Engineering and Technical Teaching Equipment

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. It is important that the future electricians acquire experience regarding electrical consumption measurement installations which are present in any building and whose development over the last years is of great relevance in terms such as energy effciency or smart grids.

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, Mains Connection and Meters in Buildings application, "WIT-MCB", has been designed by Edibon for the students formation at a proffessional-practical level in the field of the installation, wiring and testing of mains connection and meters in buildings.

This application will provide the future professionals with the knowledge and essential skills on electric installations of residential connection through the installation and wiring of those mechanical and electrical elements of a building subdistribution line, such as meters cabinets, lamps and different switches.

Due to the growing expansion of smart meters carried out by the main electric grid operators, in this application a Smart Meter and a Data Concentrator are recommended to train the students in wiring and commissioning of these devices.

The WIT-MCB application includes the following elements:

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

- FP-KIT-1. Feeders Installation Kit.

- FP-KIT-4. Wiring Installation Kit.

- FP-KIT-10. Tubes and Fittings for Channelling Wiring Kit.

- FP-KIT-32/B. Switches Kit 2.

- FP-KIT-37. Fluorescent Ceiling Fixture Kit (2 units).

- FP-KIT-59. Meter Cabinet Kit.

Required elements:

- CHER. Tool Box.

Recommended elements:

- MED65. Digital Multimeter.

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

- FP-KIT-5. Measuring Kit.

- FP-KIT-57. Smart Meter and Data Concentrator.

The WIT-MCB application includes the following elements:

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

    Aluminum structure:

    Three 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.

- **FP-KIT-1.Feeders Installation Kit.**

    Magnetothermal differential breaker.

    Three-phase encapsulated fuse holder.

    Cartridge fuses.

    Electrical board.

- **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, 20mm.

- **FP-KIT-32/B. Switch Kit 2.**

    Cross circuit breaker.

    Remote control switch.

    Push-Button.

- **FP-KIT-37. Fluorescent Ceiling Fixture Kit (2 units).**

    2 x 8W lineal fluorescent tube. (with tube holder).

• FP-KIT-59. **Meter Cabinet Kit.**

    Meter cabinet.

    40 A three-phase digital meter.

    Meter panel.

    Power panel with busbars.

    Row distribution panel.

    2 selective line switches, 3 positions.

    4-pole differential switch.

    Unipolar line switch.

    Tripolar line switch.

    Phase lane.

    Parts for the meter cabinet.

    Label set.

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:

• 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.

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

    20 m PVC Rigid Tube.

    10 x Threaded connector.

    5 x Elbow for conducts clamping.

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

    Clamp Meter:

        Clamp for alternating/direct 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-57. **Smart Meter and Data Concentrator.**

    Smart Meter:

        Power supply: 230V AC.

            The SM Module can carry out the following measurements and controls:

                - Current measurements.

                - Voltage measurements.

                - Active and reactive power measurement in four quadrants.

                - Bidirectional measurements of the active and reactive energy in four quadrants.

                - Power factor measurements.

                - Smart Relay to be controlled from the data concentrator platform web.

    Data Concentrator:

        Power supply: 380V AC.

            The communications concentrator consists of:

                A metering system formed by a number of smart meters (on our case, there is one residential smart meter). The data concentrator communicates with the smart meter by means of a power line.

                Remote control System. It is a web platform that let us have access to the data concentrator, visualize all the smart meters connected to the power line and configure different parameters, visualize all the electrical parameters of the load connected to each smart meter, etc.

        Configuration and control software (platform web):

            The CTT module includes a platform web to control the Smart Meter.

            So, the user can perform the following functions:

                Real time monitoring, remote management and verification of the network quality.

                Relay breaker to limit the maximum consumed power by the final user.

                Bidirectional communication between the Utility (the student) and the Smart Meter: the student can control and monitoring the loads state and limit the maximum power required.

- **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.- Configuration, assembly and wiring of a meter board with sub-distribution.

2.- Installation of a digital meter.

3.- Installation and wiring of the meter cabinet protection elements..

4.- Simple installation circuits in supply entry rooms.

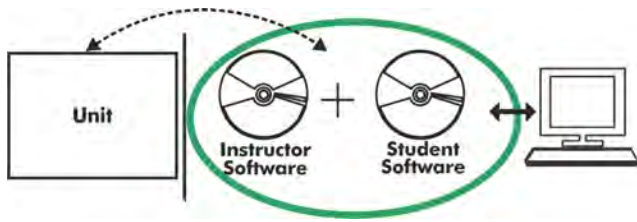- Several other exercises can be done and designed by the user.

REQUIRED SERVICES

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

DIMENSIONS AND WEIGHTS

WIT-MCB:

- 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-MCB/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.
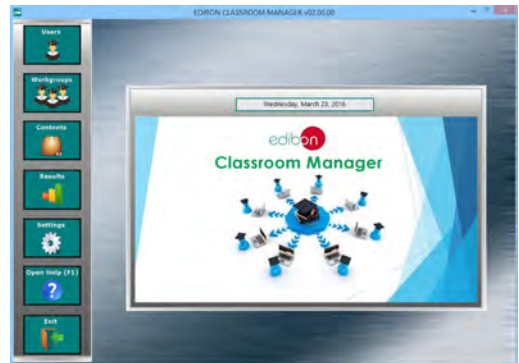
Instructor Software

- 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.**
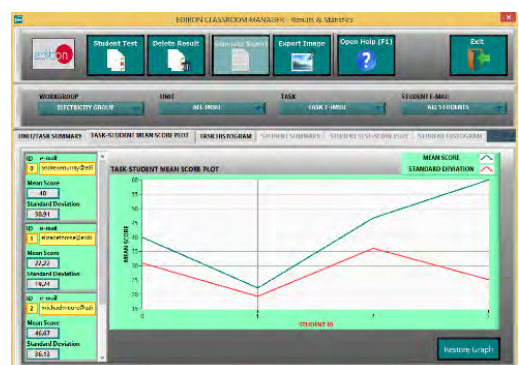

ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen
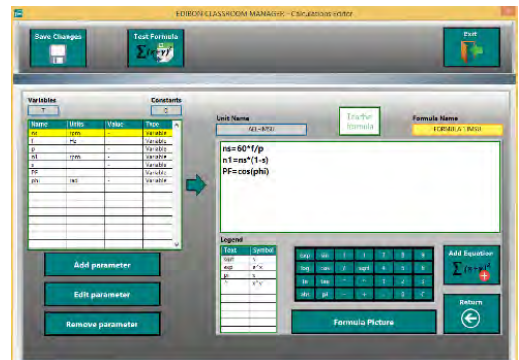
ECAL. EDIBON Calculations Program Package - Formula Editor Screen
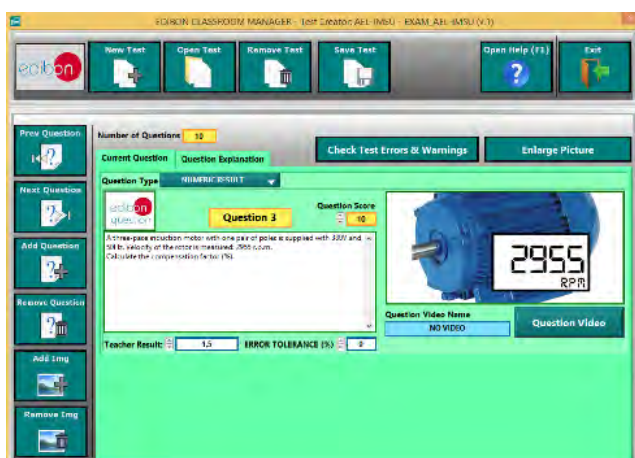
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

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

<u>Student Software</u>

- 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.
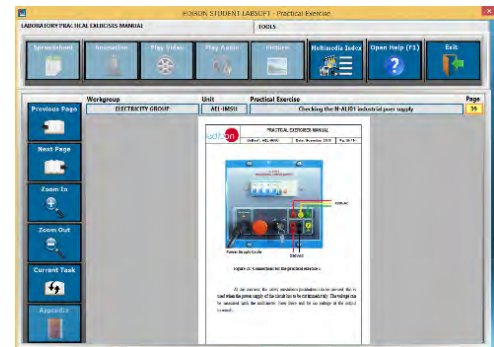
Innovative features:

• 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.
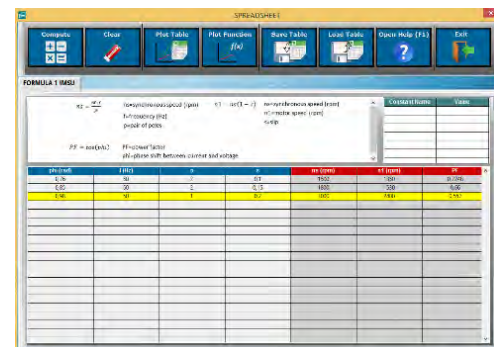
• Multimedia-Supported auxiliary resources.

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

EPE. EDIBON Practical Exercise Program Package Main Screen

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

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

ECAL. EDIBON Calculations Program Package Main Screen

ERS. EDIBON Results & Statistics Program Package - Question Explanation

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

REPRESENTATIVE: