



Electrical Machines



FREC



EMT7

www.edibon.com
 ↳ PRODUCTS
 ↳ 40.- ELECTRICITY

INTRODUCTION

Nowadays, the energy efficiency is a very important issue to be considered in the industry because it allows saving economic and material resources. Induction motors consume the 65% of the total demanded electric energy. This acquires more importance in the great generation or consumption centers where each certain percentage supposes many megawatts.



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)



Certificate and Worlddidac Member

GENERAL DESCRIPTION

The AEL-EEEM Energy Efficiency in Electrical Motors trainer has been designed by Edibon to allow the students to understand how cutting-edge devices used in high performance systems to control electrical motors work : frequency controllers versus conventional electrical power.

Actual frequency controllers can automatically control (PID) the speed of the motors depending on different conditions, such as loads variations in the motor's shaft. In the AEL-EEEM trainer allows controlling different loads conditions through the Eddy Current Brake. The results can be analyzed thanks to an included network analyzer which shows the most important electric parameters. The AEL-EEEM shows how to program the frequency controller to get an optimal consumption depending on the braking load.

The AEL-EEEM includes the following modules:

- N-ALI01. Industrial Power Supply.
- N-EAL. Network Analyzer Unit.
- N-WCA/M. AC Motor Speed Controller (Intermediate option).
- N-WCC/M. DC Motor Speed Controller (Intermediate option).
- FRECP. Eddy Current Brake.
- EMT7. Asynchronous Three-Phase Motor of Squirrel Cage.

Optional learning software:

In addition, Edibon provides optional software (AEL-EEEM/ICA) 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-EEEM 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.

SPECIFICATIONS

The trainer includes the following modules:

- N-ALI01. **Industrial Main Power Supply**

Supply voltage: 400 VAC, 3PH+N+G.

ON-OFF removable key.

Output voltage connections:

Three-Phase + Neutral: 400 VAC.

Single-Phase: 230 VAC.

Three-Phase supply hose with IP44 3PN+E 32A 400V connecting plug.

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



N-ALI01

- N-EAL. **Network Analyzer Unit**

ON-OFF switch.

Supply voltage: 230 VAC.

Input terminals: Input connection with the measurement point.

Output terminals: Output connection with the measurement point.

Digital outputs: Three digital outputs are used for pulses or alarms, or for combining both.

Fuses: 3x10 A.

Network Analyzer Display. It shows:

Active, reactive and apparent power.

Active, reactive and apparent energies.

Lines and phase currents.

Line and phase voltages.

Frequencies.

Power Factor.



N-EAL

- N-WCA/M. **AC Motors Speed Controller (intermediate option)**

Supply voltage: 230 VAC.

Nominal power: 0,4 kW.

PWM output voltage connections:

Three-Phases: 230 VAC.

10K, potentiometer for the induction motor control speed.

Setting and visualization display of the machine parameters.



N-WCA/M

- 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

Specifications

- **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

- **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 an Asynchronous Three-Phase Motor of Squirrel Cage.
- 2.- Start-up of the frequency controller.
- 3.- Forward and reverse operations with the induction motor and the frequency controller.
- 4.- Comparison of the energy consumption by the conventional electrical power and the frequency controller.
- 5.- Programming of the frequency controller according to different electrical machines operations.
- 6.- Checking the behavior of the electrical machine in function of the braking torque.
- 7.- Study the motor functioning for a demand instruction.
- 8.- Programming of the frequency controller for different loads.
- 9.- Programming of the frequency controller to get an optimal consumption.
- 10.- Analyze the electrical parameters.

REQUIRED SERVICES

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

DIMENSIONS AND WEIGHTS

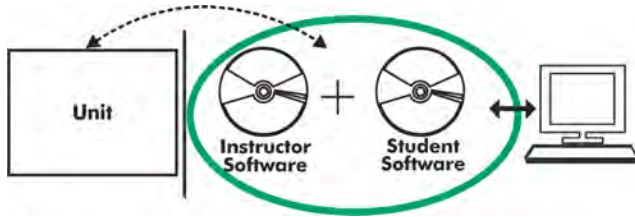
AEL-EEEM:

-Dimensions: 640 x 320 x 670 mm. approx.
(25.19 x 12.59 x 26.37 inches approx.)

-Weight: 50 Kg. approx.
(110 pounds approx.)

Optional

AEL-EEEM/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).

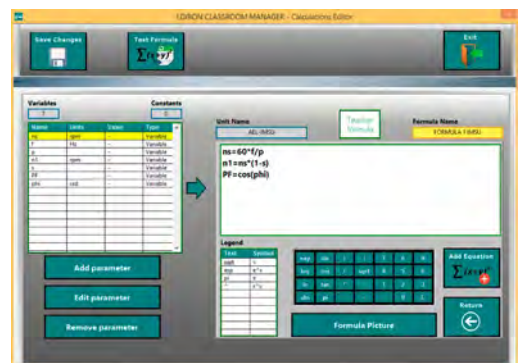
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

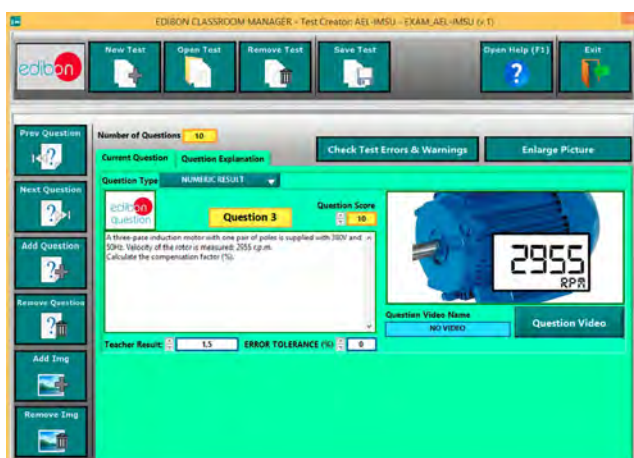
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



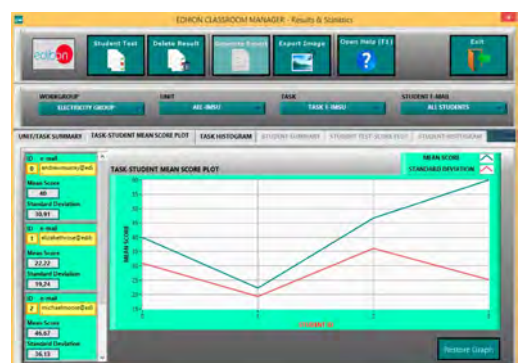
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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

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



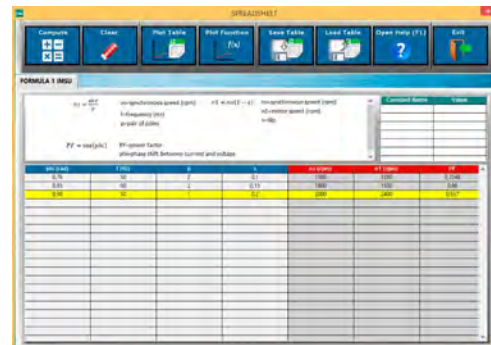
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



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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REPRESENTATIVE:

