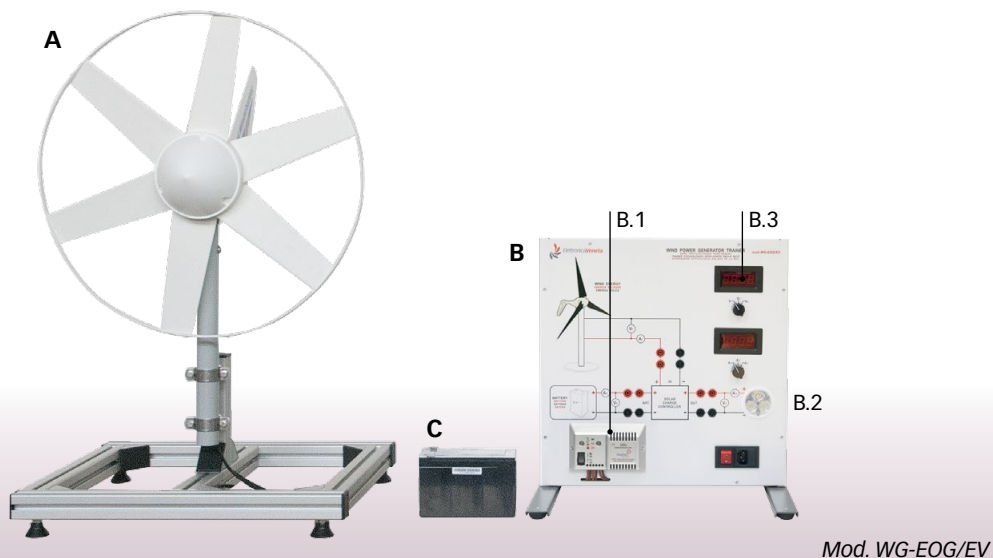


OFF-GRID WIND POWER PLANT TRAINER

Mod. WG-EOG/EV

Mod. WG-OG/EV (computerized version)



INTRODUCTION

Energy saving and environmental pollution reduction are crucial global issues. Using renewable energies as alternative sources to fossil fuels can address both issues, with great benefits especially in countries where traditional energy sources are scarce.

Considering the above, this system enables experimental investigation on the conversion of wind energy into electricity by means of a wind power generator. The equipment is manufactured using real components available on the market.

DESCRIPTION

System configuration: stand-alone (isolated from the grid)

The system consists of:

A) Horizontal axis wind power generator

B) Table top control panel including:

B.1) Charge regulator

B.2) Electric load

B.3) Electric instrumentation for detecting the energy flows in the different branches of the circuit

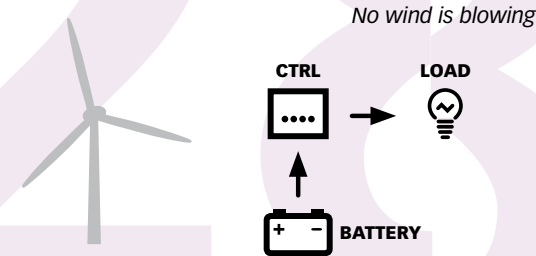
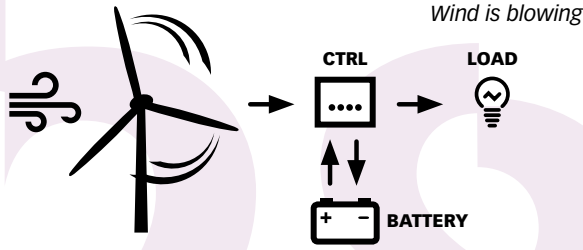
B.4) Data acquisition board with USB interface for PC connection (WG-OG/EV only)

C) Buffer battery

D) Wind speed and direction sensor (WG-OG/EV only)

Relevant features:

- To operate the wind generator a specific fan is required (refer to mod. WG-IE at the end of this data sheet)

Operating principle:

- In case there is no wind blowing, all the energy consumed by the user (loads) is taken from the battery
- In case there is wind blowing but no load is connected, all the energy produced by the system charges the battery
- In case there are both wind blowing and loads, the energy produced by the system partially charges the battery and partially powers the loads
- When the consumption is higher than the power available from the wind, the power surplus is given by the battery

TRAINING PROGRAM

- Physical principles whereby wind power is transformed into electrical power
- Energy balance and efficiency; for *WG-EOG/EV* the instrument *SORM* is required (**optional item** - refer to the end of this data sheet)
- Study of the Energy Flows and the related measurement devices

TECHNICAL SPECIFICATIONS**Horizontal axis wind power generator**

- 6 blades with outer ring (turbine diameter 510 mm):
 - Cut in Wind Speed: 3 m/s
 - Nominal power output: 49 W at 15 m/s
- Low friction 3 phase, brushless alternator
 - Output nominal voltage: 12 Vdc
- Metal supporting frame with protecting grid

Table top control panel

- Metal structure with complete color synoptic diagram
- Charge regulator:
 - Pulse Width Modulation (PWM) regulation
 - LED indicators for battery voltage levels and charging status
- Electric load:
 - 12 Vdc lamp
- Instrumentation:
 - DC digital voltmeter
 - DC digital ammeter

Buffer battery

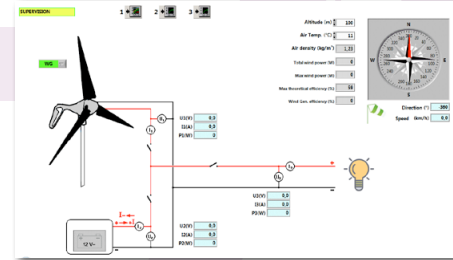
- Rated voltage: 12 Vdc
- Capacity: 12 Ah

Sensors (WG-OG/EV only)

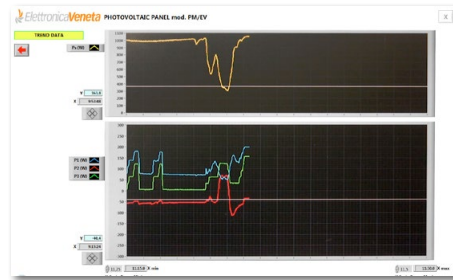
- Wind speed and direction sensor for measuring and transmitting wind speed and direction to the control panel.
 - Wind speed range: 0.5÷40 m/s
 - Wind direction range: 0÷360°

PC data acquisition (mod. WG-OG/EV only)

- The trainer is supplied with data acquisition board with USB interface for connection to PC
- A specific software (developed with LabView) is supplied to monitor the system parameters
- The visualized parameters are:
 - All DC parameters
 - Wind speed and direction
- The software enables to:



- Calculate energy conversion efficiency
- Visualize the trend of the wind speed and direction and the energy flows to and from wind generator, buffer battery and load
- Save the exercises data for future analysis or project work



Power supply: 230 Vac 50 Hz single-phase - 50 VA
(Other voltage and frequency on request)

Dimensions: Control panel 40 x 40 x 15 cm
Wind gen. rotor diameter 51 cm

Net weight: 50 kg

REQUIRED**WIND POWER GENERATOR INDOOR OPERATION DEVICE Mod. WG-IE**

To operate the aerogenerator

**PERSONAL COMPUTER**

- NOT INCLUDED -
(WG-OG/EV only)

SUPPLIED WITH**THEORETICAL-EXPERIMENTAL HANDBOOK****OPTIONAL (REF. ACCESS. AND INSTRUMENTS)****CUP VANE AIR VELOCITY METER Mod. THAC (WG-EOG/EV only)**

For the calculation of the wind energy into electric energy conversion efficiency

