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 ↳ PRODUCTS  
 ↳ 40.- ELECTRICITY

### INTRODUCTION

The electric motors are devices capable of transforming electrical energy into mechanical energy. The Universal Motors are very used in industrial installations due to its great robustness, reliability and low cost. The starting current consumed by these motors is very high, being harmful to the machine and the protections. The soft starters aim at reducing these currents close to the nominal values. For this purpose it is very important to know several operations carried out with these electrical machines.



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 Application of Universal Motor "AEL-UMA" is designed for the study of the main operations performed in the industrial field with universal motors.

The student will learn the most important operations of these electrical machines faithfully by using commutators, timers and contactors.

The AEL-UMA includes the following modules:

- N-ALI02. Domestic Power Supply.
- N-PUL48. 3 Double Chamber Push-Buttons.
- N-LAM02. Auxiliary Lamps.
- N-CON01. 3-pole Contactor (24 VAC). (3 units)
- N-ALI03. AC Auxiliary Power Supply.
- FLYW. Flywheel.
- N-WCC/M. DC Motor Speed Controller (Intermediate option).
- N-REV. Variable Resistor. (2 units)
- EMT12. Universal Motor.

Additional and recommended measurement instrumentation modules:

- N-MED21. AC Voltmeter (0-250 V).
- N-MED09. AC Ammeter (0-2.5 A).
- N-MED17. DC Voltmeter (0-200 V).
- N-MED05. DC Ammeter (0-1.5 A).

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-UMA/ICAL) 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-UMA can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-A.

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 application includes the following modules:

- **N-ALI02. Domestic 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-ALI01

- **N-PUL48. 3 Double Chamber Push-Buttons.**

Two independent chambers.

Nominal voltage: 24 VAC.

Three double chamber push-buttons (green and red).

Contacts:

Three Normally Open Contacts (NO) for green switch.

Three Normally Close Contacts (NC) for red switch.

Ground terminal.



N-PUL48

- **N-LAM02. Auxiliary Lamps.**

Nominal voltage: 24 VAC.

Three lamps (red, yellow and green).

Ground terminal.



N-LAM02

- **N-CON01. 3-pole Contactor (24 VAC). (3 units)**

Nominal voltage for power contacts: 400 VAC.

Nominal voltage for control contacts: 24 VAC.

Nominal voltage for the control coil: 24 VAC.

Contacts:

One three-phase Normally Open Contact (NO) for power circuit.

Three Normally Open Contacts (NO) for control circuit.

Two Normally Close Contacts (NC) for control circuit.

Ground terminal.



N-CON01

- **N-ALI03. AC Auxiliary Power Supply.**

Supply voltage (Single-Phase): 230VAC PH+N+G.

Output voltage:

Single-Phase 24 VAC/12 VAC.

24 VDC.

0-24 VDC through potentiometer.



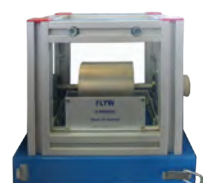
N-ALI03

- **FLYW. Flywheel.**

Weight: 2 kg

Maximum recommended speed: 4000 r.p.m.

Moment of inertia: 0,0025 kgm<sup>2</sup>.



FLYW

## Specifications

- N-WCC/M. **DC Motor Speed Controller (Intermediate option).**

Supply voltage: 230 VAC.

Variable output voltage: 0-300 VCC.

Fuse: 2 A.



N-WCC/M

- N-REV. **Variable Resistor.**

Variable resistor of 150 Ohm.

Maximum power: 500 W.

Potentiometer.

Terminals:

Three terminals to choose all resistance or variable resistance.

Fuse: 2 A.



N-REV

- EMT12. **Universal motor (single-phase).**

Supply voltage: 110-240 VAC/ VDC.

Power: 230 W.

Speed: 9000 r.p.m.



EMT12

Additional and recommended measurement instrumentation modules:

- N-MED21. **AC Voltmeter (0-250 V).**

Measurement range: 0-250 V.

Terminals:

Measurement Terminals.

Ground Terminal.



N-MED21

- N-MED09. **AC Ammeter (0-2.5 A). (2 units).**

Measurement range: 0-2.5 A.

Terminals:

Measurement Terminals.

Ground Terminal.



N-MED09

- N-MED17. **DC Voltmeter (0-200 V).**

Measurement range: 0-200 VDC.

Terminals:

Measurement terminals.

Ground terminals.



N-MED17

- N-MED05. **DC Ammeter (1-1, 5 A).**

Measurement range: 0-2 ADC.

Terminals:

Measurement Terminals.

Ground Terminal.

Fuse: 3 A.



N-MED05

- **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.- Universal motor speed control.             | 4.- Universal motor current control.             |
| 2.- Universal motor turning direction control. | 5.- Universal motor operation in AC and DC mode. |
| 3.- Universal motor speed reading.             |  |

### REQUIRED SERVICES

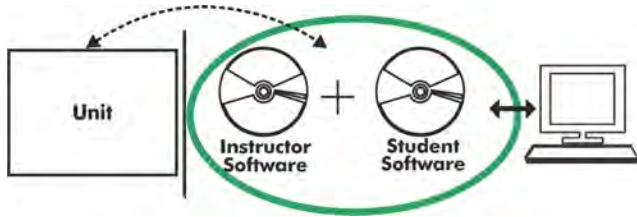
- |  |
|--|
| - Electrical supply: three-phase, 380V/50 Hz or 208V/60 Hz, 20 Kw. |
|--|

### DIMENSIONS AND WEIGHTS

- |   |
|---|
| AEL-UMA:  |
| -Dimensions: 640 x 320 x 920 mm approx.<br>(25.19 x 12.59 x 36.26 inches approx.) |
| -Weight: 25 Kg approx.<br>(55 pounds approx.)                                     |

## Optional

### AEL-UMA/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.

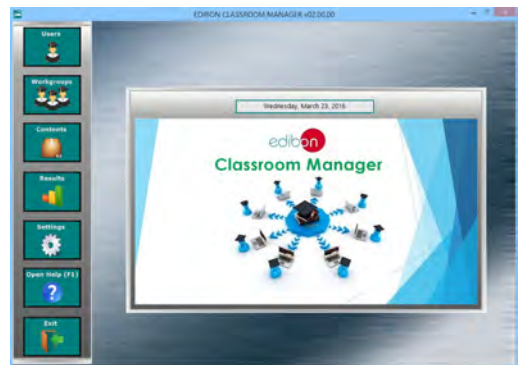
### Instructor Software

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

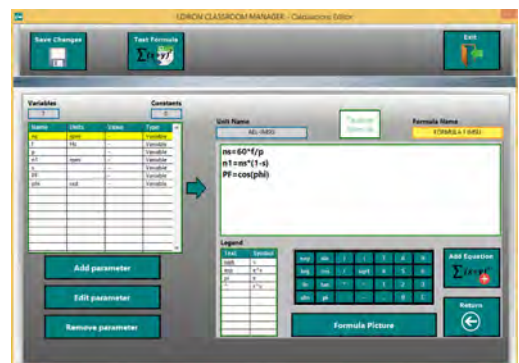
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

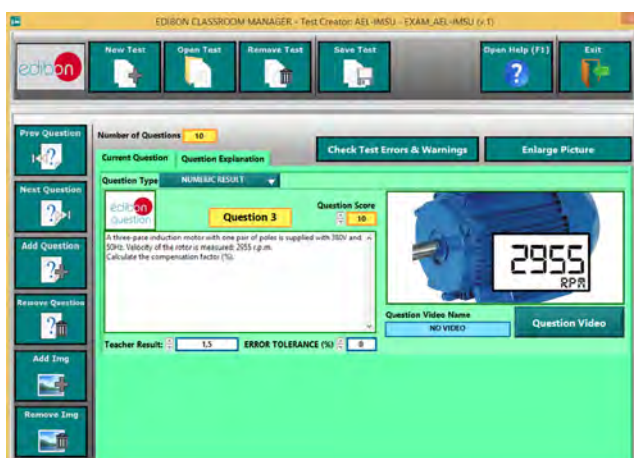
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



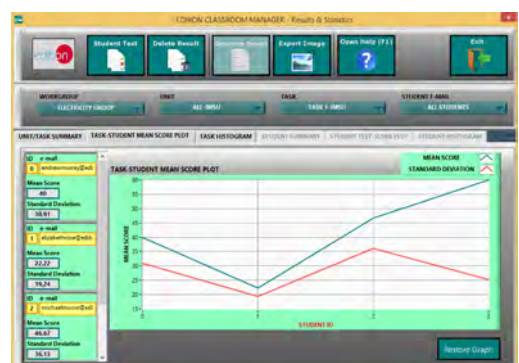
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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](http://www.edibon.com/en/files/expansion/ICAI/catalog)



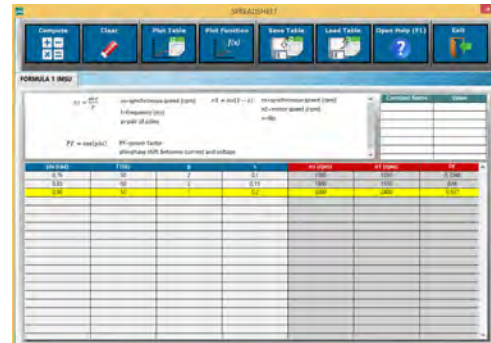
ESL-SOF. EDIBON Student LabSoft (Student Software)  
Application Main Screen



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:

