

EOL-900

Wind power training system

Simulates an autonomous wind power system with real and educational components

- Allows the analysis and study of the elements involved in the production, storage and transformation of wind power with wind simulation independent of the external climatic conditions.
- Activities can be performed using conventional instrumentation or virtual instrumentation on connection to the PC.
- Includes a data acquisition system and a LabView software application for measurement and control of the system from the PC.
- The software application EOL-900 LAB and its automatic setup features, make simple working with the different activities supplied with the equipment.

Vertical wind generator EOL-900

The generator is driven by an electric motor to simulate wind when none is present.

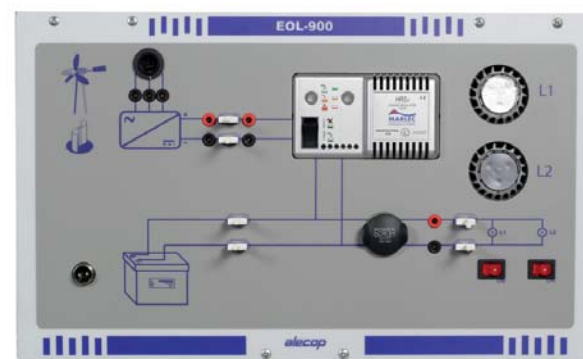
- Wind Mini-generator. Three phase output voltage.
- The generator drag by a c.c. electric motor with speed regulation.
- Manual speed control , through potentiometer, or automatically, through an external setpoint with a nominal value from 0 to 10Vcc.
- Electrical and mechanical protection, with a transparent guard.
- Optional: Horizontal-axis wind generator.



EOL-900 wind power system training panel

Incorporates the real elements of an isolated wind power system. Includes the data acquisition system and the connection with the PC.

- Wind regulator with battery charge status, battery charge regime and multistage loading for an optimal load of the batteries.
- Two LED (12V) lamps with control switches.
- Data acquisition system incorporated inside the panel with USB interface for PC connection.

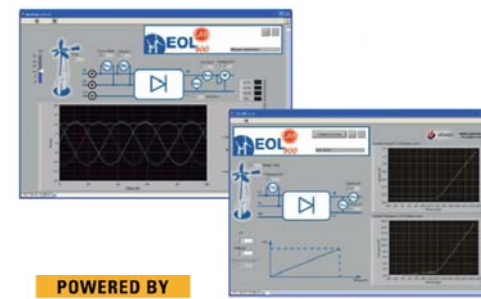


EFT-901 battery training module with charging circuit

- For connection to the EFT-900 Photovoltaic Training System and the Wind Energy Training System EOL-900.
- The module has a battery charging system using mains voltage.
- The battery is powered whether or not the charging circuit is functioning.
- Includes protective fuse.

EOL-900 LAB Virtual instrumentation and control software

Virtual instrumentation software application developed in LabView, enabling monitoring and control the wind power system from the PC.



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Renewable Energy



RENEWABLE ENERGY

Supplies of conventional fossil fuels are rapidly being depleted and their by-products, which contain various forms of pollution, are contributing to global warming. It is necessary therefore to investigate the use of renewable energy sources which can be readily replenished and are ecologically safe.

These sources such as the sun, wind and water are plentiful and their use is safe but it is difficult to produce sufficient energy to replace conventional fuels. It is essential that students understand not only how these sources can be used to produce electrical energy but also understand the efficiency of the conversion process and the limitations of their use.

Alecop produces a range of 3 similar applications for students to gain an understanding of this most important subject. These cover Solar Energy, Wind Energy and Fuel Cells. The equipment is laboratory scale but sufficiently large to allow students to make real measurements. The key benefits offered by these experiments are:

- They can be used in a laboratory without the need for direct sunlight or a source of wind or alternatively they can be used outside when climate conditions allow.
- Real measurements of input and outputs can be made using conventional instruments or virtual instruments on a PC based on NI LabVIEW™ applications.
- Investigation of loads, battery charging and safety interlocks when too little or too much energy is produced.
- Inter-connections kept to a minimum to aid understanding and configurations are automatic when used with the Virtual Instruments.

EFT-900

Solar photovoltaic training devices

This trainer implements a low production photovoltaic installation. Allows the analysis and study of the elements and components production, storage and transformation of energy.



The system includes:

EFT-900 photovoltaic training panel

With main solar photovoltaic installation components: solar controller, AC/DC inverter and consumables.

- Battery charge controller with micro processor.
- Connections to photovoltaic panel and to battery.
- Data acquisition system for measuring solar radiance, temperature and electric variables at the different points of the circuit from a PC.
- Possibility of doing measurements with conventional instrumentation.
- Solar Photovoltaic Panel.
- Photovoltaic module of 40W.
- Support with castors for easy transportation.
- Irradiance and temperature collector.
- Adjustable tilt with graduated scale.
- Optional: Floodlight accessory for wheeled or fixed support for when there is no ambient sunlight.

EFT-901 battery training module with charging circuit

- For connection to the EFT-900 photovoltaic training panel.
- The module has a battery charging system using mains voltage.
- Includes protective fuse.
- The battery is powered whether or not the charging circuit is functioning.

LabVIEW virtual instrumentation application

The photovoltaic training devices with virtual instrumentation include a data acquisition system and an application developed in LabView enabling monitoring of the photovoltaic system's main variables via PC and different types of testing to be performed, and control of the installation from the PC.



Fuel cell trainer

PAC-900

with virtual instrumentation

Training equipment for the study of the operation and characteristics of fuel cells. The proposal is based on a small panel on which a real proton exchange membrane (PEM) hydrogen fuel cell system is being implemented, together with a catchment system and monitoring of variables controlled from the PC.



The system makes it possible to:

- Discover the technology of hydrogen fuel cells, their advantages and disadvantages, and their energetic possibilities.
- Become familiar with the elements which make up a fuel cell system and the role played by each one.
- Execute the necessary operations in order to start up a hydrogen fuel cell, following the relevant security measures and instructions at all times when handling the hydrogen required for its operation.
- Assess, in a practical and simple manner, the technical characteristics and provisions of a fuel cell system via data acquisition and the subsequent analysis of the performed tests and measurements.

PAC-900 training panel

Elements included in the panel:

- Open-cathode PEMFC system. Includes the fuel cell stack and its corresponding management circuit.
- Hydrogen intake and shut-off valve.
- Drain valve outlet with an indicator LED of the valve activation.
- ON/OFF switch for turning the fuel cell on and off and indicator LEDs indicating the status of the system.
- Two 12V LED lights with control switches.
- Room temperature and relative humidity collectors for monitoring the values from the PC.
- Integrated data acquisition system. USB connector for connecting the equipment to the PC.



Control and monitoring software

Virtual instrumentation VI software application developed in LabView which makes it possible to monitor the main scales of the fuel cell system, perform different types of tests and control the system, all from the PC.

