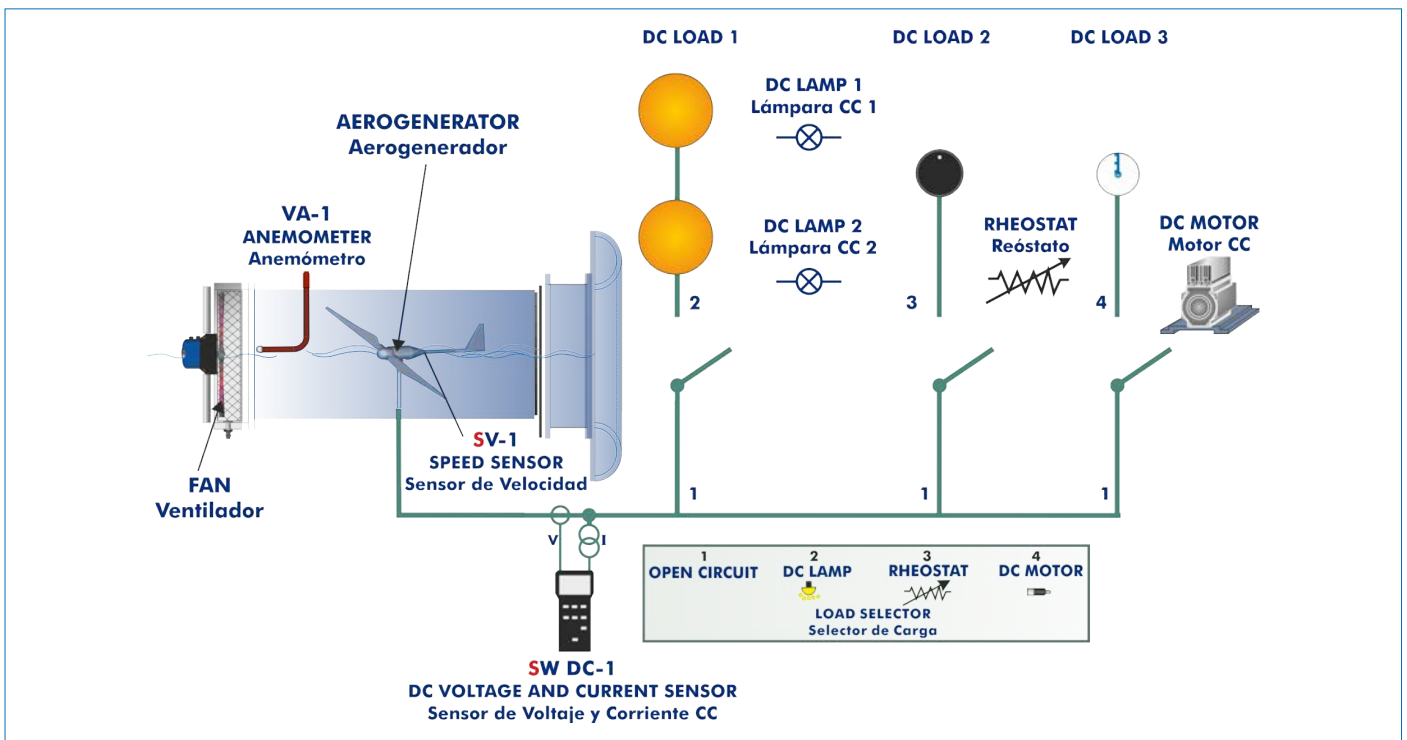




PROCESS DIAGRAM AND UNIT ELEMENTS ALLOCATION



ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)



"Worlddidac Quality Charter" and Platinum Member of Worlddidac

INTRODUCTION

Wind energy is a renewable source of energy that occurs spontaneously in nature and can be used to meet the energy requirement. This energy has been recently introduced, so the technology related to its efficient use is being improved over time. Wind power is the conversion of wind energy into a useful form of energy, either using wind turbines to generate electricity, windmills for mechanical power, wind pumps for pumping water or draining purposes or sails to propel vessels.

GENERAL DESCRIPTION

The Wind Energy Basic Unit, "MINI-EEE", is a small-scale unit designed to study wind energy and the influence of some factors on its generation.

This unit consists of a transparent tunnel, a wind turbine with rotor to place up to six blades and a variable speed axial fan.

The air speed is varied by changing the rotational speed of the axial fan and a sensor allows for measuring that air velocity.

This fan generates the required air flow to make the rotor of the wind energy unit work. The generator converts the kinetic energy of the rotor into electric energy. The rotational speed of the wind turbine can be measured with a sensor.

The unit includes a DC load module with LEDs, a rheostat, a DC motor, a load selector and switches to select the type of load. Thus, the wind turbine may work in open circuit or connected to LEDs, to a rheostat or to a DC motor.

A voltage and current sensor measures the voltage and current provided by the wind turbine in order to determine the power.

SPECIFICATIONS

Bench-top unit.

Anodized aluminum frame and panels made of painted steel.

Diagram in the front panel with distribution of the elements similar to the real one.

Air generator:

Axial fan with variable speed.

Maximum flow rate: 1473 m³/h.

Finger guard included.

Wind turbine:

The safety turbine is a simple injection model that joins the ends of up to six air blades.

Set of six blades for the wind turbine.

Power (at a rotor speed of 2000 rpm): 1 W.

Outlet voltage (at a rotor speed of 1000 rpm): 5 V DC.

Outlet current (at a rotor speed of 1000 rpm): 50 mA DC.

Minimum speed of the wind required to generate electricity: 2 m/s.

Rotational speed sensor for the wind turbine, range: 0 – 2000 rpm.

Air tunnel:

Made of PMMA.

Length of 500 mm and diameter of 300 mm approximately.

Anemometer that allows to measure speeds below 20 m/s.

Voltage and current sensor.

Electronic console:

Metallic box.

Connector for the DC current and voltage sensor.

Digital display for the current (DC).

Digital display for the voltage (DC).

Connector for the turning speed sensor for the aerogenerator.

Digital display for the turning speed.

Switch for the axial fan.

Regulator for the speed of axial fan.

This electronic console includes a DC load module:

Two LEDs.

DC motor.

Rheostat.

Independent connection of each load thanks to the load selector:

Position 1: the wind turbine works at open circuit voltage.

Position 2: the LEDs are directly connected to the wind turbine.

Position 3: the rheostat is directly connected to the wind turbine.

Position 4: the DC motor is directly connected to the wind turbine.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.



MINI-EEE detail

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Study of the aerogenerator operation depending on the wind speed variation.
- 2.- Determination of the aerogenerator characteristic parameters.
- 3.- Study of the differences in the operation by using the three available blades' configurations (aerogenerator with six, three or two blades).
- 4.- Study of the influence of the load variation in the aerogenerator.
- 5.- Study of voltage, power and current.
- 6.- Experimental determination of efficiency.
- 7.- Study of the power generated by the aerogenerator depending on the wind speed.
- 8.- Study of the power generated by the aerogenerator depending on the number of blades.
- 9.- Determination of the wind energy measurement.
- 10.- Study of the characteristic curve of the aerogenerator at constant wind speed.
- 11.- Study of the characteristic curve of the aerogenerator at constant revolutions.
- 12.- Study of the DC loads connection.

REQUIRED SERVICES

- Electrical supply: single-phase, 220 V/50 Hz or 110 V/60 Hz.

DIMENSIONS AND WEIGHTS

MINI-EEE:

Unit:

- Dimensions: 600 x 400 x 500 mm approx.
(23.62 x 15.75 x 19.68 inches approx.)
- Weight: 20 Kg approx.
(44 pounds approx.)

Electronic console:

- Dimensions: 490 x 330 x 310 mm approx.
(19.29 x 12.99 x 12.20 inches approx.)
- Weight: 10 Kg approx.
(22 pounds approx.)

AVAILABLE VERSIONS

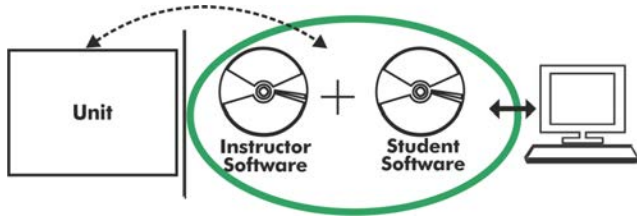
Offered in this catalog:

- MINI-EEE. Wind Energy Basic Unit.

Offered in other catalogs:

- MINI-EEEC. Computer Controlled Wind Energy Basic Unit.
- EEEEC. Computer Controlled Wind Energy Unit.
- EEE. Wind Energy Unit.

MINI-EEE/ICAI. Interactive Computer Aided Instruction Software System:



With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

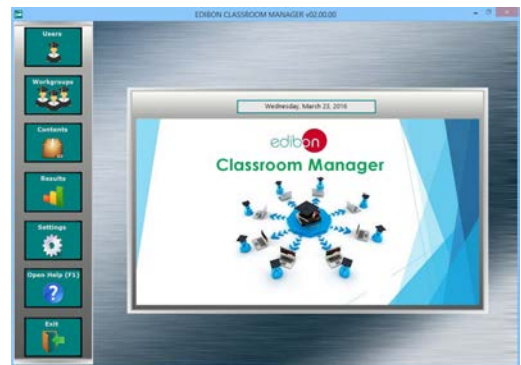
Instructor Software

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).

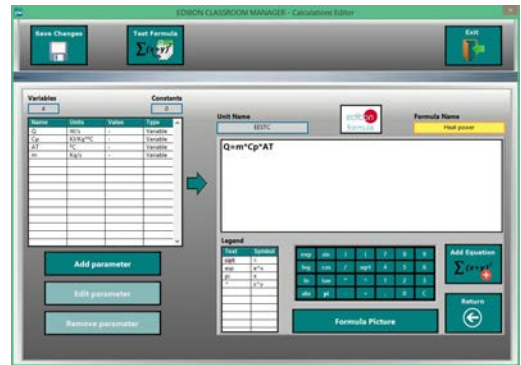
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual students, workgroups, units, etc... so the teacher can know in real time the level of understanding of any student in the classroom.

Innovative features:

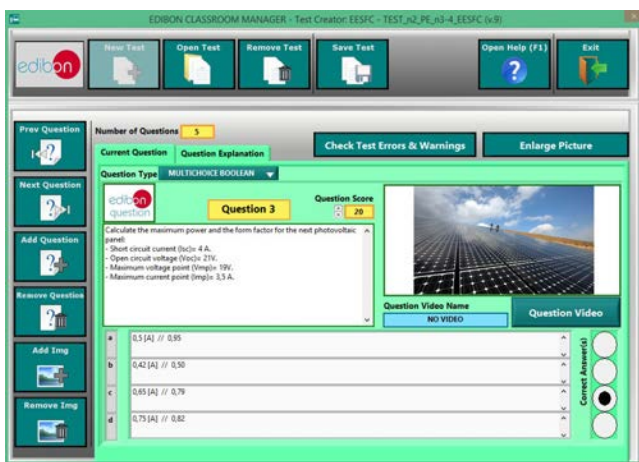
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.
- Updatable Contents.
- Report generation, User Progression Monitoring and Statistics.



ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram

Optional
Student Software

- ESL-SOF. EDIBON Student Labsoft (Student Software).

ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- Test self-correction.
- Calculations computing and plotting.
- Equation System Solver Engine.
- User Monitoring Learning & Printable Reports.
- Multimedia-Supported auxiliary resources.

For more information see ICAI catalogue. Click on the following link:

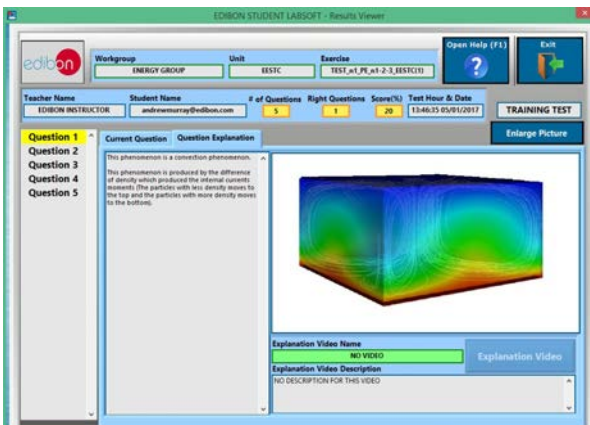
www.edibon.com/en/files/expansion/ICAI/catalog



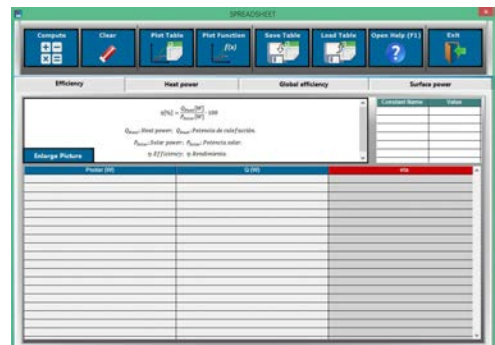
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

* Specifications subject to change without previous notice, due to the convenience of improvement of the product.



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Edition: ED01/18
Date: April/2018

REPRESENTATIVE:

