INTEGRATED PHOTOVOLTAIC-WIND POWER KIT

Mod. PMWG-K/EV

INTRODUCTION

This kit represents the typical configuration of an integrated system for the exploitation of renewable energies, with energy production via horizontal axis wind power generator, used to convert the wind kinetic energy directly into mechanical energy, and via silicon photovoltaic cells enabling to transform solar energy into electricity.

TRAINING PROGRAM

- Components of a combined wind and solar system for electricity production
- Effect of solar radiation on the panel output voltage (*)
- Effects of shading on a real solar installation (*)
- Photovoltaic panel energy conversion efficiency (*)
- Effect of the wind speed on the generator output voltage (**)
- Wind generator energy conversion efficiency (**)
- Battery charging system management
- Operation and efficiency of a DC/AC inverter
- Connection to portable rheostat *PRH-1* (**optional item** - refer to the end of this data sheet) for photovoltaic panel characteristic curve construction
- Connection to wind power generator indoor operation device *WG-IM/EV* (**optional item** - refer to the end of this data sheet) for wind generator characteristic curve construction

(*) Solar radiation meter *SORM* (**optional item** - refer to the end of this data sheet) required
(**) Cup vane air velocity meter *THAC* (**optional item** - refer to the end of this data sheet) required

TECHNICAL SPECIFICATIONS

Horizontal axis wind power generator:
- Aluminium generator body
- 3 composite material blades (rotor diameter 1,17 m):
  - Energy output: approx. 30 kWh/month at 5,8 m/s (13 mph) average wind speed
  - Startup Wind Speed: 3,6 m/s (8 mph)
  - Survival wind speed: 49,2 m/s (110 mph)
- Permanent magnet brushless alternator
- Microprocessor-based controller:
  - Output voltage: 12 Vdc
  - Overspeed protection: electronic torque control
- Stainless steel supporting pole:
  - Length 1,5 m
  - Outer diameter: 48,1 mm
  - Mounting kit

Photovoltaic module:
- 120 W Peak power with maximum radiation
- Adjustable inclination framework mounted on castors

Charge controller for photovoltaic panels:
- Rated voltage: 12 Vdc
- Maximum current: 20 A

Buffer battery:
- Rated voltage: 12 Vdc
- Capacity: 100 Ah

Clamp meter:
- Voltage range (ac/dc): 0 to 600 V
- Current range (ac/dc): 0 to 200 A

Inverter:
- Continuous output power: 600 W
- Output peak power: 1200 W
- Input voltage: 12 Vdc
- Output voltage: 230 Vac - 50 Hz
- Output waveform: modified sine wave
- Stop for low battery charge
- Protection against: overload, short circuit, overtemperature

Dimensions

Rotor diameter:	1,15 m
Photovoltaic module:	67 x 120 x 155 cm
Overall weight:	140 kg

SUPPLIED WITH

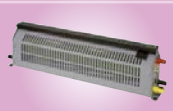
THEORETICAL-EXPERIMENTAL HANDBOOK

OPTIONAL (REF. ACCESS. AND INSTRUMENTS)

WIND POWER GENERATOR INDOOR OPERATION DEVICE Mod. WG-IM/EV
To operate the aerogenerator indoor

ELECTRIC BATTERY CHARGER Mod. EBCH
To recharge the buffer battery after a prolonged period of inactivity of the system

PORTABLE RHEOSTAT Mod. PRH-1
To draw the photovoltaic panel characteristic curve



SPOTLIGHT Mod. ACL220V
To be used as 230 Vac electric load

LAMP Mod. DCL12V
To be used as 12 Vdc electric load

SOLAR RADIATION METER Mod. SORM
To calculate the solar energy into electric energy conversion efficiency

CUP VANE AIR VELOCITY METER Mod. THAC
For the calculation of the wind energy into electric energy conversion efficiency

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