power control panel

- (1) Voltage, current output indicator
- (3) Equip with power indicator , safety power output terminal .
- (4) Inner with AC power source, with short circuit protection function .

3.4 Equip components

- (1) Controller hanging box 1 piece
- (2) Inverter hanging box 1 piece
- (3) Meter box hanging box 1 piece
- (4) Terminal load hanging box 1 piece
- (5) 4mm safety electrical connection cable 25 easy
- (6) Electrician tool 1 set
- (7) Digital parameter 1 ea

4. Experiment list

- (1) Battery feature test:
 - 1) Electricity technical parameter
 - 2) Battery connect in series and parallel
- (2) Charge controller experiment:
 - 1) Connect inversed protection experiment
 - 2) Controller protection on Battery overcharge
 - 3) Controller protection on battery over discharging experiment
 - 4) Anti reverse Charge experiment
- (3) Simulate wind generating electricity system experiment
- (4) Wind energy charging control experiment
- (5) Generator work power test experiment
- (6) Photovoltaic battery open circuit voltage test experiment
- (7) Photovoltaic battery short circuit current test experiment
- (8) Photovoltaic battery work power test experiment
- (9) To test photovoltaic battery different maximum test experiment under different illumination
- (10) Photovoltaic battery output feature experiment
- (11) Photovoltaic battery charging control principle experiment
- (12) Photovoltaic battery anti reverse charging experiment
- (13) Photovoltaic battery connect in series and parallel experiment
- (14) Inverter basic principle experiment
- (15) Simple inverter output waveform test experiment
- (16) Photovoltaic battery connect and parallel experiment
- (17) Inverter basic principle experiment
- (18) Simple inverter output waveform test experiment
- (19) Inverter power drive AC experiment
- (20) Wind and solar generator complementary

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