

## WIND TURBINE ON A TOWER WITH POWER PRODUCTION SYSTEM



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### Experimental capabilities

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- Identification of the components of a real wind turbine installation
- Visualization of the implementation of components
- Switching on, use and settings
- Measurement of different parameters (wind speed, voltage and electric current)
- Analysis of the energy efficiency of the system
- Computer Data Acquisition

**CAUTION:** The system needs to be installed at the outside of the building in an area exposed to the wind.

## Operating principle

The purpose of this equipment is to study the production of wind energy in real site. It consists of a 400W wind turbine mounted on a guyed mast and an inner transformation and energy dissipation module.

The wind turbine must be installed in an area exposed to wind.

Students will first identify the components of the energy chain and then perform wiring by double sink safety sockets. They can then perform electrical measurements on individual components (controller, battery, inverter, dissipation ...). They can also measure the wind speed with the anemometer placed on the mast of the wind turbine.

The measurements used to characterize the energy production and define the components efficiency.

The machine is equipped with an acquisition system allowing to keep track of parameters over a long period (one week for example).

The robust design of this device makes it suitable for use in schools.

The equipment is set up on an Anodized aluminium frame on casters wheels. This gives it great strength and a flexibility of integration into your premises. The manufacture of this equipment complies with the European standard for machinery manufacturing.

## Illustrations



## Technical details

The bench includes at least the following elements:

A wind turbine (24VDC-400W) with its clamp mast and the accessories for the attachment. The mast is equipped with a wind speed sensor. A 25m connecting cable is included for connection to the indoor unit.

A module of production and energy storage (C) comprising :

- The electrical box of supply of the machine comprising standard security devices.
  - A quick connector Harting type for the electrical connection between the wind turbine and this module
  - 2 batteries to store energy (12VDC / 55Ah) with protective bin
  - A charge controller
  - A inverter (24VDC / 230VAC-500W)
  - A emergency charger for the battery
  - An area of 24VDC loads comprising two lamps and a fan
  - An area of 230VAC loads comprising two lamps and a fan
- So the system is electrically connected by the students safely, each electrical terminal of each component is brought in front of the panel on a dual sink socket.

The dual sink cords required for connection are provided.

The bench is supplied with the following instrumentation:

- A wind speed sensor on the mast of the wind turbine
- A portable multimeter with ammeter clamp AC/DC to measure voltages and currents to the terminals of various elements
- A data acquisition system to monitor the production of energy

## Services required

- Electrical supply : 230Vac – 50 Hz
- Dimensions: (LxWxH mm): 1760 x 770 x 1820
- weight (Kg): 100

Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine

## Documentation

- User's manual
- Lab exercises
- Technical documentation of the components
- Certificate of conformity CE