edib**on**

Engineering and Technical Teaching Equipment

Modular Trainer for Electrotechnics (Motors)

AEL-AI13-C

INTRODUCTION

The electrical engineering is the base of electric knowledge in the most of the industrial processes. The motors belong to this discipline and are one of the more important electric machines. Motors are devices capable of transforming electric energy into mechanical energy and viceversa. The study of the motors, as part of electrotechnics, is fundamental to the understanding of many industrial processes.

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

The Modular Trainer for Electrotechnics (Motors) "AEL-AI13-C" has been designed by Edibon to study different motor types: single-phase induction motor with starting and running capacitor, universal motor, three-phase squirrel cage induction motor.

This trainer allows the user to acquire basic concepts with respect to the magnetic and electric flow relation easily. It includes the modules required for the study of the Electric Magnetic Field (EMF) and several motors in order to analyze its response when are configured in different ways.

The AEL-AI13-C includes the following modules:

- N-ALI01. Industrial Main Power Supply.

- N-ALI10. Power Supply Module.

- EMT16. Asynchronous single-phase motor with starting and running capacitor.

- EMT12. Universal Motor.

- EMT7. Asynchronous three-phase motor of squirrel cage.

- N-VAR16. Electromagnetism Kit with group of motor/generator.

- N-MED65. Digital Multimeter.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AI13-C/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 trainer AEL-AI13-C can be mounted on rack (option A) or on rail (option B):

Option A:

This trainer 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 trainer 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-ALI01. **Industrial Power Supply.**
  Supply voltage: 400 VAC, 3 PH+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, 25 A, 300 mA AC 6 KA.

N-ALI01

• N-ALI10. **Power Supply Module.**
  Supply voltage (Single-Phase): 230VAC PH+N+G.
  Output voltage:
    15-0-15 VAC.
    24 VAC.
    24 VDC.
    0-24 VDC (adjustable).

N-ALI10

• EMT16. **Single-phase capacitor motor.**
  Supply voltage: 110-220 V.
  Power: 370 W.
  Speed: 2780 r.p.m.
  Frequency: 50/60 Hz
  Armature current: 1,85 A.

EMT16

• 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.
  RPM: 2730 r.p.m.
  Nominal current: 1,67/ 0,97 A.

EMT12

• EMT 12. **Universal motor.**
  Supply voltage: 110-240 VAC/ VDC.
  Power: 0,3 HP.
  Speed: 9000 r.p.m.

EMT7

• N-VAR16. **Electromagnetism kit with group of motor/generator.**
  Solenoids of 1000 turns and 2000 turns.
  Cores of brass, stainless steel, ferrite and magnetic materials.
  Motor/generator set with attached tachometer (24 VDC).

• N-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.

N-VAR16

N-MED65

• **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.- Checking the operation of the Industrial Main Power Supply (N-ALI01).

2.- Checking the operation of the Power Supply (N-ALI10).

3.- Electric energy into mechanic energy conversion.

4.- Mechanic energy into electric energy conversion.

5.- Electric energy into magnetic energy conversion.

6.- Magnetic induction: Lenz's Law.

7.- Wiring and put into operation a Single-Phase Motor.

8.- Single-phase motor basic operations.

9.- Wiring and put into operation a Universal Motor.

10.- Universal Motor basic operations.

11.- Wiring and put into operation a Squirrel-Cage Three-Phase Motor.

12.- Squirrel-Cage Three-Phase Motor basic operations.

13.- Study of the electromagnetism in different materials.

REQUIRED SERVICES

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

DIMENSIONS AND WEIGHTS

AEL-A13-C:

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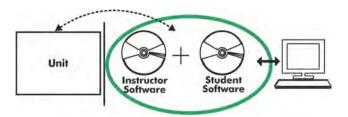
          (25.19 x 12.59 x 26.37 inches approx.)

- Weight: 60 Kg approx.

          (132 pounds approx.)

AEL-AI13-C/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.
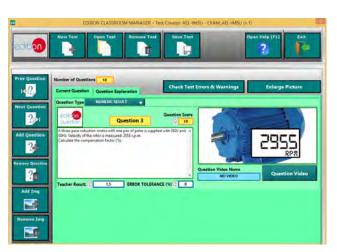
Instructor Software

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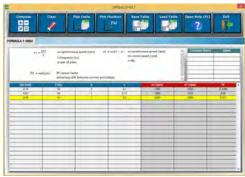
www.edibon.com/en/files/expansion/ICAI/catalog

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

C/ Del Agua, 14. Polígono Industrial San José de Valderas.
28918 LEGANÉS. (Madrid). ESPAÑA - SPAIN.
Tel: 34-91-6199363   Fax: 34-91-6198647
E-mail: edibon@edibon.com   Web: **www.edibon.com**

REPRESENTATIVE: