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PRODUCTOS
4.- ELECTRICIDAD

INTRODUCTION

The students who begin their professional career as electrical installers, assemblers or electrical maintenance technicians require a hands-on learning with equipments that reflect faithfully the electrical installations in which they will work in the future. In the industrial field the power factor correction is very important in companies in which the reactive energy consumption of their loads is high. This allows reducing problems such as overload power lines, drop voltage and power performance. Thus, the electrician must know how this system is wired and installed.



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

GENERAL DESCRIPTION

The Wiring Installation Training, Power Factor Correction Devices application, "WIT-PFC", has been designed by Edibon for the formation at professional-practical level in the field of the installations, wiring and testing of existing power factor correction systems in industry.

This application provides the future professionals with knowledge and essential skills on the assembly, installation, wiring and testing of different reactive power compensation systems (according to the technology employed) through the use of capacitor batteries and power factor controllers.

To acquire a complete knowledge, this application includes a specific manual in which is explained, at theoretical-practical level, the aspects concerning to the installation procedures and wiring of these installations.

The WIT-PFC application includes the following elements:

- FP-STR. Assembly Frame with Safe Electrical Power Supply.
- FP-KIT-4. Wiring Installation Kit.
- FP-KIT-10. Tubes and Fittings for Channelling Wiring Kit.
- FP-KIT-48. Three-Phase Variable Loads Kit.
- FP-KIT-49. Stepper Power Factor Correction Kit.
- MED65. Digital Multimeter.

Required elements:

- CHER. Tool Box.

Recommended elements:

- FP-KIT-5. Measuring Kit.
- FP-KIT-10/B. Rigid Tube Kit.
- FP-KIT-50. Linear Power Factor Correction via Thyristors Kit.
- FP-KIT-51. Power Factor Correction with Nitrogen Capacitors Kit.

The WIT-PFC application includes the following elements:

- **FP-STR. Assembly Frame with Safe Electrical Power Supply.**

Aluminum structure:

Two aluminum struts.

Easy assembly of components via hammer head screws.

Possibility of simultaneous work of several students.

Four swiveling casters to facilitate the movement.

Dimensions:

Structure height: 1800 mm.

Useful working height: 1000 mm.

Width: 1500 mm.

Three-Phase connection plug.

Safe electric box:

Differential magnetothermal, 4 poles, 25A, 300mA AC 6KA.

Emergency stop mushroom (230/400V AC).

5-wire hose for connection to frame.

Signal lamp of voltage presence. Armature voltage: 200V DC.

- **FP-KIT-4. Wiring Installation Kit.**

100 meters of grey wire of 1.5 mm².

100 meters of brown wire of 1.5 mm².

100 meters of black wire of 1.5 mm².

100 meters of green/yellow wire of de 1.5 mm².

25 meters of screened wire.

- **FP-KIT-10. Tubes and Fittings for Channeling Wiring Kit.**

PVC electrical conduit for wiring installation, 20 m.

7 x Electrical box.

Cable guide.

20 x PMA cable clamp, 20 mm.

- **FP-KIT-48. Three-Phase Variable Loads Kit.**

Three-phase variable resistor:

Nominal power: 2100 VA.

Resistor range: 0-233 ohms.

Three-phase variable reactance:

Nominal power: 2100 VAR.

Inductance: 742 mH.

Reactance range: 0-233 ohms.

Two potentiometer to regulate the power load.

- **FP-KIT-49. Stepper Power Factor Correction Kit.**

Capacitors battery:

Nominal voltage: 400 VAC.

Star connection nominal power: 2100 VAR.

Delta connection nominal power: 6300 VAR.

Capacitor discharge resistor.

Power factor controller:

Nominal voltage: 400V AC.

6 control steps.

It shows the power factor of the system.

Five Three-Pole Contactors:

Nominal voltage for power contacts: 400V AC.

Nominal voltage for control contacts: 230V AC.

Nominal voltage for the control coil: 230V AC.

Auxiliary contacts:

3 NO / 2 NC.

Harmonic filtered reactance.

6 x Single-phase fuse holders for DIN rail mounting:

Fuse: 1 x 30 A.

6 x Three-phase fuse holders for DIN rail mounting:

Fuses: 3 x 30 A.

- **MED65. Digital Multimeter.**

This module has a digital multimeter of about 3 ½ digits, with double-jack ending cables of about 4 mm to facilitate interconnections.

With this digital multimeter we will be able to measure:

- Voltage.
- Current.
- Resistance.
- Capacitors capacity.
- Temperature.

Required elements:

- **CHER. Tool Box.**

- Crimper.
- Tin.
- Meter.
- Insulation tape.
- Heat shrink.
- Voltage tester screwdriver.
- Cross-head screwdriver and flat-head screwdriver.
- Allen keys.
- Soldering iron.
- Rubber hammer.
- Wire terminals and Connection terminals.
- Flanges.
- Wire cutter.
- Screw Clamp Terminals.
- Wire stripper.

Recommended elements:

- **FP-KIT-5. Measuring Kit.**

Clamp Meter:
Clamp for alternating current measurements contactless.

The clamp can measure:

- Current.
- Voltage.
- Resistance.

A voltage and continuity tester:

- Voltage range: 12-690V AC.
- Phases rotating detection in three-phase systems.
- Polarity tester.

- **FP-KIT-10/B. Rigid Tube Kit.**

- 20 m PVC Rigid Tube.
- 10 x Threaded connector.
- 5 x Elbow for conducts clamping.

- **FP-KIT-50. Linear Power Factor Correction via Thyristors Kit.**

Capacitors battery:

Nominal voltage: 400V AC.

Star connection nominal power: 2100 VAR.

Delta connection nominal power: 6300 VAR.

Capacitor discharge resistor.

Automatic power factor controller:

Nominal voltage: 400V AC.

Automatic power factor regulation.

It shows the power factor of the system.

6 x Control thyristor module:

Nominal power: 1 kW.

Harmonic filtered reactance.

6 x Single-phase superfast semiconductor fuse holders for DIN rail mounting.

Fuse: 1 x 30 A.

6 x Three-phase superfast semiconductor fuse holders for DIN rail mounting.

Fuses: 3 x 30 A.

- **FP-KIT-51. Power Factor Correction with Nitrogen Capacitors Kit.**

Capacitors battery:

Nominal voltage: 400V AC.

Nominal power: 2000 Var.

Capacitor discharge resistor.

Power factor controller:

Nominal voltage: 400V AC.

6 control steps.

It shows the power factor of the system.

Five Three-Pole Contactors:

Nominal voltage for power contacts: 400V AC.

Nominal voltage for control contacts: 230V AC.

Nominal voltage for the control coil: 230V AC.

Auxiliary contacts:

3 NO / 2 NC

Harmonic filtered reactance.

6 x Single-phase fuse holders for DIN rail mounting.

Fuse: 1 x 30 A.

6 x Three-phase fuse holders for DIN rail mounting.

Fuses: 3 x 30 A.

- **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.- Wiring and installation of the capacitors battery connected in star.
 - 2.- Wiring and installation of the capacitors battery connected in delta.
 - 3.- Wiring and installation of the nitrogen capacitors battery connected in star.
 - 4.- Wiring and installation of the nitrogen capacitors battery connected in delta.
 - 5.- Wiring and installation of the protection fuses of the feed line.
 - 6.- Wiring and installation of the control contactors.
 - 7.- Wiring and installation of the control thyristor.
 - 8.- Wiring and installation of the discharge resistor to its corresponding capacitor.
 - 9.- Wiring and installation of the harmonic filtered reactance.
 - 10.- Wiring and installation of the power factor controller.
 - 12.- Wiring and installation of the variable resistive and inductive load.
 - 13.- Testing of the linear power factor correction according to a preconfigured power factor.
 - 14.- Testing of the stepper power factor correction according to a preconfigured power factor.
- Several other exercises can be done and designed by the user.

REQUIRED SERVICES

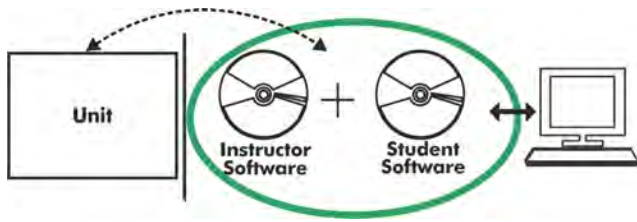
- Electrical supply: three-phase, 380V/50 Hz or 208V/60 Hz, 3 kW.

DIMENSIONS AND WEIGHTS

WIT-PFC:

- Dimensions: 1500 x 400 x 1800 mm approx.
(78.74 x 15.75 x 78.74 inches approx.)
- Weight: 80 Kg approx.
(220 pounds approx.)

WIT-PFC/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.

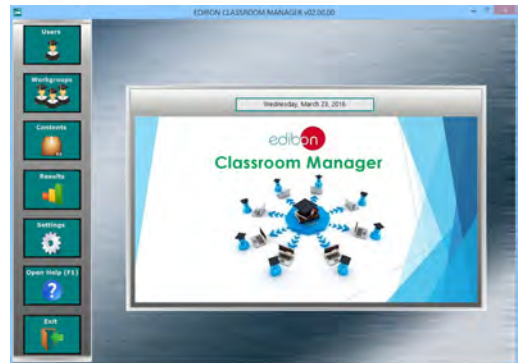
Instructor Software

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

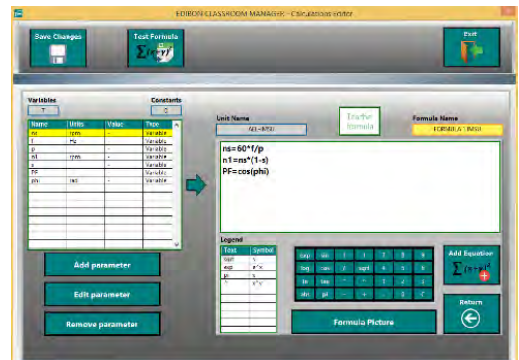
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

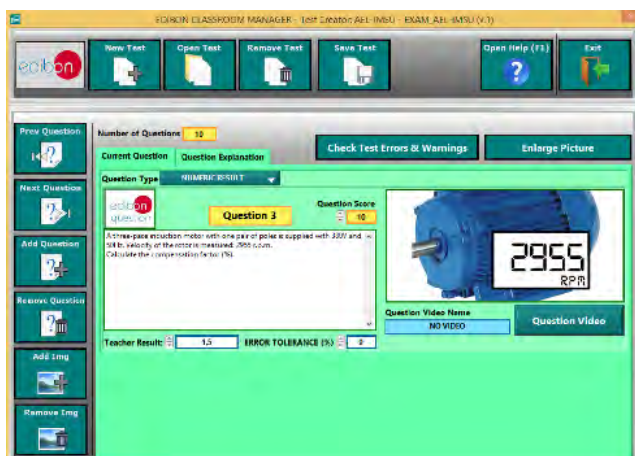
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



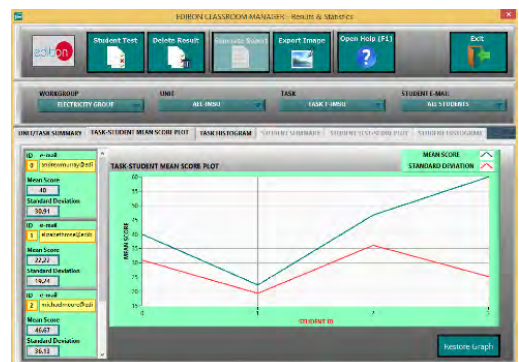
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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

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:

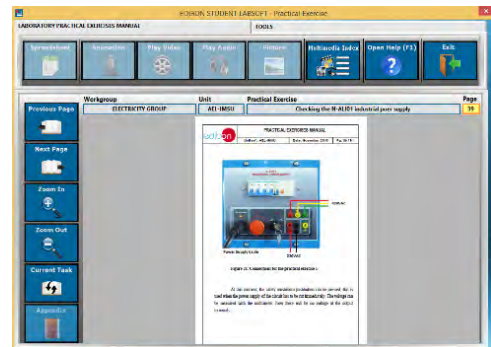
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- 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



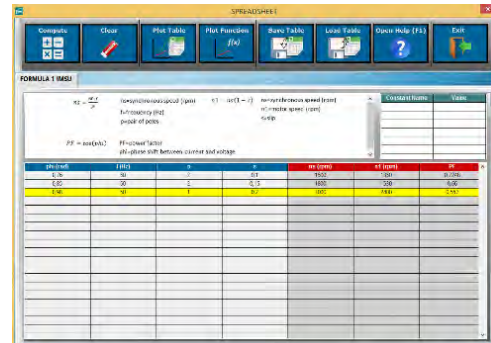
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



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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REPRESENTATIVE:

