Single-phase Automatic Power Compensation

Engineering and Technical Teaching Equipment

AEL-APFC

GENERAL DESCRIPTION

The AEL-APFC Single-phase Automatic Power Factor Compensation is an application designed to study the single phase automatic power factor controllers installed in the energy utilization points. In some places where the reactive energy consumption is high, distribution lines may be overload and it is necessary to install power factor compensators.

The AEL-APFC consists of a single phase automatic power factor controller of six compensation steps that work together resistor and inductor loads.

The AEL-APPC includes the following modules:

- N-ALI02.   Domestic Main Power Supply.
- N-CFPS.   Single-phase Automatic Power Factor Controller.
- N-CAR19S4D.   Single-Phase Digital Capacitor Banks Module.
- N-IND.   Variable Inductive Load with commutator. (2 units)
- N-REF.   Resistor Load with commutator.

Optional learning software:

In addition, Edibon provides optional software (AEL-APFC/ICAI) to reinforce knowledge about this field. This software is formed by:

- ECM-SOF.   EDIBON Classroom Manager (Instructor Software).
- ESL-SOF.   EDIBON Student Labsoft (Student Software).

The application AEL-APFC can be mounted on rack (option A) or on rail (option B):

Option A:

  This application needs the following racks:

- N-RACK-M.

  Optionally the AEL-WBR. Electrical Workbench (Rack) can be supplied to place the rack/s.

Option B:

  This application can be mounted on rail.

  Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules.

The trainer includes the following modules:

• N-ALI02. **Domestic Main Power Supply.**

Supply voltage (Single-Phase): 230 VAC, PH+N+G.

ON-OFF removable key.

Output Voltage Connections:

Two Single-Phase: 230 VAC.

Single-Phase supply hose connecting plug.

Differential magnetothermal, 2 poles, 25A, 30mA AC 6KA.

N-ALI02

• N-CFPS. **Advanced Single-phase power factor controller module.**

Power factor automatic controller.

Regulation in four quadrants.

FCP (fast computerized program) system.

Compensation stages: 6 relay type outputs.

LCD screen with three digits and more than 20 icons to indicate different operating conditions.

ON-OFF switch.
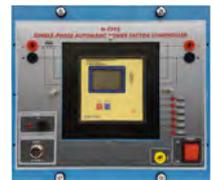
N-CFPS

• N-CAR19S4D. **Three-phase digital capacitor banks module.**

Digital capacitors bank module.

6 stages of 7uF.

Voltage supply of 230 VAC.

Step signal input jack.

Micro connector of 8 pins.

N-CAR19S4D

• N-IND. **Inductance module. (2 units).**

Value: 1.4H.

Current fuse: 2A

N-IND

• N-REF. **Fixed resistor module.**

Value: 150 ohm.

Maximum power: 500 W.

Current fuse: 2 A.

N-REF

• **All necessary cables to realize the practical exercises are included**.

Cables and accessories, for normal operation.

Manuals:

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

EXERCISES AND PRACTICAL POSSIBILITIES

1.- Studying the reactive power compensation for static loads.

2.- Comparison of the reactive energy before and after of power factor compensation.

3.- Optimum configuration of the reactive power controller.

4.- Checking the compensation control unit applying different reactive power levels.

5.- Practical case in which the user carries out manually the reactive energy compensation.

REQUIRED SERVICES

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

DIMENSIONS AND WEIGHTS

AEL-APFC:

-Dimensions: 1600 x 550 x 2000 mm. approx.

(62.99 x 21.65 x 78.73 inches approx.)

-Weight: 50 Kg. approx.

(110 pounds approx.)

AEL-APFC/ICAI. Interactive Computer Aided Instruction Software System.
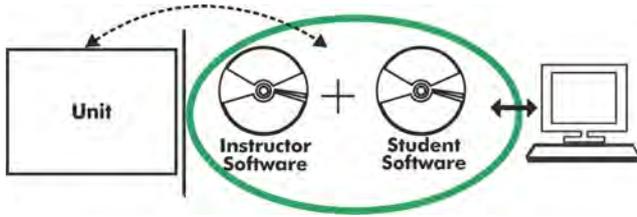
Whit no physical connection between unit and computer (PC), **this complete software package consists of an Instructor Software (EDIBON Classroom Manager-ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft-ESL-SOF).** Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

<u>Instructor Software</u>

-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.
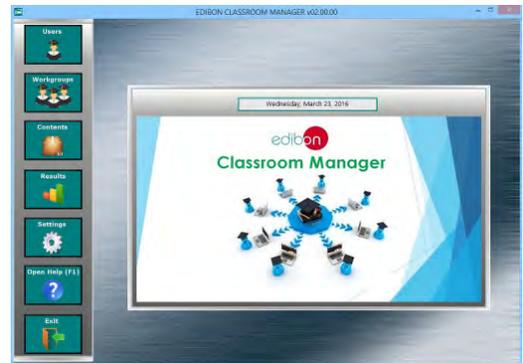
ECM-SOF. EDIBON Classroom Manager (Instructor Software)
Application main screen
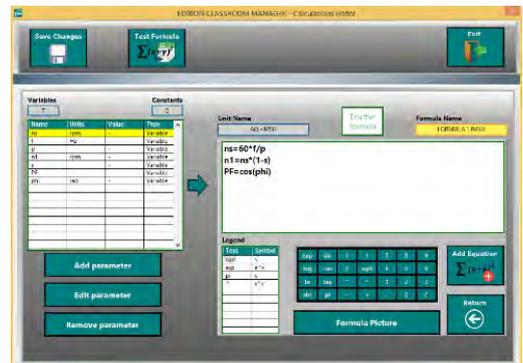
ECAL. EDIBON Calculations Program Package - Formula
Editor Screen
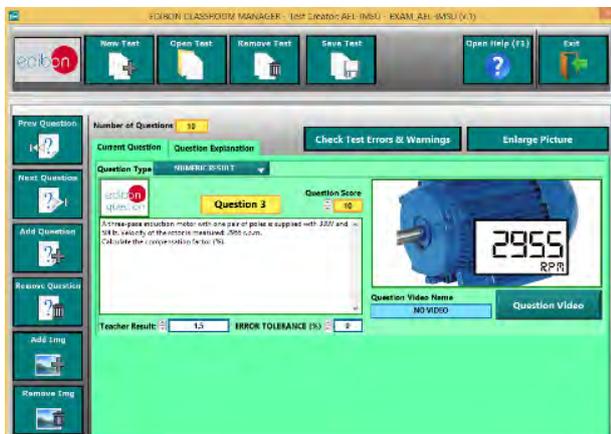
ETTE. EDIBON Training Test & Exam Program Package - Main Screen
with Numeric Result Question
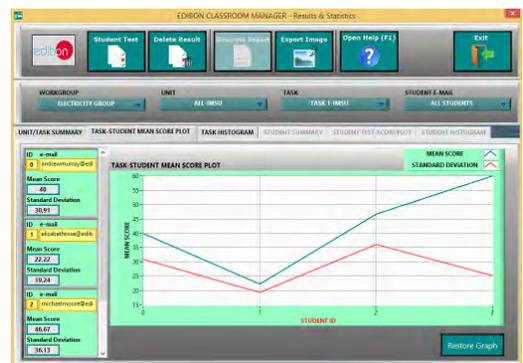
ERS. EDIBON Results & Statistics Program
Package - Student Scores Histogram

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/products/catalogues/en/units/electricity/ICAI-Electricity/ICAI-Electricity.pdf

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
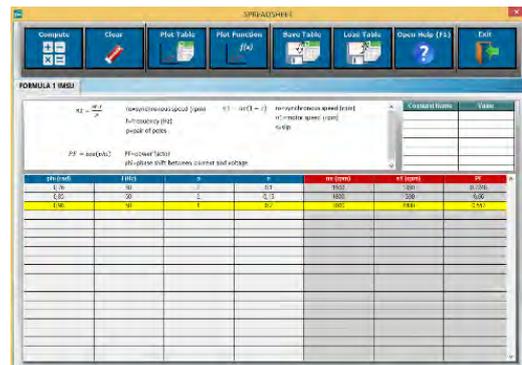
ECAL. EDIBON Calculations Program Package Main Screen

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

REPRESENTATIVE