Industrial Installations Monitoring Application

AEL-MED

edibon

Engineering and Technical Teaching Equipment

INTRODUCTION

In an industrial installation, one of the important points to study at electrical level is the checking of the consumption and the state of the installation. From the electrical point of view, it is important to know the consumption of your installation, for example, to verify the quality and continuity of the grid. But it is also important from the economical point of view, for example, for doing a prediction of future bills.

The Industrial Installations Monitoring Application, "AEL-MED", is an application designed with the objective of introducing the consumption supervision of industrial installations. For that, the application contains the next modules: a main power supply, a voltmeter, an ammeter AC, a frequency meter to check the quality of the service or detect interferences, a network analyzer with active and reactive power consumption, this allow us to calculate for example the power factor in each instant, an hour counter and a four position selector to measure different points. With all of this equipment it is possible to supervise an industrial installation and announce the students the different kinds of devices used for these purposes.

The AEL-MED includes the following modules:

- N-ALI02. Domestic Main Power Supply.

- N-MED22. AC Voltmeter (0-400 V).

- N-MED10. AC Ammeter (0-5 A).

- N-MED26. Reed Frequency Meter 50 Hz, 400 V.

- N-EALD. Network Analyzer Unit with Data Acquisition.

- N-MED49. Hour Counter.

- N-SWT4. Four position selector (measuring point selector).

Additional and recommended modules:

- EMT7. Asynchronous Three-Phase Motor of squirrel cage.

- EMT9. Dahlander Three-Phase Motor (two speeds).

- N-REF/T. Three-Phase Resistor Load with Commutator Module.

- N-IND/T. Three-Phase Inductive Load with Commutator Module.

- N-CON/T. Three-Phase Variable Capacitor Load with Commutator Module.

- FLYW. Flywheel.

- FRECP. Eddy Current Brake.

- N-VVCC/M. DC Motor Speed Controller (intermediate option).

If the Option A (modules mounted on rack) is chosen, the rack/s required will depend on the optional modules requested by the customer.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-MED/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-MED can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- 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 application 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, 25 A, 30 mA AC 6 KA.

N-ALI02

- **N-MED22. AC Analog Voltmeter (0-400 VAC).**

    Measurement range: 0-400 VAC.

    Terminals:

        Measurement Terminals.

        Ground Terminal.

N-MED22

- **N-MED10. AC Analog Ammeter (0-5 A).**

    Measurement range: 0-5 A.

    Terminals:

        Measurement Terminals.

        Ground Terminal.

N-MED10

- **N-MED26. Reed Frequency Meter 50 Hz, 400 V.**

    Nominal voltage: 400 VAC.

    Nominal frequency: 50 Hz.

    Accuracy: 5 Hz.

N-MED26

- **N-EALD. Network Analyzer Unit with Data Acquisition**

    Switch ON/OFF.

    Voltage supply: 400 VAC.

    Input terminals: Input connection with the measure point.

    Output terminals: Output connection with the measure point.

    Digital outputs: three digital outputs for pulses or alarms or combine both.

    Communication port RS-485.

    Fuses: 3 x 10 A.

    Grid analyzer display, where it shows:

        Active, reactive and apparent power.

        Active, reactive and apparent energy.

        Phase and line currents.

        Phase and line voltages.

        Frequencies.

        Power factor.

N-EALD

• N-MED49. **Hour counter.**

  Real time hour counter of time service.

N-MED49

• N-SWT4. **Four position selector (point selector measuring).**

  IP66 protection.

N-SWT4

Additional and recommended modules:

• EMT7. **Asynchronous Three-Phase Motor of squirrel cage.**

  Nominal power: 370 W.

  Nominal voltage: 3x 230/400 VAC Δ/Y.

  Frequency: 50/60 Hz.

  Number of poles: 2.

  Speed: 2730 r.p.m.

  Nominal current: 1,67/ 0,97 A.

EMT7

• EMT9. **Dahlander Three-Phase Motor (two speeds).**

  Nominal power: 370 W.

  Nominal voltage: 3x 400 VAC.

  Frequency: 50/60 Hz.

  Number of poles: 4.

  Speed: 1400/2800 r.p.m.

  Nominal current: 1,2 / 1,55 A.

EMT9

• N-REF/T. **Three-Phase Resistor Load with commutator module.**

  Nominal voltage: 400 VAC.

  Three-phase resistance: 3x150 Ohm.

  Nominal current: 1,6 A.

  Manual commutator to switch on/off the inductances.

  Fuses: 3 x 2 A.

  Terminals:

    Four inputs terminals (3PH+N).

    Four outputs terminals (3PH+N).

  Ground terminal.

N-REF/T

- N-CON/T. **Three-phase Capacitor module.**

  Capacitor value: 3 x 7 uF.

  Nominal Voltage: 400 VAC.

  Manual commutator to switch on/off the capacitors.

  Fuses: 3 x 4 A.

  Terminals:

  Four inputs terminals (3PH+N).

  Four outputs terminals (3PH+N).

  Ground terminal.

N-CON/T

- N-IND/T. **Three-phase Inductance module.**

  Nominal voltage: 400 VAC.

  Inductance value: 1,4 H.

  Nominal current: 1,6 A.

  Manual commutator to switch on/off the inductances.

  Fuses: 3 x 2 A.

  Terminals:

  Four inputs terminals (3PH+N).

  Four outputs terminals (3PH+N).

  Ground terminal.
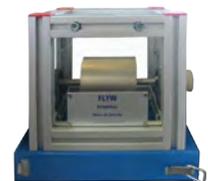
N-IND/T

- FLYW. **Flywheel.**

  Weight: 2 kg.

  Maximum recommended speed: 4000 r.p.m.

  Moment of inertia: 0,0025 Km².

FLYW

- FRECP. **Eddy Current Brake.**

  Maximum supply voltage: 60 VCC.

  Nominal current: 1,67 A.

  Maximum current: 1,8 A.

  Maximum braking torque: 1,4 Nm.

FRECP

- N-VVCC/M. **DC Motor Speed Controller (intermediate option).**

  Supply voltage: 230 VAC.

  Variable output voltage: 0-300 VCC.

  Fuse: 2 A.

N-VVCC/M

- **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.- Measurement of voltage and current in the installations.

2.- Measurement of the energy consumption, both active and reactive, and calculate the power factor of the installations.

3.- Registry of hours of service.

4.- Development of remote measurement stations.

REQUIRED SERVICES

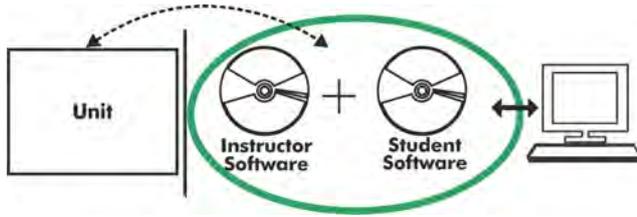- Electrical supply: three-phase, 380V/50 Hz or 208V/60 Hz, 20 Kw.

DIMENSIONS AND WEIGHTS

AEL-MED:
- Dimensions: 640 x 320 x 920 mm approx.

                (25.19 x 12.59 x 32.22 inches approx.)
- Weight: 60 Kg approx.

                (132 pounds approx.)

AEL-MED/ICAI. Interactive Computer Aided Instruction Software System:

With 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.
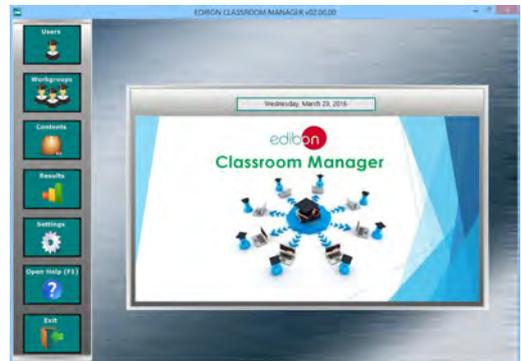
Instructor Software

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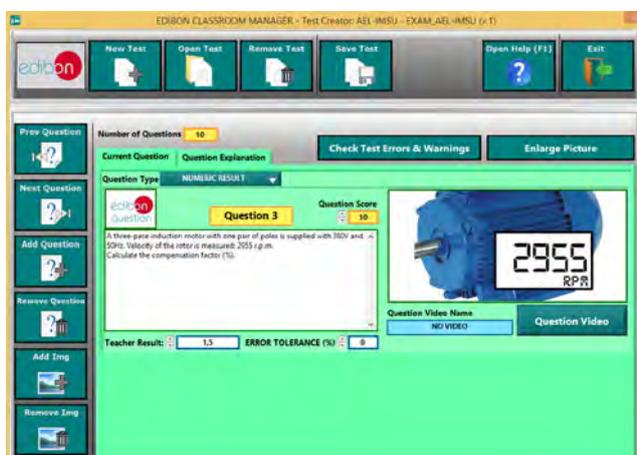
ETTE. EDIBON Training Test & Exam Program Package - Main Screen with
Numeric Result Question

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.

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

ERS. EDIBON Results & Statistics Program Package - Question Explanation
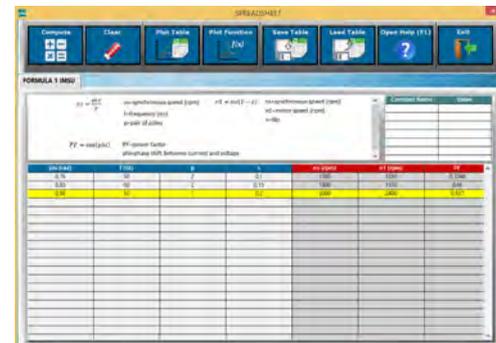
ECAL. EDIBON Calculations Program Package Main Screen

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

INTERNATIONAL

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REPRESENTATIVE: