Engineering and Technical
Teaching Equipment

Advanced Dissectible and Configurable Electrical Machines

AEL-EMT-KIT

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↳PRODUCTS
↳4.- ELECTRICITY

Configuration example of AEL-EMT-KIT application and additional recommended elements

Key features:

- **Many types of electrical motors can be built, configured and started up: AC Asynchronous, Induction Motors, DC Motors/Generators, AC Synchronous Motors/Generators and Stepper Motor.**
- **Monitoring and analyzing waves shape of electrical machines.**
- **Data Acquisition System of electrical machines.**
- **Study of power factor.**
- **Measurement all electrical parameters.**
- **Testing of electrical machines magnetic field.**

INTRODUCTION

The application of Advanced Dissectible and Configurable Electrical Machines, "AEL-EMT-KIT", is a set of configurable electrical machines designed for the study of the fundamental principles of electrical machines. This application offers a unique experience, allowing students to explore key concepts in depth:

Disassemblable mechanical parts that facilitate the understanding of a wide variety of electric motors.

Ability to assemble and disassemble the windings of electric machines as well as their mechanical parts.

Step-by-step construction and configuration of a wide range of rotating electrical machines.

Performing rotating magnetic field tests with a compass.

Understanding the differences between DC electric motors, AC electric motors, stepper motors, reluctance motors, among others.

Availability of specific controllers for each type of electric machine, which allows observing its operation in detail.

Diagnosis of possible wiring errors with instruments such as multimeters and analog measuring devices, such as ammeters, voltmeters, frequency meters, and more.

Through this resource, students will be able to clearly visualize both machine components and their interconnection, both in electrical and mechanical terms. The application includes mechanical elements, coils and electrical connection diagrams, enabling students to create and test countless types of electrical machines. Importantly, the machines have protected rotating parts and operate at low voltages, and their characteristics are compatible with equivalent industrial models.

GENERAL DESCRIPTION

The application of Advanced Configurable and Demountable Electrical Machines, "AEL-EMT-KIT", unveils a world of innovation and know-how in the field of electrical engineering. These machines, carefully designed by EDIBON, represent an invaluable tool for theoretical and practical training in the exciting field of design and assembly of rotating electrical machines, both alternating current (AC) and direct current (DC).

In a scenario where electricity plays a central role in our daily lives and in industry, understanding the operation and application of electrical machines is essential. The "AEL-EMT-KIT" stands as an essential educational resource, intended for both students and professionals who wish to acquire a deeper understanding of the fundamental principles of electrical machines.

The "AEL-EMT-KIT" included following elements:

AEL-EMT-KIT/B. Base Unit and Common Modules.

AEL-EMT-KIT/AS. AC Asynchronous Induction Motors.

AEL-EMT-KIT/DC. DC Motors/Generators.

AEL-EMT-KIT/SMG. AC Synchronous Motors/Generators.

AEL-EMT-KIT/MPP. Stepper Motor.

This set of resources not only opens the door to advanced learning in the field of electrical machines, but also fosters understanding and hands-on experimentation, giving users the opportunity to explore and apply the fundamental principles of these vital machines in our electrified society.

AEL-EMT-KIT/B. Base Unit and Common Modules.

The "AEL-EMT-KIT/B" kit is the essential base unit for the construction of any rotary machine. It is the cornerstone of the "AEL-EMT-KIT" set and includes all the common elements necessary for the process. This kit includes:

- BRLA. Compass.
- N-ALI01. Industrial Main Power Supply Module.
- N-ARR12. Direct Starter Module.
- TECNEL/TM. Hand Tachometer.

This kit constitutes the fundamental starting point for the creation and experimentation with rotating electrical machines, and is an essential component of the application "AEL-EMT-KIT."

Configuration example ▶

AEL-EMT-KIT/AS. AC Asynchronous Induction Motors.

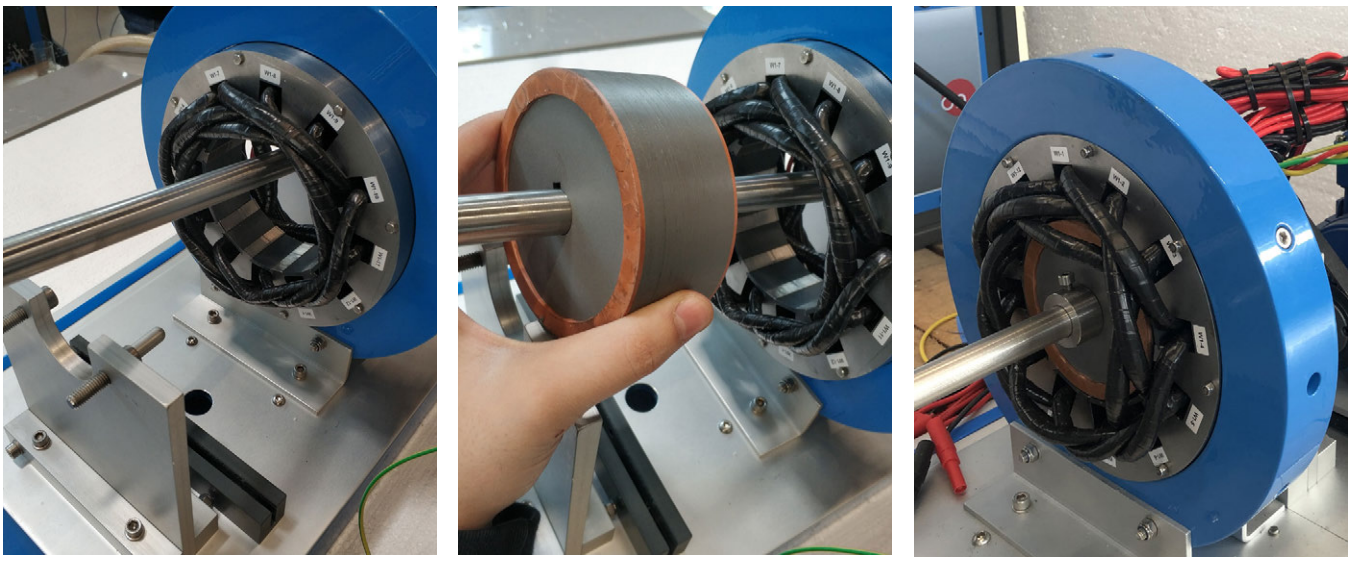
The "AEL-EMT-KIT/AS" kit is specially designed for the study of asynchronous alternating current (AC) induction motors. This kit brings together a selection of mechanical parts that are assembled in a coordinated manner to allow the assembly and operation of different models of asynchronous induction machines. Its main objective is to provide a means for the detailed study of the operation of asynchronous induction motors, understanding their components, the distribution of the stator windings to configure the inductive poles and the possibility of testing the rotating magnetic field of these machines by using a compass.

Users of this kit can carry out the construction and simulation of the real behavior of the following models of electrical machines using the "AEL-EMT-KIT/AS":

Three-phase alternating current induction motor with squirrel cage rotor (2-pole).

Three-phase alternating current induction motor with squirrel cage rotor (4-pole).

This kit provides a valuable tool to explore in depth the operation of alternating current induction motors and their application in industry, offering users the opportunity to perform practical experiments with various models of asynchronous electrical machines.



Assembly of motor stator and rotor

Toolbox for storing all the components

Required elements (Not included):

- N-VVCA/M. AC Motor Speed Controller (Intermediate Option) Module.

Additional recommended elements (Not included):

- N-MED22. AC Voltmeter (0-400 V) Module.
- N-MED10. AC Ammeter (0-5 A) Module.
- N-MED26. Reed Frequency Meter 50 Hz, 400 V.
- N-EALD. Network Analyzer Module with Oscilloscope and Data Acquisition.

AEL-EMT-KIT/DC. DC Motors/Generators.

The "AEL-EMT-KIT/DC" has been meticulously designed for the study of DC motors and generators. This comprehensive kit comprises a collection of mechanical components that are intricately assembled to enable the construction and operation of various models of DC machines. The primary aim of this kit is to explore the inner workings and various components of DC generators and motors, as well as to comprehend the intricacies of independent, series, shunt, and compound electrical connections.

Remarkably versatile, this kit functions in two distinct modes: as a generator and as a motor. With the "AEL-EMT-KIT/DC" at their disposal, users can construct and simulate the real-world behavior of a wide range of electrical machines, including:

DC shunt motor (with and without interpoles).

DC series motor (with and without interpoles).

DC compound motor (with and without interpoles).

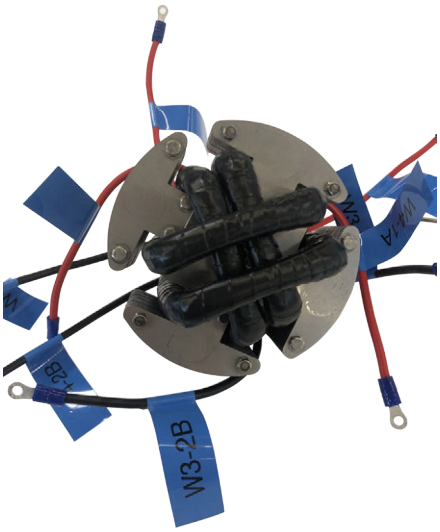
DC shunt generator (with and without interpoles).

DC series generator (with and without interpoles).

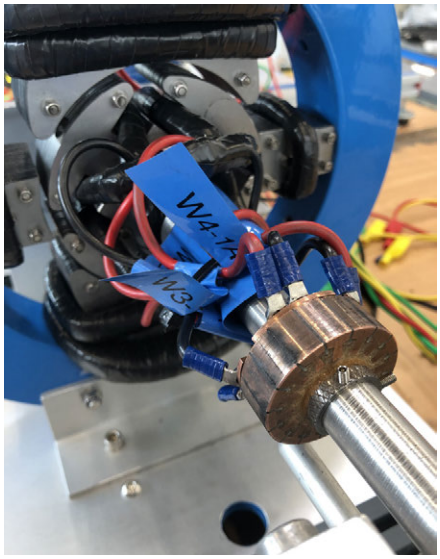
DC compound generator (with and without interpoles).

DC separately excited generator (with and without interpoles).

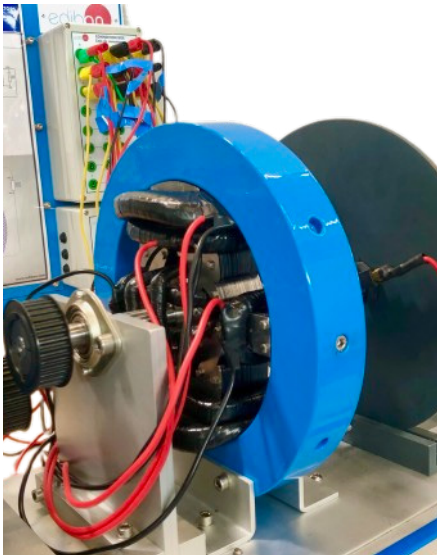
This kit not only facilitates hands-on learning and experimentation but also provides a comprehensive understanding of the operation and configurations of DC motors and generators. It serves as an invaluable resource for students and professionals seeking to delve into the intricacies of direct current electrical machines.



Contruction of DC rotor



Assembly of DC motor/generator



DC motor/generator coupling

Toolbox for storing all the components

Required elements (Not included):

- N-REV. Single-Phase Variable Resistor Module. (2 units)
- N-VVCC/M. DC Motor Speed Controller (Intermediate Option) Module. (2 units)
- N-VVCA/M. AC Motor Speed Controller (Intermediate Option) Module.

Additional recommended elements (Not included):

- N-MED17. DC Voltmeter Module (0-200 V). (2 units)
- N-MED05. DC Ammeter Module (0-15 A). (2 units)
- N-REF. Single Phase Fixed Resistor Module.

AEL-EMT-KIT/SMG. AC Synchronous Motors / Generators.

The "AEL-EMT-KIT/SMG" kit has been meticulously designed for the study of synchronous machines. This kit consists of a series of mechanical parts that are precisely assembled to allow the assembly and operation of various models of synchronous machines.

The main purpose of this kit is to present and demonstrate the operation of synchronous machines found in the market, breaking down their components, how the stator windings are distributed to configure the inductive poles, how the speed of these machines is controlled and how, by using a simple compass, the rotating magnetic field of these machines can be tested.

With the AEL-EMT-KIT/SMG kit, users can assemble and simulate the real behavior of the following models of electrical machines:

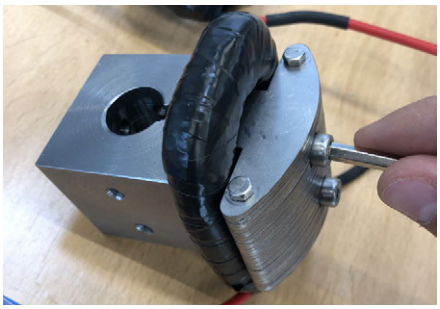
Three-phase AC synchronous motor (2 pole).

Three-phase AC synchronous generator (2 pole).

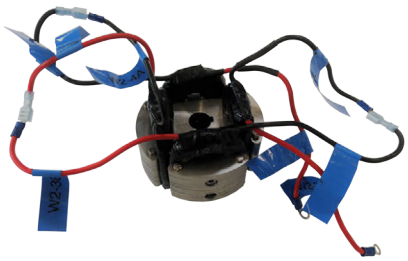
Three-phase AC synchronous motor (4 pole).

Three-phase AC synchronous generator (4 pole).

This kit provides a valuable tool to study synchronous machines in depth, allowing users to carry out practical experiments with different models of synchronous electrical machines and understand their operation in depth.

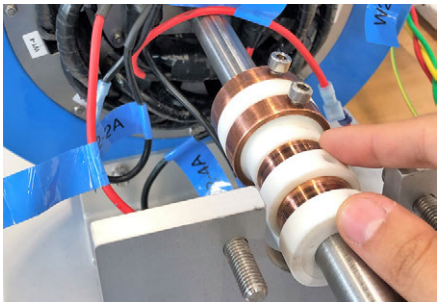


Winding coupling

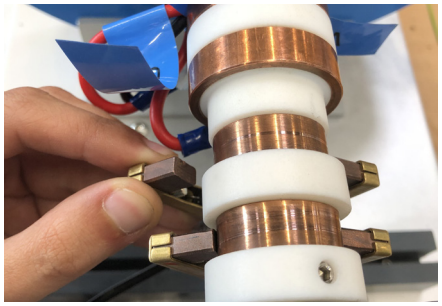


Coils connection

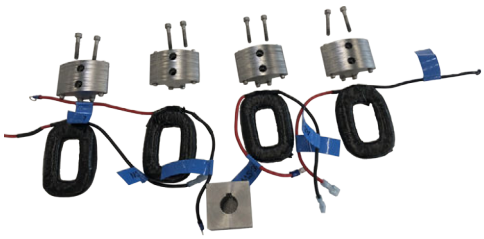
Assembly of AC motor/generator



Assembly of slip rings



Slip rings connection



Rotor, poles and windings

Toolbox for storing all the components

Required elements (Not included):

- N-WCC/M. DC Motor Speed Controller (Intermediate Option) Module.
- N-WCA/M. AC Motor Speed Controller (Intermediate Option) Module.

Additional recommended elements (Not included):

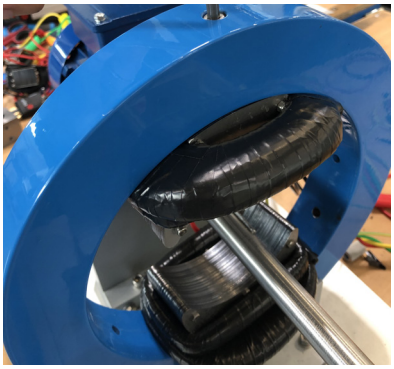
- N-MED22. AC Voltmeter (0-400 V) Module.
- N-MED10. AC Ammeter (0-5 A) Module.
- N-MED26. Reed Frequency Meter Module 50 Hz, 400 V.
- N-MED17. DC Voltmeter Module (0-200 V).
- N-MED05. DC Ammeter Module (0-15 A).
- N-REFT300. 300 Ohms Three-Phase Fixed Resistor Module.
- N-CONT. Three- phase Commutable Capacitive Load Module.

AEL-EMT-KIT/MPP. Stepper Motors.

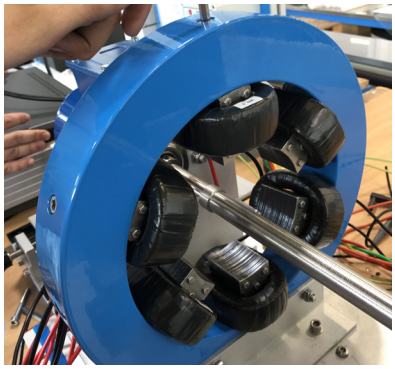
The "AEL-EMT-KIT/MPP" kit has been carefully designed for the study of stepper motors. This kit is composed of a series of detachable parts that are assembled together for the creation and operation of a stepper motor.

The fundamental objective of this kit is to deepen the operation and the different parts that make up a stepper motor. It includes a cross-shaped rotor that allows the motor shaft to rotate by means of a rotating magnetic field controlled by a controller.

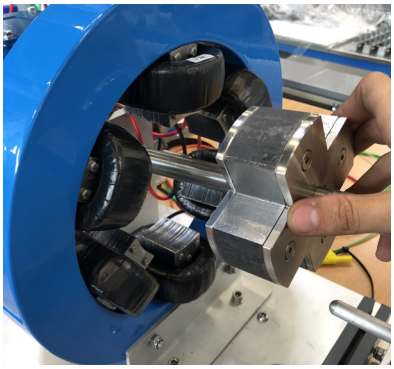
With the AEL-EMT-KIT/MPP, users have the opportunity to explore and understand the detailed operation of stepper motors. This kit provides the ability to build and operate a stepper motor, which facilitates the study of its operation and the interaction between its components, including the rotor and the controller.



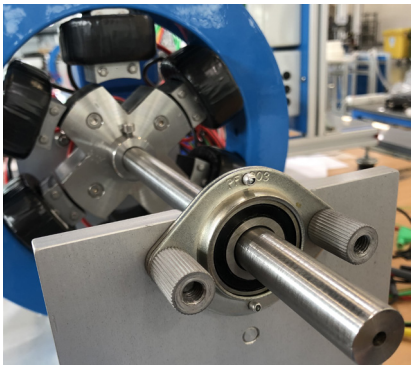
Assembly of poles and windings



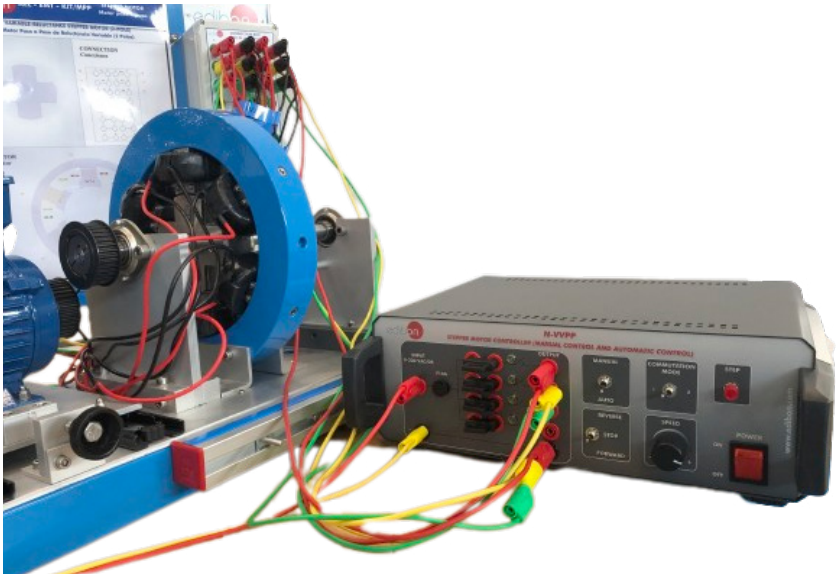
Windings coupling



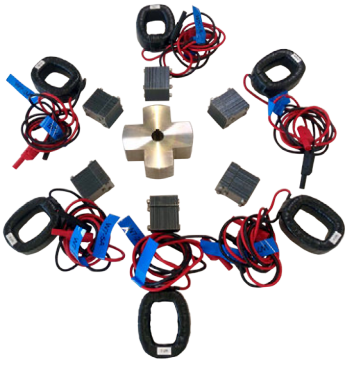
Assembly of rotor



Assembly of rotor



Assembly of stepper motor



Rotor, poles and windings

Toolbox for storing all the components

Required elements (Not included):

- N-VPP. Stepper Motor Controller (manual control and automatic control).
- N-VCC/M. DC Motor Speed Controller (Intermediate Option) Module.

The "AEL-EMT-KIT" included following elements:

AEL-EMT-KIT/B. Base Unit and Common Modules.

- It is formed by:
  - -Frame.
  - -Support ring.
  - -Bearings.
  - -Shaft.
  - -Axle bearings.
  - -Other parts.


BRLA

- BRLA. **Compass.**

- N-ALI01. **Industrial Main Power Supply Module.**
  Supply voltage: 400 VAC, 3PH + N.
  ON / OFF removable key.
  Output voltage connections:
  Three-phase + Neutral: 400 VAC.
  Single-phase: 230 VAC.
  Three-phase supply hose with IP44 3PN+E 32 A 400 V connecting plug.
  Differential magnetothermal 4 poles, 25 A, 30 mA AC 6 KA.
  Emergency stop push-button.


N-ALI01

- N-ARR12. **Direct Starter Module.**
  Nominal voltage: 400 VAC.
  Three input terminals for power supply connection.
  Six output terminals for motor connection.
  Maximum contacts current: 10 A.
  Two ON/OFF switches:
  0: Open circuit.
  Y: Closed circuit.


N-ARR12

- TECNEL/TM. **Hand Tachometer.**
  Two AA batteries.
  Three positions switch to choice the measurement method.
  Speed recording push button.
  Speed measurement push button.
  Disassemble pieces for different shafts.
  Speed digital display.


TECNEL/TM

AEL-EMT-KIT/AS. AC Asynchronous Induction Motors.

It includes:

- Squirrel cage rotor.
  This element consists of a set of circular ferromagnetic sheets that make up the rotor of the induction machine. The squirrel cage, where electrical currents are induced, is inside.
- Crosspiece.
  Ferromagnetic element designed to distribute the magnetic fields of the machine stator in areas of minor reluctance, being able to simulate the behavior of an industrial reluctance motor.
- Stator.
  Slotted mechanical ferromagnetic element. Its aim is to hold the stator windings of the squirrel cage induction motor.
- Induction coils.
  These coils generate the rotating magnetic field of the three-phase induction motor, which can be configured to generate 2 or 4 poles.

Required elements (Not included):

- N-VVCA/M. **AC Motors Speed Controller (Intermediate option).**
  ON / OFF Switch.
  Supply voltage: 230 VAC.
  Nominal power: 750 W.
  PWM output voltage connections:
  Three-phases: 230 VAC.
  10 K, potentiometer for the induction motor control speed.
  Setting and visualization display of the machine parameters.


N-VVCA/M

Additional recommended elements (Not included):

- N-MED22. **AC Voltmeter (0-400 V) Module**.
  Measuring range: 0 – 400 VAC.
  Terminals:
  Measurement terminal.


N-MED22

- N-MED10. **AC Ammeter (0-5 A) Module.**
  Measuring range: 0 – 5 A.
  Terminals:
  Measurement terminal.


N-MED10

- N-MED26. **Reed Frequency Meter Module 50 Hz, 400 V**.
  Nominal voltage: 400 VAC.
  Frequency: 50 Hz.
  Accuracy: 5 Hz.


N-MED26

- N-EALD. **Network Analyzer Module with Oscilloscope and Data Acquisition.**
  The network analyzer module allows fulfilling measurements, displaying and analyzing all the parameters of the AC electrical networks. It has an LCD screen and push-buttons for the navigation through the different menus. It includes specific software for monitoring current and voltage curves, harmonics display, tariffs programming, alarms programming and electrical parameters storage.
  Features:
  Multifunctional three-phase power meter:
  Three-phase and single-phase voltage. Up to 690 VAC L-L.
  Line and neutral nominal current: 10 A.
  Active, reactive and apparent power.
  Suitable frequencies: 25 Hz, 50 Hz, 60 Hz and 400 Hz.
  Display of the V-I vector diagram.
  Supply voltage: 85 – 265 VAC.
  Energy quality control:
  Current and voltage individual harmonics measurement. Up to the 40th harmonic.
  Voltage and current THD, TDD and K-Factor.
  Maximums and minimums display.
  Waveforms display, 128 samples/sec.
  Events and data storage:
  Harmonics analyzer:
  Voltage and current THD, current TDD and K-Factor, up to the 40th harmonic.
  Current and voltage harmonic spectrum and angles.
  Tariff programming:
  Class 0.5S IEC 62053 – 22, active and reactive power in four quadrants.
  Measurement of the total and per phase three-phase active, reactive and apparent powers.
  Usage time, four energy/demand records of total tariffs.
  Eight tariffs, four seasons and four types of days.
  Automatic daily report of energy consumption maximums and minimums.
  Communications:
  RS – 485 communication port.


N-EALD

AEL-EMT-KIT/DC. DC Motors/Generators.

This kit will be able to work in two different modes:

As a generator: the "AEL-EMT-KIT/DC" includes a drive motor or main energy source to work as a generator. It will make the DC generator turn to a velocity specified by the user.

The excitation current of the generator can be controlled by a DC variable power supply or depending on the DC generator configuration (independent, in series, shunt, and compound), it can be auto-excited without the need of a DC variable source.

As a motor: to work as a motor, the user can control field and excitation currents depending on the configuration (independent, series, shunt and compound). Thus, apart from assembling the machine, both the velocity and torque of the machine can be controlled.

It includes:

- Rotor.
  This element consists of a set of ferromagnetic pieces that constitute the rotor of the two-pole synchronous generator. Such poles consist of sheets to reduce the parasitic currents of the machine.
- Commutator with segments.
  It is an essential element in this type of DC motors/generators DC, since its function is to transform the DC current it receives from the rotor winding into AC current. The user can control the current of the machine armature with a variable voltage supply (N-WCC/M. DC Motor Speed Controller).
- Poles and interpoles.
  Ferromagnetic pieces located in the stator of the machine to generate the inductive magnetic field.
- Field winding.
  These windings generate the magnetic field of the DC motor. It includes a main winding and interpoles.
- Drive motor.
  When the AEL-EMT-KIT/DC works as a generator, a prime mover will make the DC machine rotate. The prime mover is controlled through a frequency variator that will allow the user to determine the turning rate of the generator.


N-REV


N-WCC/M


N-WCA/M


N-MED17


N-MED05


N-REF

Required elements (Not included):

- N-REV. **Single-Phase Variable Resistor Module.** (2 units)
  Variable resistor: 150 Ohm.
  Maximum power: 500 W.
  Potentiometer.
  Terminals:
  Three terminals to choose all resistance or variable resistance.
  Fuse: 2 A.

- N-WCC/M. **DC Motor Speed Controller (Intermediate Option) Module.** (2 units)
  Supply voltage: 230 VAC.
  Variable output voltage: 0 – 300 VDC.
  Fuse: 2 A.

- N-WCA/M. **AC Motor Speed Controller (Intermediate Option) Module**.
  ON/OFF Switch.
  Supply voltage: 230 VAC.
  Nominal power: 750 W.
  PWM output voltage connections:
  Three-Phases: 230 VAC.
  10 K, potentiometer for the induction motor control speed.
  Setting and visualization display of the machine parameters.

Additional recommended elements (Not included):

- N-MED17. **DC Voltmeter Module (0-200 V)**. (2 units)
  Measuring range: 0 – 200 VDC.
  Terminals:
  Measurement terminal.

- N-MED05. **DC Ammeter Module (0-15 A)**. (2 units)
  Measuring range: 0 – 2 A.
  Fuse: 3 A.
  Terminals:
  Measurement terminal.

- N-REF. **Single Phase Fixed Resistor Module**.
  Value: 150 Ohm.
  Maximum power: 500 W.
  Switch:
  Position 0: circuit opened.
  Position 1: circuit closed.
  Fuse: 2 A.

AEL-EMT-KIT/SMG. AC Synchronous Motors/Generators.

It includes:

- Rotor.

  This element consists of a set of ferromagnetic pieces that constitute the rotor of the two-pole synchronous generator. Such poles consist of sheets to reduce the parasitic currents of the machine.

- Slip ring.

  The slip rings collector is an essential element in this type of synchronous generators, since its function is to excite the rotor of the machine by injecting a DC current. The user can control the excitation level of the machine through a variable voltage source (N-VVCC/M. DC Motor Speed Controlled).

- Stator.

  Slotted mechanical ferromagnetic element. Its aim is to hold the stator windings of the squirrel cage induction motor.

- Stator coils.

  These coils generate the electrical energy generated by the generator. 12 induction coils are configured in such a way that the result is a two pairs of poles generator.

- Induction coils.

  These coils generate the rotating magnetic field of the synchronous generator. 4 induction coils are configured to generate two pairs of magnetic poles that will induce the three-phase currents on the stator of the machine.

- Drive motor.

  Squirrel cage induction motor used to move the synchronous motor. This motor will enable to control the turning speed and mechanical power supplied to the synchronous generator.

Required elements (Not included):

- N-VVCC/M. **DC Motor Speed Controller (Intermediate Option) Module**.

  Supply voltage: 230 VAC.
  Variable output voltage: 0 – 300 VDC.
  Fuse: 2 A.


N-VVCC/M

- N-VVCA/M. **AC Motor Speed Controller (Intermediate Option) Module**.

  ON/OFF Switch.
  Supply voltage: 230 VAC.
  Nominal power: 750 W.
  PWM output voltage connections:
  Three-Phases: 230 VAC.
  10 K, potentiometer for the induction motor control speed.
  Setting and visualization display of the machine parameters.


N-VVCA/M

Additional recommended elements (Not included):

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

  Measuring range: 0 – 400 VAC.
  Terminals:
  Measurement terminal.


N-MED22

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

  Measuring range: 0 – 5 A.
  Terminals:
  Measurement terminal.


N-MED10

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

  Nominal voltage: 400 VAC.
  Frequency: 50 Hz.
  Accuracy: 5 Hz.


N-MED26

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

  Measuring range: 0 – 200 VDC.
  Terminals:
  Measurement terminal.


N-MED17

- N-MED05. **DC Ammeter Module (0-15 A)**.
  Measuring range: 0 – 2 A.
  Fuse: 3 A.
  Terminals:
  Measurement terminal.


N-MED05

- N-REFT300. **300 Ohms Three-Phase Fixed Resistor Module**.
  Nominal voltage: 400 VCA.
  Resistance: 3x 300 Ohm.
  Nominal power: 3x 200 W.
  Manual switch to turn on / off resistors.
  Fuses: 3x 5 A.
  Terminals:
  Three input terminals (3PH).
  Three output terminals (3PH).


N-REFT300

- N-CONT. **Three-phase Commutable Capacitive Load Module**.
  Nominal voltage: 400 VAC.
  Capacitance: 3x 7 μF.
  Manual switch to turn on / off capacitors.
  Fuses: 3x 4 A.
  Terminals:
  Four Input Terminals (3PH+N).
  Four Output Terminals (3PH+N).


N-CONT

AEL-EMT-KIT/MPP. Stepper Motor.
It includes:
- Crosspiece.
  This element includes a set of ferromagnetic pieces that make up the rotor of the DC motor.
- Poles.
  Six inductive poles geometrically located opposite each other to set a rotating magnetic field.

Required elements (Not included):
- N-WPP. **Stepper Motor Controller (manual control and automatic control)**.
  Supply Voltage: 230 VAC.
  Outputs: 4.
  Output Type: Relay.
  Output: 2 A.
  Single-phase: 220 V; 6.3 VA.


N-WPP

- N-WCC/M. **DC Motor Speed Controller (Intermediate Option) Module.**
  Supply voltage: 230 VAC.
  Variable output voltage: 0 – 300 VDC.
  Fuse: 2 A.


N-WCC/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

AEL-EMT-KIT/AS. AC Asynchronous Induction Motors:

1.- Recognition of the mechanical parts of a three-phase induction motor of squirrel cage.
2.- Construction of a three-phase induction motor of squirrel cage (2 pole), step by step.
3.- Construction of a three-phase induction motor of squirrel cage (4 pole), step by step.
4.- Measurement of the starting and running currents.
5.- Complete wiring of the stator wounds according to the electrical machines theory.

AEL-EMT-KIT/DC. DC Motors/Generators:

6.- Recognition of the mechanical parts of DC motors/generators .
7.- Construction of a DC shunt motor (with and without interpoles).
8.- Construction of a DC series motor (with and without interpoles).
9.- Construction of a DC compound motor (with and without interpoles).
10.-Construction of a DC shunt generator (with and without interpoles).
11.-Construction of a DC series generator (with and without interpoles).
12.-Construction of a DC compound generator (with and without interpoles).
13.-Construction of a DC separately excited generator (with and without interpoles).
14.-Complete wiring of all DC motors / generators according to theory.

AEL-EMT-KIT/SMG. AC Synchronous Motors / Generators:

15.-Recognition of the mechanical parts of synchronous motors/ generators.
16.-Construction of a three-phase AC synchronous motor (2 pole).
17.-Construction of a three-phase AC synchronous generator (4 pole).
18.-Measurement of the current excitation.
19.-Measurement of the voltage generation in function of the speed of the generator.
20.-Measurement of the voltage generation in function of the current excitation.

AEL-EMT-KIT/MPP. Stepper Motor:

21.-Construction of a stepper motor.
22.-Speed control of the stepper motor.

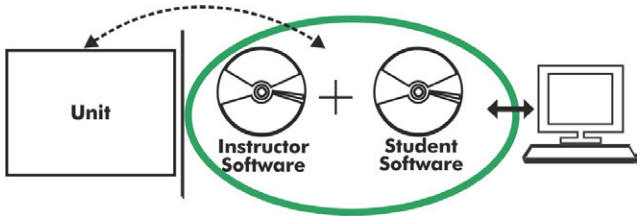
REQUIRED SERVICES

- Electrical supply: three-phase, 380 VAC – 400 VAC/50 Hz or 190 VAC – 240 VAC/60 Hz, 20 kW.

DIMENSIONS AND WEIGHTS

AEL-EMT-KIT:
-Dimensions: 1500 x 500 x 400 mm approx.
(59.05 x 19.68 x 15.74 inches approx.)
-Weight: 40 Kg approx.
(88.18 pounds approx.).

AEL-EMT-KIT/ICAI. Interactive Computer Aided Instruction Software:



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.

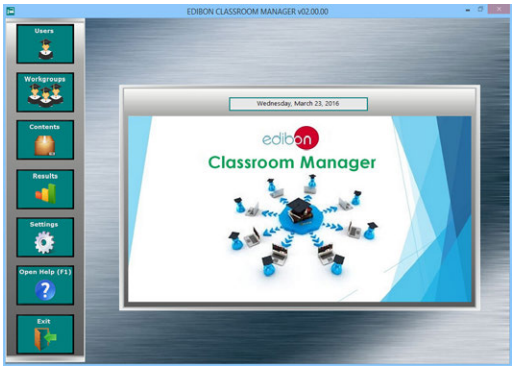
Instructor Software

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

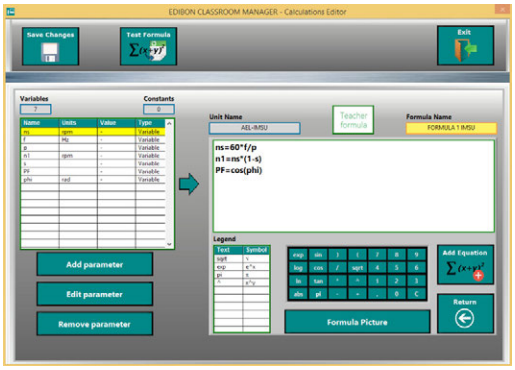
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

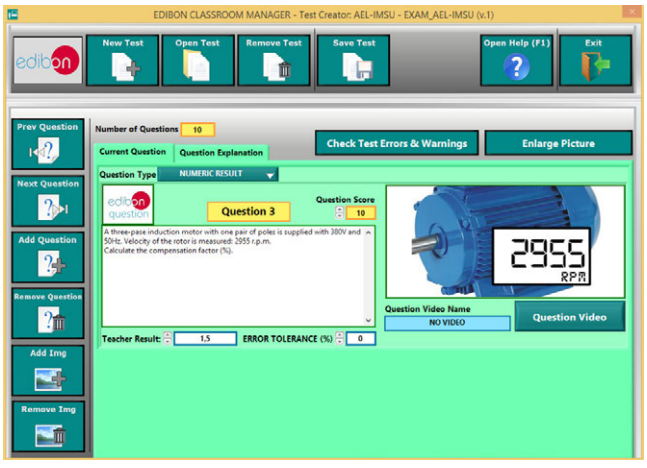
- **User Data Base Management.**
- **Administration and assignment of Workgroup, Task and Training sessions.**
- **Creation and Integration of Practical Exercises and Multimedia Resources.**
- **Custom Design of Evaluation Methods.**
- **Creation and assignment of Formulas & Equations.**
- **Equation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



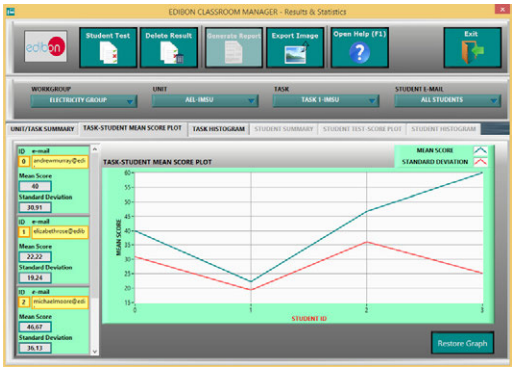
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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).

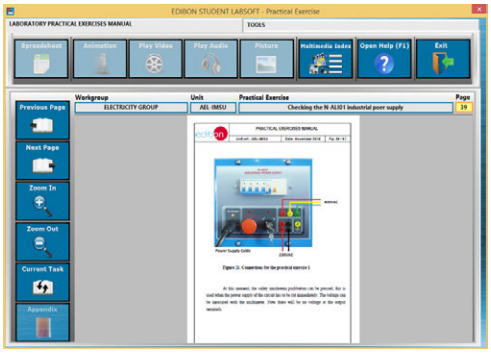
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are 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.**

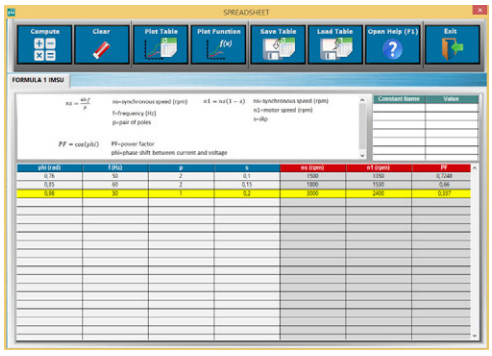
For more information see **ICAI** catalogue. Click on the following link:
www.edibon.com/en/interactive-computer-aided-instruction-software

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: