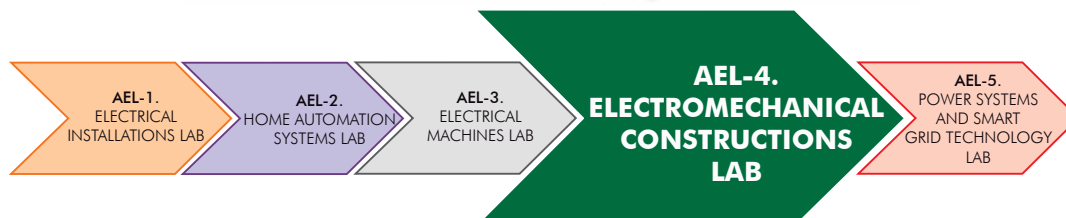




www.edibon.com

Products
Products range
Units
4.-Electricity



Key features:

- ▶ **SCADA Control System.**
- ▶ **Specialized EDIBON Softwares, based on Labview, for:**
 - SCADA Control Software.
 - Data Acquisition Software.
 - Computer Aided Instruction Software.
 - ... and others.
- ▶ **Touch Screens and computers.**
- ▶ **Functional and self contained Electrical Workbench with instrumentation panel with all the required elements to supply power and control in the workbench.**
- ▶ **Intuitive, quick and accurate interaction of the user with the Electrical Workbench.**
- ▶ **Complete and functional training solution for electricity learning purposes.**
- ▶ **Covering all areas of electricity field.**
- ... and others possibilities.



ISO 9000: Quality Management
(for Design, Manufacturing,
Commercialization and After-sales service)



European Union Certificate
(total safety)

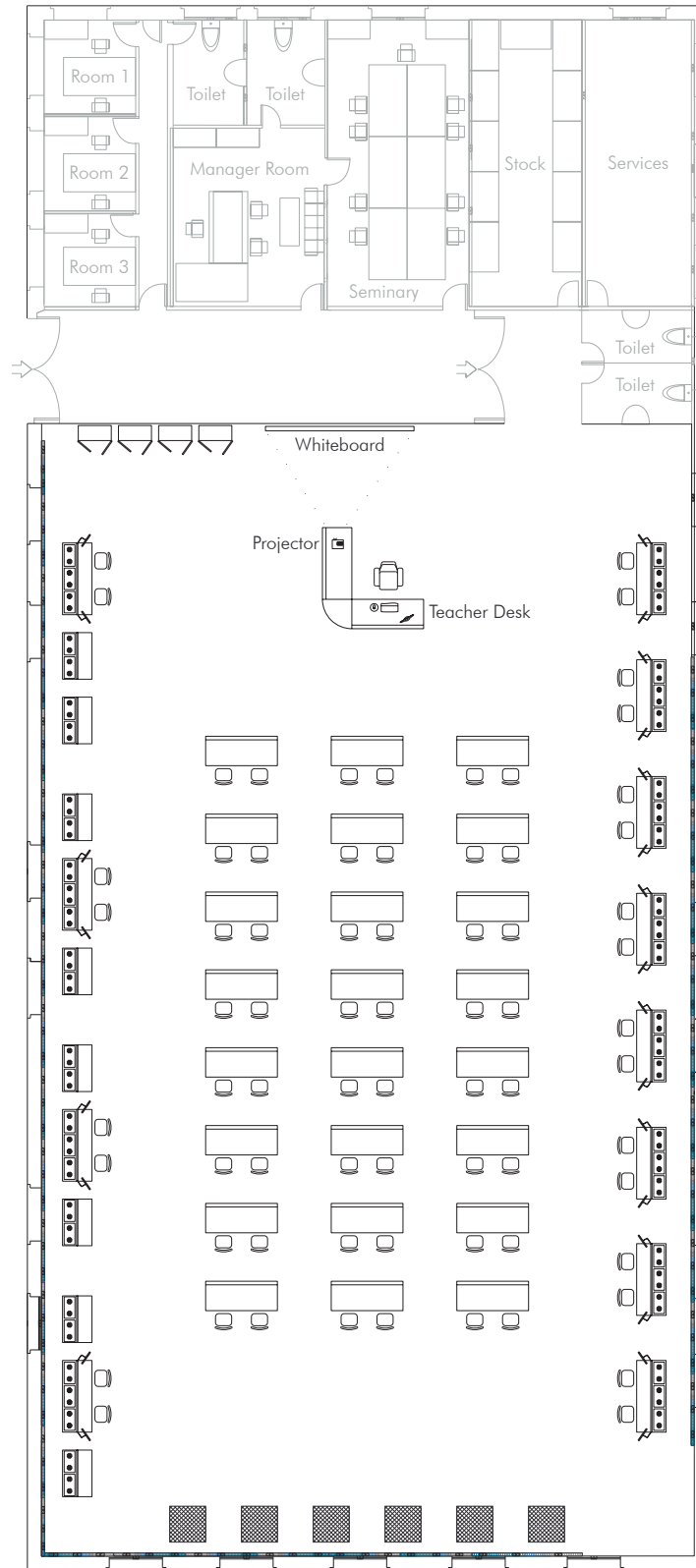







Certificates ISO 14000 and
ECO-Management and Audit Scheme
(environmental management)



Worlddidac Quality Charter
Certificate and
Worlddidac Member

Classroom and Laboratory Lay Out



-  AEL-WTS. Laboratory Workplace Table
-  AEL-WBC. Electrical Workbench (Rail) + 2 x AEL-PC. Two Touchscreen and computers
-  AEL-WBM. Electrical Workbench (Mobile)
-  AEL-MC. Multipurpose Cabinet
-  AEL-WIC. Electrical Installations Cabinet

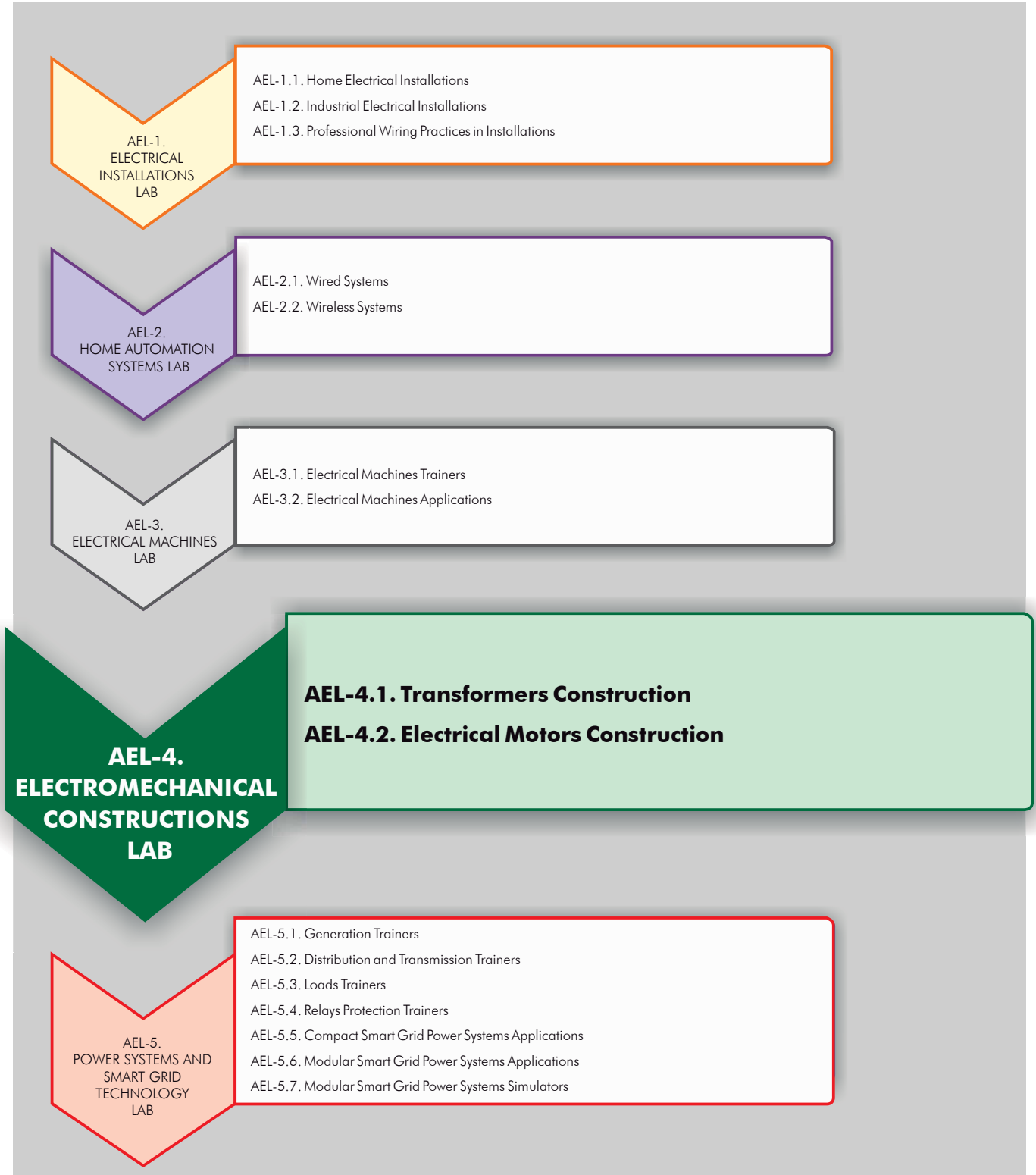
EDIBON, a company with more than 35 years of experience designing and implementing training systems, has a wide variety of applications adapted to XXI century new technologies.

Apart from providing a solid theoretical basis, EDIBON units and trainers are aimed at technical professional training, vocational training, for higher education and even applied research, as well as at the improvement in all fields through advanced systems.

The electricity area includes five great groups that cover Electrical Installations, Home Automation Systems, Electrical Machines, **Electromechanical Constructions**, Power Systems and Smart Grid Technology.

All the units have a modular and intuitive design, with real elements used in the industry and technological market.

In this catalogue we will cover "AEL-4. Electromechanical Constructions Lab."



AEL-4. Electromechanical Constructions Lab

The AEL-4. Electromechanical Constructions Lab is formed by:

AEL-WBC. Electrical Workbench (Rail)



AEL-WBR. Electrical Workbench (Rack)



+

Applications
(to be mounted on rail)



AEL-AD33



AEL-AD3A

...



AEL-AD33 + N-RACK-A



AEL-AD3A + N-RACK-A

...

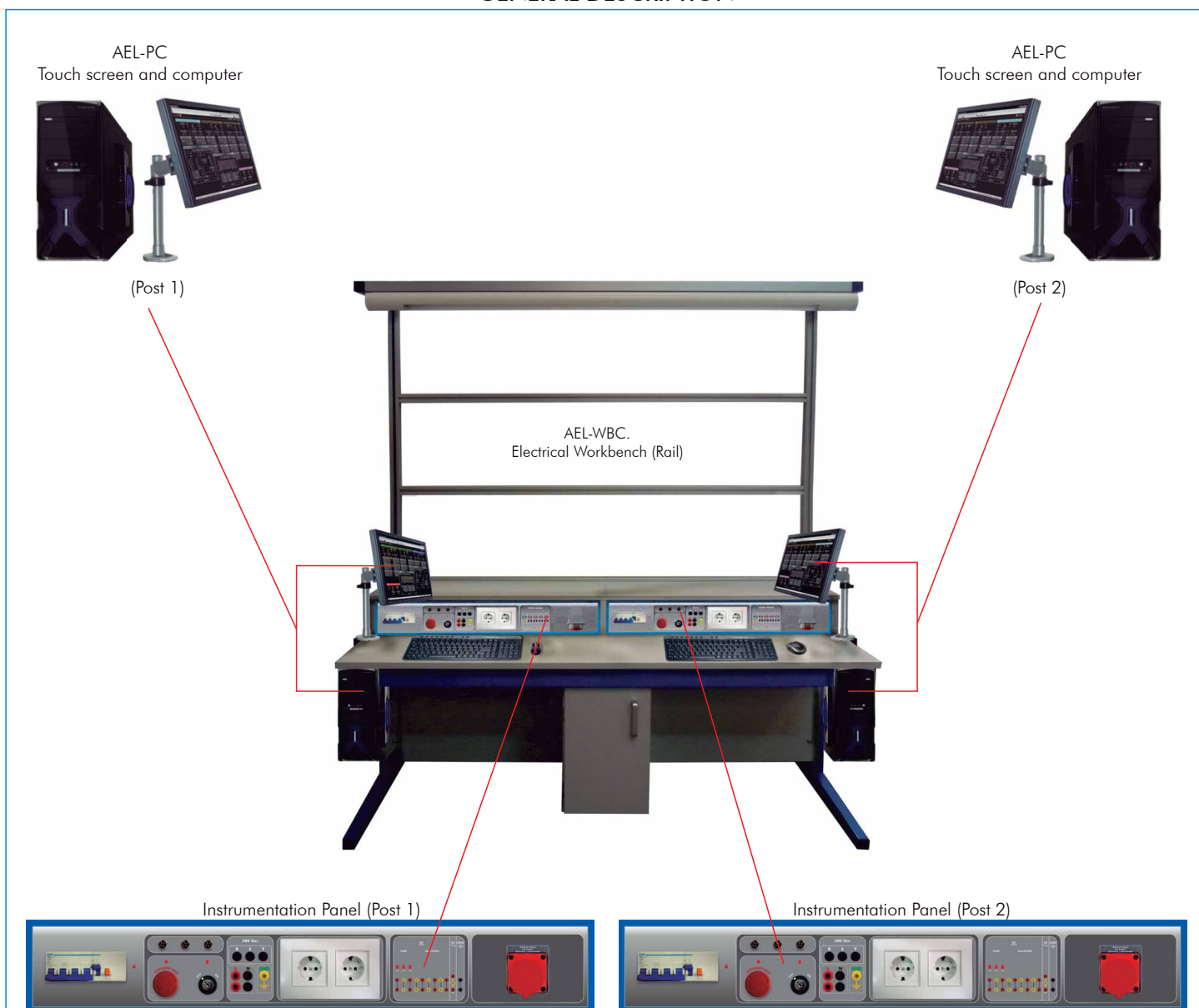
+

Software packages



Electrical Workbench

GENERAL DESCRIPTION



The Electrical Workbench has been designed to offer the students and teachers the necessary tools to learn and teach about the XXI century technologies.

The Electrical Workbench consists of:

Furniture, itself:

Consists of the frame that allows to locate the applications, lighting fitting, table, supports, etc.

Instrumentation Panel:

The workbench has been designed to be used by one or two students. Each student has access to its own instrumentation panel.

There are two Electrical Workbench versions:

AEL-WBC. Electrical Workbench (Rail).

The AEL-WBC is a workbench designed with rails in order to put and remove all electrical modules free.

AEL-WBR. Electrical Workbench (Rack).

The AEL-WBR is a workbench designed with strong rack in order to fix all electrical modules.

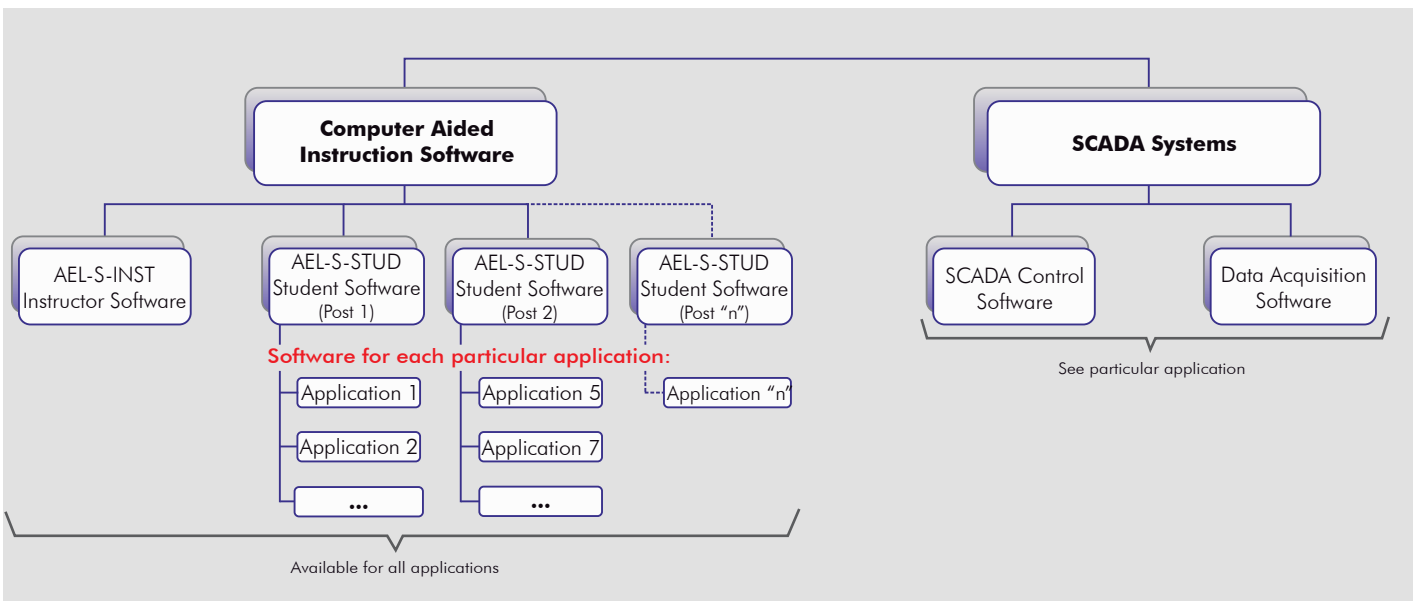
Optional:

Touch screen and computer (AEL-PC):

The workbench can be supplied with one or two touch screens and computers. Thus, both students and teachers gain quick access to the applications to control them better, obtaining the maximum man-machine interaction.

In summary, technology, quality and aesthetics are combined in this piece of furniture in order to offer the best features for both research and teaching fields.

Software packages GENERAL DESCRIPTION



EDIBON has different software packages to provide students the maximum level in training systems.

Computer Aided Instruction Software

- AEL-S-INST. Instructor Software:

This software is recommended as a comprehensive, multi-level, instructional tool that directs students to work independently and at their own speed, while also freeing the instructor to provide specific guidance whenever needed.

- AEL-S-STUD. Student Software:

This software includes theory about the applications and assesses the students' knowledge through tests and exams.

NOTE: Will be necessary acquire a license per student.

SCADA Systems

- SCADA. Control Software:

Software designed to control different applications that require an advance control system, such as generation systems remote control, distribution systems with control over power flows and isolating switches, etc. It is included if the application required it.

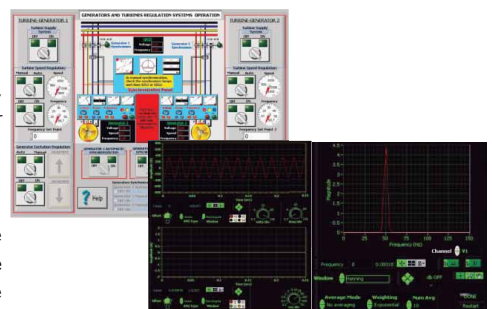
- Data Acquisition Software:

This software has been designed to acquire different signals to know the state of the processes. For example, to study the dynamic characteristics of an induction squirrel cage motor, the data acquisition system allows to monitor, in real time, the mechanical torque curves, speed, electrical power, etc. to obtain thus all the electrical parameters of the machine. It is included if the application required it.

Example of some Software Screens:



Computer Aided Instruction Software screens



SCADA Control and Data Acquisition Softwares screens

List of Applications

AEL-4. ELECTROMECHANICAL CONSTRUCTIONS LAB	
AEL-4.1. Transformers Construction	AEL-4.2. Electrical Motors Construction
<p style="text-align: center;"><u>Applications</u></p> <p>Single-Phase Transformers Construction</p> <ul style="list-style-type: none"> •AEL-SPTC. Single-Phase Transformer Construction Kit. <p>Three-Phase Transformers Construction</p> <ul style="list-style-type: none"> •AEL-TPTC. Three-Phase Transformer Construction Kit. <p>Professional Practices in wiring Transformers</p> <ul style="list-style-type: none"> •AEL-PSPTC. Single-Phase Transformer wiring. •AEL-PTPTC. Three-Phase Transformer wiring. 	<p style="text-align: center;"><u>Applications</u></p> <p>Cut Away Electrical Motors</p> <ul style="list-style-type: none"> •AEL-EMT1-S. Cut away DC independent excitation motor-generator. •AEL-EMT2-S. Cut away DC series excitation motor-generator. •AEL-EMT3-S. Cut away DC shunt excitation motor-generator. •AEL-EMT4-S. Cut away DC compound excitation motor-generator. •AEL-EMT5-S. Cut away DC shunt-series compound excitation motor. •AEL-EMT6-S. Cut away AC synchronous three-phase motor alternator. •AEL-EMT7-S. Cut away asynchronous three-phase motor of squirrel cage. •AEL-EMT8-S. Cut away asynchronous three-phase motor with wound rotor. •AEL-EMT9-S. Cut away Dahlander three-phase motor. •AEL-EMT10-S. Cut away asynchronous three-phase motor of two independent speeds. •AEL-EMT11-S. Cut away asynchronous single-phase motor with starting capacitor. •AEL-EMT12-S. Cut away universal motor. •AEL-EMT14-S. Cut away repulsion motor, single-phase with short circuited brushes. •AEL-EMT15-S. Cut away DC permanent magnet motor. •AEL-EMT16-S. Cut away asynchronous single-phase motor with starting and running capacitor. •AEL-EMT17-S. Cut away asynchronous three-phase motor of squirrel cage with "Y" connection. •AEL-EMT18-S. Cut away DC Brushless motor. •AEL-EMT19-S. Cut away stepper motor. •AEL-EMT20-S. Cut away asynchronous single-phase motor with split phase. •AEL-EMT21-S. Cut away three-phase reluctance motor. •AEL-EMT22-S. Cut away single-phase shaded pole motor. <p>Transparent and Functional Electrical Motors</p> <ul style="list-style-type: none"> •AEL-EMT1-T. Transparent and functional DC independent excitation motor-generator. •AEL-EMT2-T. Transparent and functional DC series excitation motor-generator. •AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator. •AEL-EMT4-T. Transparent and functional DC compound excitation motor-generator. •AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator. •AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator. •AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage. •AEL-EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor. •AEL-EMT9-T. Transparent and functional Dahlander three-phase motor. •AEL-EMT10-T. Transparent and functional asynchronous three-phase motor of two independent speeds. •AEL-EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacitor. •AEL-EMT12-T. Transparent and functional universal motor. •AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushes. •AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting and running capacitor. •AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage with "Y" connection. •AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase. •AEL-EMT21-T. Transparent and functional three-phase reluctance motor. •AEL-EMT22-T. Transparent and functional single-phase shaded pole motor. <p>Removable Electrical Motors</p> <ul style="list-style-type: none"> •AEL-DIM-KIT. 4 Disassembly Induction Motors Kit. •AEL-TPIC. Three-Phase Induction Motor Construction. •AEL-SPIC. Single-Phase Induction Motor Construction with starting and running capacitor. •AEL-DCMC. DC Motor Construction. <p>Dissectable and Configurable Electrical Motors System</p> <ul style="list-style-type: none"> •AEL-EMT-KIT. Advanced Dissectable and Configurable Electrical Machines. <p>Professional practices in wiring Electrical Motors</p> <ul style="list-style-type: none"> •AEL-PSPIM. Single-Phase Induction Motor wiring. •AEL-PTSIM. Three-Phase Induction Motor wiring.

The Electromechanical Constructions Lab (AEL-4) is focused on the practical study of transformers and electric motors construction. This covers all the issues concerning detachable electric machines and transformers, electric motors construction and professional practices in wiring electrical machines.

The complete Electromechanical Constructions Lab (AEL-4) includes:

- Electrical Workbench.
- Software packages.
- Applications.

Electrical Workbench:

There are two Electrical Workbench versions:

AEL-WBC. Electrical Workbench (Rail).

The AEL-WBC is a workbench designed with rails in order to put and remove all electrical modules free. The frame consists of three levels to get a maximum space for the modules and applications. Besides, the user can put and remove manually all electrical modules and make free configurations to construct different applications.

The advantage of this workbench is that all modules can be put and removed free and quick, so the student can change quickly to other practical exercises.

AEL-WBR. Electrical Workbench (Rack).

The AEL-WBR is a workbench designed with strong rack in order to fix all electrical modules. Each module will be fixed with screws. The frame consists of three racks to support different applications.

The advantage of this workbench is that all applications are perfectly covered to get a homogeny and strong unit.



The Electrical Workbench is ready to use Specialized EDIBON Softwares, based on Labview, for:

- SCADA Control Software.
- Data Acquisition Software.
- Computer Aided Instruction Software.
- ...others.

It is a complete and functional training solution for electricity learning purposes, with intuitive, quick and accurate interaction of the user with the Electrical Workbench.

It is a functional and self contained Electrical Workbench, with wide working area for several applications, with instrumentation panel including all the required elements to supply power and control in the workbench.

The Electrical Workbench is mainly formed by:

Furniture, itself:

- Formed by the frame that allows to allocate the applications, lighting fitting, table, supports, etc.
- Dimensions: 2000 x 1000 x 1900 mm approx.

Instrumentation Panel:

- 2 x Control and supply panels.
- Three-phase and single-phase power systems.
- Independent Residual Circuit Breaker (RCB).
- Two single-phase sockets.
- Different level control voltages for signals applications.
- Integrated lighting system.

Technical data:

- 1 x Differential Protection, 1 x Emergency Stop Button and 1 x Safety Key.
- Power Terminal Connections: 1 x Three-phase terminals: 380 Vac + N+ GND and 1 x Single-phase terminals: 230 Vac + GND and 2 x Single-phase plugs + 2 x Three-phase plugs.
- Control terminals: 2 x 24 Vac., 2 x (+24) Vdc., 2 x (+12) Vdc., 2 x (-12) Vdc. and 2 x (+5) Vdc.
- Power Supply required: 380 Vac 3PH + N + GND.

Optional:

- Touch screen and computer (AEL-PC).
- The workbench can be supplied with one or two touch screens and computers.

Software packages:**Computer Aided Instruction Software:****AEL-S-INST. Instructor Software:**

It is software designed for the teacher. The teacher can administrate the classroom and students, schedule specific task for single student or groups, follow the progress of the class through the practical exercises and tests. It is composed of:

Student Manager:

- Administration of an unlimited number of students and courses.
- Addition, deletion and editing of students and student data.

Classroom Editor:

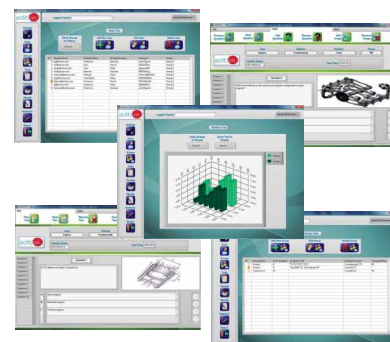
- Wizard for creation of new courses.
- Addition, deletion and editing of student groups.
- Creating, deletion and editing courses.
- Assignment of students to classes.
- Assignment of Scheduled practical exercises and tests to students or classes.

Test & Questioner Creator:

- Creating, deletion and editing custom test.
- Programming of the number of questions, number of answers, time to perform the test and more.
- Specific questions or an arbitrary set of question taken from a database.
- Test preview.
- Insertion of graphics, animations and tables.
- Insertion of test questions.
- Editing questions.
- Seven different types of question: single and multiple choice, missing text, assignment, matrices, arbitrary text, selection of images.
- Ability to input meta data (points, time for questions, difficulty, etc.)

Reporter & Static Results:

- Presentation of the results, selecting users, groups, tests or a mix.
- Statistics of users or groups, to view the evolution and progress.
- Graphical presentation of progress in courses and tests.
- Reports on courses, tests, single user or classes.
- Summary of results and time.
- Calculation of average results for groups

**AEL-S-STUD. Student Software:**

It allows students to complete practical exercises with a PC. It loads programmatically practical exercises scheduled by the teacher, allows student to do test and view the results obtained. To help to follow the practical exercises, it provides gadgets such as animation loaders, video help players and more. It software are composed of:

Registration:

- Easy student registration.

Practical Exercise:

- Automatically load of practical exercise files (PDFs) scheduled by the teacher by date, classroom or course.
- Windows Calculator and Notepad integration.
- Default web browser integration.
- Custom Spreadsheet. This gadgets loads a file containing the information about the most common equations used in each practical exercise. It has the following features:
 - Allows the student to fill the table and computes student input data.
 - It can load and save tables with full data.
 - It can plot the table data linking with two variables.
 - It can plot the equations used in the practical test.
 - It can export data to an XLS file.

Allows student to record an audio or a video and send it to the teacher.

The student can load additional help, such as PDFs, GIFs, Flash animations or videos.

Student and teacher can chat through the application.

Exercises:

- Student can perform provided tests, or customized tests created by the teacher.

Result Viewer:

- Students can see the results obtained on their tests attempts.
- Summary of single user results and time.
- Reports on single user results.



Applications:

AEL-4.1

Transformers Construction

Single-Phase Transformers Construction

AEL-SPTC. Single-Phase Transformer Construction Kit

This Single-Phase Transformer Construction Kit allows the student to construct and operate Single-phase transformers.

The AEL-SPTC has been designed to show students how a Single-phase transformer is constructed step by step.

It includes the single-phase transformer core (STC) and manufactured coils and the necessary elements to construct the transformer.

See additional elements at the beginning of the catalogue.

Optional:

- N-ACPWS. AC Motor Power Supply.
In order to carry out the tests.
- MWMT. Manual Winding Machine for Motors and Transformers (to design coils).
- N-MED65. Digital Multimeter.

Some practical possibilities:

- 1.- Step by step construction of a single-phase transformer.
- 2.- Study of different parts of a single-phase transformer.

Additional practical possibilities (with the optional modules):

With the optional modules it is possible to carry out different tests, such as putting the units into operation, measuring the transformer ratio, etc.

- 3.- Measurement of the transformer coils.
- 4.- Testing of the single-phase transformer after the construction.
- 5.- Measurement of the different voltages in the primary and secondary wounds.
- 6.- Designing different types of coils using a winding machine.

Three-Phase Transformers Construction

AEL-TPTC. Three-Phase Transformer Construction Kit

This Three-Phase Transformer Construction Kit allows the student to construct and operate three-phase transformers.

The AEL-TPTC has been designed to show students how a three-phase transformer is constructed step by step.

It includes the three-phase transformer core (TTC) and manufactured coils and the necessary elements to construct the transformer.

See additional elements at the beginning of the catalogue.

Optional:

- N-ACPWS. AC Motor Power Supply.
In order to carry out the tests.
- MWMT. Manual Winding Machine for Motors and Transformers (to design coils).
- N-MED65. Digital Multimeter.

Some practical possibilities:

- 1.- Step by step construction of a three-phase transformer.
- 2.- Study of different parts of a three-phase transformer.

Additional practical possibilities (with the optional modules):

With the optional modules it is possible to carry out different tests, such as putting the units into operation, measuring the transformer ratio, etc.

- 3.- Measurement of the transformer coils.
- 4.- Testing of the three-phase transformer after the construction.
- 5.- Measurement of the different voltages in the primary and secondary wounds.
- 6.- Designing different types of coils using a winding machine.

Applications:

AEL-4.1
Transformers Construction

Professional Practices in wiring Transformers

AEL-PSPTC. Single-Phase Transformer wiring

The AEL-PSPTC allows the student to wire step by step a single-phase transformer.

The AEL-PSPTC includes:

- STC. Single-phase transformer core.
- N-MED65. Digital Multimeter. (2 units)
- MWMT. Manual Winding Machine for Motors and Transformers (to construct the coils).
- N-ALI02. Main Power Supply.
- N-REF. Resistor Load with commutator.
- N-AUTR. Variable Auto-Transformer.

Some practical possibilities:

- 1.- Construction of a single-phase transformer.
- 2.- Manufacturing of the coils for the transformer.
- 3.- Testing the transformer without load.
- 4.- Testing the transformer with load.
- 5.- Measurement of electrical parameters.

The application AEL-PSPTC 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.

See additional elements at the beginning of the catalogue.

AEL-PTPTC. Three-Phase Transformer wiring

The AEL-PTPTC allows the student to wire step by step a three-phase transformer.

The AEL-PTPTC includes:

- TTC. Three-phase transformer core.
- N-MED65. Digital Multimeter. (2 units)
- MWMT. Manual Winding Machine for Motors and Transformers (to construct the coils).
- N-ALI01. Industrial Main Power Supply.
- N-REFT. Three-phase Resistor Load with commutator.
- N-AUTR3PH. Three-phase Variable Auto-transformer.

Some practical possibilities:

- 1.- Construction of a three-phase transformer.
- 2.- Manufacturing of the coils for the transformer.
- 3.- Testing the transformer without load.
- 4.- Testing the transformer with load.
- 5.- Measurement of electrical parameters.

The application AEL-PTPTC can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

- N-RACK-M.
- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Applications:

AEL-4.2
Electrical Motors Construction

— Cut Away Electrical Motors —

AEL-EMT1-S. Cut away DC independent excitation motor-generator

It includes a Cut away DC independent excitation motor-generator (EMT1-S) in order to study the different parts of this motor type.

AEL-EMT2-S. Cut away DC series excitation motor-generator

It includes a Cut away DC series excitation motor-generator (EMT2-S) in order to study the different parts of this motor type.

AEL-EMT3-S. Cut away DC shunt excitation motor-generator

It includes a Cut away DC shunt excitation motor-generator (EMT3-S) in order to study the different parts of this motor type.

AEL-EMT4-S. Cut away DC compound excitation motor-generator

It includes a Cut away DC compound excitation motor-generator (EMT4-S) in order to study the different parts of this motor type.

AEL-EMT5-S. Cut away DC shunt-series compound excitation motor

It includes a Cut away DC shunt-series compound excitation motor (EMT5-S) in order to study the different parts of this motor type.

AEL-EMT6-S. Cut away AC synchronous three-phase motor alternator

It includes a Cut away AC synchronous three-phase motor alternator (EMT6-S) in order to study the different parts of this motor type.

AEL-EMT7-S. Cut away asynchronous three-phase motor of squirrel cage

It includes a Cut away asynchronous three-phase motor of squirrel cage (EMT7-S) in order to study the different parts of this motor type.

AEL-EMT8-S. Cut away asynchronous three-phase motor with wound rotor

It includes a Cut away asynchronous three-phase motor with wound rotor (EMT8-S) in order to study the different parts of this motor type.

AEL-EMT9-S. Cut away Dahlander three-phase motor

It includes a Cut away Dahlander three-phase motor (EMT9-S) in order to study the different parts of this motor type.

AEL-EMT10-S. Cut away asynchronous three-phase motor of two independent speeds

It includes a Cut away asynchronous three-phase motor of two independent speeds (EMT10-S) in order to study the different parts of this motor type.

AEL-EMT11-S. Cut away asynchronous single-phase motor with starting capacitor

It includes a Cut away asynchronous single-phase motor with starting capacitor (EMT11-S) in order to study the different parts of this motor type.

images of some motors



Applications:

AEL-4.2
Electrical Motors Construction

Cut Away Electrical Motors

AEL-EMT12-S. Cut away universal motor

It includes a Cut away universal motor (EMT12-S) in order to study the different parts of this motor type.

images of some motors

AEL-EMT14-S. Cut away repulsion motor, single-phase with short circuited brushes

It includes a Cut away repulsion motor, single phase with short circuited brushes (EMT14-S) in order to study the different parts of this motor type.

AEL-EMT15-S. Cut away DC permanent magnet motor

It includes a Cut away DC permanent magnet motor (EMT15-S) in order to study the different parts of this motor type.

AEL-EMT16-S. Cut away asynchronous single-phase motor with starting and running capacitor

It includes a Cut away asynchronous single-phase motor with starting and running capacitor (EMT16-S) in order to study the different parts of this motor type.

AEL-EMT17-S. Cut away asynchronous three-phase motor of squirrel cage with "Y" connection

It includes a Cut away asynchronous three-phase motor of squirrel cage with «Y» connection (EMT17-S) in order to study the different parts of this motor type.

AEL-EMT18-S. Cut away DC Brushless motor

It includes a Cut away DC Brushless motor (EMT18-S) in order to study the different parts of this motor type.

AEL-EMT19-S. Cut away stepper motor

It includes a Cut away stepper motor (EMT19-S) in order to study the different parts of this motor type.

AEL-EMT20-S. Cut away asynchronous single-phase motor with split phase

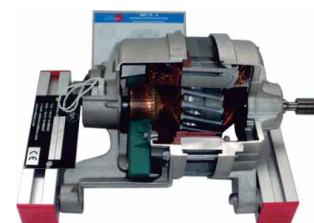
It includes a Cut away asynchronous single-phase motor with split phase (EMT20-S) in order to study the different parts of this motor type.

AEL-EMT21-S. Cut away three-phase reluctance motor

It includes a Cut away three-phase reluctance motor (EMT21-S) in order to study the different parts of this motor type.

AEL-EMT22-S. Cut away single-phase shaded pole motor

It includes a Cut away single-phase shaded pole motor (EMT22-S) in order to study the different parts of this motor type.



Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT1-T. Transparent and functional DC independent excitation motor-generator

The AEL-EMT1-T includes a transparent and functional motor.

With this application the student can see how work a DC independent excitation motor - generator and visualize how the rotor is moved.

It includes the following modules:

- EMT1-T. Transparent and functional DC independent excitation motor-generator.
- N-WCC/M.DC Motor Speed Controller. (2 units)
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter. (2 units)

The application AEL-EMT1-T 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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.

This brake requires the DC Motor Speed Controller (N-WCC/M).

- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement module:

- STRO. Stroboscope.

Some practical possibilities:

- 1.- Start-up of the EMT1-T motor.
- 2.- Speed control of the EMT1-T motor.
- 3.- Torque control of the EMT1-T motor.
- 4.- Study of different wirings of this type of motors.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of this type of motors with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT2-T. Transparent and functional DC series excitation motor-generator

The AEL-EMT2-T includes a transparent and functional motor.

With this application the student can see how work a DC series excitation motor-generator and visualize how the rotor is moved.

It includes the following modules:

- EMT2-T. Transparent and functional DC series excitation motor-generator.
- N-WVCC/M. DC Motor Speed Controller.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter. (2 units)

The application AEL-EMT2-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.

This brake requires the DC Motor Speed Controller (N-WVCC/M).

- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement module:

- STRO. Stroboscope.

Some practical possibilities:

- 1.- Start-up of the EMT2-T motor.
- 2.- Speed control of the EMT2-T motor.
- 3.- Torque control of the EMT2-T motor.
- 4.- Study of different wirings of this type of motors.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of this type of motors with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

————— Transparent and Functional Electrical Motors —————

AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator

The AEL-EMT3-T includes a transparent and functional motor.

With this application the student can see how work a DC shunt excitation motor-generator and visualize how the rotor is moved.

It includes the following modules:

- EMT3-T. Transparent and functional DC shunt excitation motor-generator.
- N-WCC/M.DC Motor Speed Controller.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter. (2 units)

The application AEL-EMT3-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WCC/M).
- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement module:

- STRO. Stroboscope.

Some practical possibilities:

- 1.- Start-up of the EMT3-T motor.
- 2.- Speed control of the EMT3-T motor.
- 3.- Torque control of the EMT3-T motor.
- 4.- Study of different wirings of this type of motors.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of this type of motors with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT4-T. Transparent and functional DC compound excitation motor-generator

The AEL-EMT4-T includes a transparent and functional motor.

With this application the student can see how work a DC compound excitation motor-generator and visualize how the rotor is moved.

It includes the following modules:

- EMT4-T. Transparent and functional DC compound excitation motor-generator.
- N-WCC/M.DC Motor Speed Controller.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter. (2 units)

The application AEL-EMT4-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREN.D. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.

This brake requires the DC Motor Speed Controller (N-WCC/M).

- FREN.P. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement module: (to chose)

- STRO. Stroboscope.

Some practical possibilities:

- 1.- Start-up of the EMT4-T motor.
- 2.- Speed control of the EMT4-T motor.
- 3.- Torque control of the EMT4-T motor.
- 4.- Study of different wirings of this type of motors.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of this type of motors with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

————— Transparent and Functional Electrical Motors —————

AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator

The AEL-EMT5-T includes a transparent and functional motor.

With this application the student can see how work a DC shunt-series compound excitation motor and visualize how the rotor is moved.

It includes the following modules:

- EMT5-T. Transparent and functional DC shunt-series compound excitation motor.
- N-WCC/M. DC Motor Speed Controller. (2 units)
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter. (2 units)

The application AEL-EMT5-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.

This brake requires the DC Motor Speed Controller (N-WCC/M).

- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement module:

- STRO. Stroboscope.

Some practical possibilities:

- 1.- Start-up of the EMT5-T motor.
- 2.- Speed control of the EMT5-T motor.
- 3.- Torque control of the EMT5-T motor.
- 4.- Study of different wirings of this type of motors.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of this type of motors with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator

The AEL-EMT6-T includes a transparent and functional motor.

With this application the student can see how work this type of motor and visualize how the rotor is moved.

It includes the following modules:

- EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.
- N-WVCC/M.DC Motor Speed Controller.
- EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.
- N-WVCA/M.AC Motor Speed Controller.
- N-ALI02. Main Power Supply.
- N-REFT. Three-phase Resistor Load with commutator.
- N-MED65. Digital Multimeter. (2 units)

The application AEL-EMT6-T 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.

See additional elements at the beginning of the catalogue.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
This unit may be necessary to measure voltage, current, power factor ,etc of the generator.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Start-up of the motor.
- 2.- Study of different applications of these types of generators.
- 3.- Study of output voltage in function of the current excitation.
- 4.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 5.- Study of output voltage in function of the frequency.
- 6.- Frequency control.
- 7.- Study of the synchronous generator without load.
- 8.- Study of the synchronous generator with load.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage

The AEL-EMT7-T includes a transparent and functional motor.

With this application the student can see how an asynchronous three-phase motor of squirrel cage and visualize how the rotor is moved.

It includes the following modules:

- EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter.
- N-WCA/M. AC Motor Speed Controller.

The application AEL-EMT7-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WCC/M).
- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the three-phase induction motor of squirrel cage.
- 2.- Start-up of the motor.
- 3.- Configuration in clockwise direction.
- 4.- Configuration in anti-clockwise direction.
- 5.- Study of frequency controller.
- 6.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 7.- Study of the response of the motor with variable brake torque.
- 8.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor

The AEL-EMT8-T includes a transparent and functional motor.

With this application the student can see how an asynchronous three-phase motor with wound rotor and visualize how the rotor is moved.

It includes the following modules:

- EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor.
- N-ALI02. Main Power Supply.
- N-REVT. Three-phase Variable Resistor.
- N-MED65. Digital Multimeter.
- N-WCA/M. AC Motor Speed Controller.

The application AEL-EMT8-T 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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WCC/M).
- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the asynchronous three-phase motor with wound rotor in short circuit.
- 2.- Start-up of the motor.
- 3.- Study of this motor with the variable resistor in the rotor.
- 4.- Study of frequency controller.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of the response of the motor with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT9-T. Transparent and functional Dahlander three-phase motor

The AEL-EMT9-T includes a transparent and functional motor.

With this application the student can see how work a Dahlander three-phase motor and visualize how the rotor is moved.

It includes the following modules:

- EMT9-T. Transparent and functional Dahlander three-phase motor.
- N-ALI01. Industrial Main Power Supply.
- N-MED65. Digital Multimeter.
- N-ARR07. Manual Dahlander Commutator, 2 Speeds.

The application AEL-EMT9-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WCC/M).
- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the electrical connections of the Dahlander motor.
- 2.- Start-up of the motor.
- 3.- Study of two speed manual Dahlander commutation.
- 4.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 5.- Study of the response of the motor with variable brake torque.
- 6.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT10-T. Transparent and functional asynchronous three-phase motor of two independent speeds

The AEL-EMT10-T includes a transparent and functional motor.

With this application the student can see how work an asynchronous three-phase motor of two independent speeds and visualize how the rotor is moved.

It includes the following modules:

- EMT10-T. Transparent and functional asynchronous three-phase motor of two independent speeds.
- N-ALI01. Industrial Main Power Supply.
- N-MED65. Digital Multimeter.
- N-ARR09. Manual Independent Windings Commutator, 2 speeds.

The application AEL-EMT10-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREN. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WCC/M).
- FREN. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the asynchronous three-phase motor of two independent speeds with different wiring configurations:
 - Two poles configuration.
 - Four poles configuration.
- 2.- Start-up of the motor.
- 3.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 4.- Study of the response of the motor with variable brake torque.
- 5.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

————— Transparent and Functional Electrical Motors —————

AEL-EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacitor

The AEL-EMT11-T includes a transparent and functional motor.

With this application the student can see how work an asynchronous single-phase motor with starting capacitor and visualize how the rotor is moved.

It includes the following modules:

- EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacitor.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter.

The application AEL-EMT11-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WCC/M).
- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the asynchronous single-phase motor with starting capacitor.
- 2.- Put into operation the motor.
- 3.- Study of the influence of the starting capacitor in the motor.
- 4.- Study of the main applications of this type of motors.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of the response of the motor with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT12-T. Transparent and functional universal motor

The AEL-EMT12-T includes a transparent and functional motor.

With this application the student can see how work an universal motor and visualize how the rotor is moved.

It includes the following modules:

- EMT12-T. Transparent and functional universal motor.
- N-WCC/M. DC Motor Speed Controller.
- N-ALI02. Main Power Supply.
- N-REV. Variable Resistor.
- N-MED65. Digital Multimeter.

The application AEL-EMT12-T 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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.

This brake requires the DC Motor Speed Controller (N-WCC/M).

- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement devices: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushes

The AEL-EMT14-T includes a transparent and functional motor.

With this application the student can see how work a repulsion motor, single phase with short circuited brushes and visualize how the rotor is moved.

It includes the following modules:

- EMT14-T. Transparent and functional repulsion motor, single phase with short circuited brushes.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter.

The application AEL-EMT14-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the repulsion motor.
- 2.- Study of the speed control of this type of motors.
- 3.- Study of the main operations of this type of motors.
- 4.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 5.- Study of the response of the motor with variable brake torque.
- 6.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting and running capacitor

The AEL-EMT16-T includes a transparent and functional motor.

With this application the student can see how work an asynchronous single-phase motor with starting and running capacitor and visualize how the rotor is moved.

It includes the following modules:

- EMT16-T. Transparent and functional asynchronous single-phase motor with starting and running capacitor.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter.

The application AEL-EMT16-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREN.D. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WCC/M).
- FREN.P. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-MED65. Digital Multimeter.
- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the asynchronous single-phase motor with starting and running capacitor.
- 2.- Study of the influence of the starting and running capacitor in the motor.
- 3.- Study of the main operations of this type of motors.
- 4.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 5.- Study of the response of the motor with variable brake torque.
- 6.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage with "Y" connection

The AEL-EMT17-T includes a transparent and functional motor.

With this application the student can see how work an asynchronous three-phase motor of squirrel cage with «Y» connection and visualize how the rotor is moved.

It includes the following modules:

- EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage with «Y» connection.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter.
- N-WVCA/M. AC Motor Speed Controller.

The application AEL-EMT17-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WVCC/M).
- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the asynchronous three-phase motor of squirrel cage with "Y" connection.
- 2.- Study of the wiring of this type of motors.
- 3.- Study of the forward and reverse operations.
- 4.- Study of frequency controller.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of the response of the motor with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase

The AEL-EMT20-T includes a transparent and functional motor.

With this application the student can see how work an asynchronous single-phase motor with split phase and visualize how the rotor is moved.

It includes the following modules:

- EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter.
- N-WCA/M. AC Motor Speed Controller.

The application AEL-EMT20-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.
This brake requires the DC Motor Speed Controller (N-WCC/M).
- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the asynchronous single-phase motor with split phase.
- 2.- Study of the connections diagram of this type of motors.
- 3.- Study of the characteristics of these motors.
- 4.- Study of frequency controller.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of the response of the motor with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT21-T. Transparent and functional three-phase reluctance motor

The AEL-EMT21-T includes a transparent and functional motor.

With this application the student can see how work a three-phase reluctance motor and visualize how the rotor is moved.

It includes the following modules:

- EMT21-T. Transparent and functional three-phase reluctance motor.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter.
- N-WVCA/M. AC Motor Speed Controller.

The application AEL-EMT21-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional brakes modules to study this motor: (to chose)

- FREND. Dynamo Brake.
- DI-FRE. Pendular Dynamo Brake.
- FRECP. Eddy Current Brake.

This brake requires the DC Motor Speed Controller (N-WCC/M).

- FRENP. Magnetic Powder Brake.
- FRE-FE. Electronic Brake.

Optional measurement modules: (to chose)

- N-EAL. Network Analyzer Unit.
- STRO. Stroboscope.

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

Some practical possibilities:

- 1.- Study of the three-phase reluctance motor.
- 2.- Study of the connections diagram of this type of motors.
- 3.- Study of the characteristics of these motors.
- 4.- Study of frequency controller.
- 5.- Measurement of electrical parameters.

Additional practical possibilities (with the optional modules):

- 6.- Study of the response of the motor with variable brake torque.
- 7.- Measurement of voltages and currents in function of the brake torque.

Applications:

AEL-4.2
Electrical Motors Construction

Transparent and Functional Electrical Motors

AEL-EMT22-T. Transparent and functional single-phase shaded pole motor

The AEL-EMT22-T includes a transparent and functional motor. With this application the student can see how work a single-phase shaded pole motor and visualize how the rotor is moved.

It includes the following modules:

- EMT22-T. Transparent and functional single-phase shaded pole motor.
- N-ALI02. Main Power Supply.
- N-MED65. Digital Multimeter.

The application AEL-EMT22-T can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Optional measurement modules:

- STRO. Stroboscope.

Removable Electrical Motors

AEL-DIM-KIT. 4 Disassembly Induction Motors Kit

This Disassembly Induction Motors Kit, AEL-DIM-KIT, allows the student to construct and operate induction motors. It has been designed to introduce students into the basic principles of electrical induction motors and provide them with a good understanding of induction motors operation.

Using this Kit, the student will see clearly the induction motors piece by piece and will learn how to construct the machine step by step.

Disassembly induction motors:

- EMT7-D. Disassembly asynchronous three-phase motor of squirrel cage.
- EMT8-D. Disassembly asynchronous three-phase motor with wound motor.
- EMT20-D. Disassembly asynchronous single-phase motor with split phase.
- EMT16-D. Disassembly asynchronous single-phase motor with starting and running capacitor.

Module:

- N-MED65. Digital Multimeter.

Optional module:

- N-ACPWS.AC Motor Power Supply.

With this optional module the student can start the induction motors assembled by himself.

Some practical possibilities:

- 1.- Assembly, step by step, an asynchronous three-phase motor of squirrel cage.
- 2.- Assembly, step by step, an asynchronous three-phase motor with wound motor.
- 3.- Assembly, step by step, an asynchronous single-phase motor with split phase.
- 4.- Assembly, step by step, an asynchronous single-phase motor with starting and running capacitor.

Additional practical possibilities (with the optional module):

- 5.- Put into operation the asynchronous three-phase motor of squirrel cage.
- 6.- Put into operation the asynchronous three-phase motor with wound motor.
- 7.- Put into operation the asynchronous single-phase motor with split phase.
- 8.- Put into operation the asynchronous single-phase motor with starting and running capacitor.



AEL-DIM-KIT

Applications:

AEL-4.2
Electrical Motors Construction

Removable Electrical Motors

AEL-TPIC. Three-Phase Induction Motor Construction

This application allows the student to construct and operate a three-phase induction motor.

The AEL-TPIC has been designed to show students how to construct AC three-phase induction motor (EMT7-D. Disassembly Asynchronous three-phase motor of squirrel cage) step by step.

Besides, the student can design the coils with the Manual Winding Machine for Motors and Transformers (MWMT) and carry out different tests.

It also includes a Digital Multimeter module (N-MED65).

Optional module:

- N-ACPWS. AC Motor Power Supply.

With this module you can put into operation the machine.

Some practical possibilities:

- 1.- To assemble all parts of the motor.
- 2.- To construct the coils using a Manual Winding Machine for Motors and Transformers (MWMT).

Additional practical possibilities (with the optional module):

- 3.- To put into operation the machine through the AC Motor Power Supply (N-ACPWS).

AEL-SPIC. Single-Phase Induction Motor Construction with starting and running capacitor

This application allows the student to construct and operate a single-phase induction motor and to understand the objectives of a centrifugal switch and a starting and running capacitor.

The AEL-SPIC has been designed to show students how to construct step by step a single-phase induction motor with starting and running capacitor (EMT16-D. Disassembly asynchronous single-phase motor with starting and running capacitor).

Besides, the student can design the coils with the Manual Winding Machine for Motors and Transformers (MWMT) and carry out different tests.

It also includes a Digital Multimeter module (N-MED65).

Optional module:

- N-ACPWS. AC Motor Power Supply.

With this module you can put into operation the machine.

Some practical possibilities:

- 1.- To assemble all parts of the motor.
- 2.- To construct the coils using a Manual Winding Machine for Motors and Transformers (MWMT).

Additional practical possibilities (with the optional module):

- 3.- To put into operation the machine through the AC Motor Power Supply (N-ACPWS).

AEL-DCMC. DC Motor Construction

This application allows the student to construct and operate DC motors.

The AEL-DCMC has been designed to show students how construct step by step a DC motor (EMT5-D. Disassembly DC Shunt-series compound excitation motor).

Besides, the student can design the coils with the Manual Winding Machine for Motors and Transformers (MWMT) and carry out different tests.

It also includes a Digital Multimeter module (N-MED65).

Optional module:

- N-DCPWS. DC Motor Power Supply.

With this module you can put into operation the machine.

Some practical possibilities:

- 1.- To assemble all parts of the motor.
- 2.- To construct the coils using a Manual Winding Machine for Motors and Transformers (MWMT).

Additional practical possibilities (with the optional module):

- 3.- To put into operation the machine through the DC Motor Power Supply (N-DCPWS).

Applications:

AEL-4.2
Electrical Motors Construction

Dissectable and Configurable Electrical Motors System

AEL-EMT-KIT. Advanced Dissectable and Configurable Electrical Machines

The "AEL-EMT-KIT. Advanced Dissectable and Configurable Electrical Machines " is a set of configurable and dissectable electrical machines designed to study the basic principles of electrical machines.

It consists of mechanical pieces and electrical wirings.

The student will be able to make and test innumerable types of electrical machines.

Using this application the student will clearly observe the components of the machines and how they must be interconnected, both electrically and mechanically.

The different machines have protected rotating parts and use low voltages.

AEL-EMT-KIT consists of:

- a) AEL-EMT-KIT/B. Base Unit and common modules.

Kits:

- b) AEL-EMT-KIT/AS. AC Asynchronous Induction Motors.
- c) AEL-EMT-KIT/DC. DC Motors/Generators.
- d) AEL-EMT-KIT/SMG. AC Synchronous Motors/Generators.
- e) AEL-EMT-KIT/MPP. Stepper Motor.

- a) AEL-EMT-KIT/B. Base Unit and common modules.

It includes:

- EMT-KIT/B. Base Unit.
It is formed by:
 - Frame.
 - Support ring.
 - Bearings.
 - Shaft.
 - Axle bearings.
 - Other parts.
- N-ALI01. Industrial Main Power Supply.
- BRLA. Compass to observe the rotating magnetic field.
- TECNEL/TM. Optical Speed Meter.

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

The AEL-EMT-KIT/AS is designed to study asynchronous motors.

This kit consists of a set of mechanical pieces assembled among them in order to mount and operate different models of asynchronous induction machines.

It includes:

- Squirrel cage rotor.
- Crosspiece.
- Stator.
- Induction coils.

Required modules:

- N-VVCA/M. AC Motor Speed Controller.

Recommended modules:

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

- N-MED10. AC Ammeter (0-5 A).
- N-MED26. Frequency Meter.

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

The AEL-EMT-KIT/DC has been designed to study DC motors/generators.

This kit consists of a set of mechanical pieces assembled among them in order to mount and operate different models of DC machines.

It includes:

- Rotor.
- Commutator with segments.
- Poles and interpoles.
- Field winding.
- Drive motor.

Required modules:

- N-VVCA/M. AC Motor Speed Controller.
- N-VVCC/M. DC Motor Speed Controller. (2 units)

- N-REV. Variable Resistor. (2 units)

Recommended modules:

- N-MED17. DC Voltmeter (0-200 V). (2 units)
- N-MED05. DC Ammeter (0-1.5 A). (2 units)
- N-REF. Resistor Load with commutator.

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

The AEL-EMT-KIT/SMG has been designed to study synchronous machines.

This Kit consists of a set of mechanical pieces assembled among them in order to mount and operate different models of synchronous machines.

It includes:

- Rotor.
- Slip ring.
- Stator.
- Stator coils.
- Induction coils.
- Drive motor.

Required modules:

- N-VVCA/M. AC Motor Speed Controller.
- N-VVCC/M. DC Motor Speed Controller.

Recommended modules:

- N-MED22. AC Voltmeter (0-400 Vac).
- N-MED10. AC Ammeter (0-5 A).
- N-MED26. Frequency Meter.
- N-MED17. DC Voltmeter (0-200 V).
- N-MED05. DC Ammeter (0-1.5 A).
- N-REF300. 300 Ohms Three-phase Fixed Resistor Module.
- N-CONT. Three-phase Variable Capacitor Load with commutator.



Continue...

Applications:

AEL-4.2
Electrical Motors Construction

————— Dissectable and Configurable Electrical Motors System —————

AEL-EMT-KIT. Advanced Dissectable and Configurable Electrical Machines (continuation)

e) AEL-EMT-KIT/MPP Stepper Motor.

The AEL-EMT-KIT/MPP has been designed to study stepper motors.

This Kit consists of a set of removable pieces assembled among them to make and operate a stepper motor.

It includes:

- Crosspiece.
- Poles.

Required modules:

- N-WVCC/M. DC Motor Speed Controller.
- N-WPP. Stepper Motor Controller (manual and automatic control).

This application is mounted on racks.

Optionally the AEL-WBR. Electrical Workbench (Rack) can be supplied to place the rack/s.

Some 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.

Applications:

AEL-4.2
Electrical Motors Construction

Professional practices in wiring Electrical Motors

AEL-PSPIM. Single-Phase Induction Motor wiring

The AEL-PSPIM has been designed to train the students in the single-phase induction motors wiring.

For this purpose, are included the following elements:

- EMT20-D. Disassembly asynchronous single-phase motor with split phase.
- MWMT. Manual Winding Machine for Motors and Transformers.
- CWC. Copper wire coil.
- N-ACPWS. AC Motor Power Supply.
- N-MED65. Digital Multimeter.

The application AEL-PSPIM can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Some practical possibilities:

- 1.- Designing and wiring the coils of the motor.
- 2.- Put into operation the constructed electrical machine.
- 3.- Measurement of electrical parameters.

AEL-PTSIM. Three-Phase Induction Motor wiring

The AEL-PTSIM has been designed to train the students in the three-phase induction motors wiring.

For this purpose, are included the following elements:

- EMT7-D. Disassembly asynchronous three-phase motor of squirrel cage.
- MWMT. Manual Winding Machine for Motors and Transformers.
- CWC. Copper wire coil.
- N-ACPWS. AC Motor Power Supply.
- N-MED65. Digital Multimeter.

The application AEL-PSPIM can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following rack:

- N-RACK-B.

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.

See additional elements at the beginning of the catalogue.

Some practical possibilities:

- 1.- Designing and wiring the coils of the motor.
- 2.- Put into operation the constructed electrical machine.
- 3.- Measurement of electrical parameters.

ALL Advanced Electrical Laboratories (AEL-LABS)

AEL-1. ELECTRICAL INSTALLATIONS LAB		
AEL-1.1. Home Electrical Installations	AEL-1.2. Industrial Electrical Installations	AEL-1.3. Professional Wiring Practices in Installations
<p style="text-align: center; margin: 0;"><u>Applications</u></p> <p>Lighting and Control</p> <ul style="list-style-type: none"> • AEL-AD13. Audio Door Entry System. • AEL-AD14. Audio and Video Door Entry System. • AEL-AD6A. Luminosity Control Station. • AEL-AD6B. Basic Luminosity Control Station. • AEL-AD24. Position Switch. • AEL-AD5. Stair Lights Timing. • AEL-AI13-E. Modular Trainer for Electrotechnics (Lighting). • AEL-AE4. Test Unit for Differential Automatic Switches. <p>Climatization</p> <ul style="list-style-type: none"> • AEL-AD9A. Heating Control Station. • AEL-AD9B. Basic Heating Control Station. 	<p style="text-align: center; margin: 0;"><u>Applications</u></p> <p>Industrial Control Engineering</p> <ul style="list-style-type: none"> • AEL-CM1. Manual Control Operations. • AEL-CM2. Operations with Manual Commutators. • AEL-CM3. Automatic Control Operations. • AEL-CM4. Automatic Control Operations with contactors and sensors. • AEL-MED. Industrial Measurement Technology. <p>Fault Simulators</p> <ul style="list-style-type: none"> • AEL-AD33. Single-Phase Installations Faults Simulator. • AEL-AD33T. Three-Phase Installations Faults Simulator. <p>Relays Trainer</p> <ul style="list-style-type: none"> • AEL-PRTS. Protective Relaying Training System. • AEL-AE5. Relay Control Station. <p>Loads</p> <ul style="list-style-type: none"> • AEL-AI13-A. Modular Trainer for Electrotechnics (RLC Circuits). 	<p style="text-align: center; margin: 0;"><u>Applications</u></p> <p>Cubicle Wiring Installations</p> <ul style="list-style-type: none"> • AEL-AEBI. Assembly Exercises in Building Installations. • AEL-AESI. Assembly Exercises for Signals Electrical Installations. • AEL-AEBM. Assembly Exercises on Building Mains Feeds and Meter Cabinets. • AEL-AESU. Assembly Exercises on Switching Units. <p>Electrical Control Panel Wiring</p> <ul style="list-style-type: none"> • AEL-AEPI. Electrical Control Panel Wiring Installation.
<div style="border: 1px solid orange; padding: 5px; display: inline-block;">See catalogue of: AEL-1. Electrical Installations Lab</div>		

AEL-2. HOME AUTOMATION SYSTEMS LAB	
AEL-2.1. Wired Systems	AEL-2.2. Wireless Systems
<p style="text-align: center; margin: 0;"><u>Applications</u></p> <p>General Wired Home Automation Systems</p> <ul style="list-style-type: none"> • AEL-AD1A. Robbery Alarm Station. • AEL-AD1B. Basic Robbery Alarm Station. • AEL-AD3A. Fire Alarm Station. • AEL-AD3B. Basic Fire Alarm Station. • AEL-AD15A. Position Control Station. • AEL-AD15B. Basic Position Control Station. • AEL-AD25A. Control Station for Home Electric Service through the telephone. • AEL-AD22. Flooding Control Station. • AEL-AD30. Gas Control Station. • AEL-AD31. Movement and Sound Detection and Control. • AEL-AD40. Remote Control Station Via Telephone. <p>EIB Systems</p> <ul style="list-style-type: none"> • AEL-EIB1. EIB Lighting Control System. • AEL-EIB2. EIB Shutter Control System. • AEL-EIB3. EIB Heating Control System. • AEL-EIB4. EIB Safety Control System. • AEL-EIB5. EIB PLC, Touch Panel and Timer System. • AEL-EIB6. EIB Scenery Control System. • AEL-EIB-T. EIB Complete Control System. 	<p style="text-align: center; margin: 0;"><u>Applications</u></p> <p>General Wireless Home Automation Systems</p> <ul style="list-style-type: none"> • AEL-AD28A. Integral Control Station of Home Electric Systems. • AEL-AD28B. Basic Control Station of Home Electric Systems. • AEL-AD28C. Elementary Control Station of Home Electric Systems. • AEL-AD23. Wireless Basic Control Station (RF).
<div style="border: 1px solid black; padding: 5px; display: inline-block;">See catalogue of: AEL-2. Home Automation Systems Lab</div>	

AEL-3. ELECTRICAL MACHINES LAB

AEL-3.1. Electrical Machines Trainers	AEL-3.2. Electrical Machines Applications
<p style="text-align: center;"><u>Applications</u></p> <p>Transformers Trainers</p> <ul style="list-style-type: none"> • AEL-SPTT. Single-Phase Transformer Trainer. • AEL-TPTT. Three-Phase Transformer Trainer. • AEL-DTT. Distribution Transformer Trainer. • AEL-AI13-D. Modular Trainer for Electrotecnics (Transformers). <p>Generators/Motors Trainers</p> <ul style="list-style-type: none"> • AEL-EEA. Alternator Study Unit. • AEL-EGMG24. Motor-Generator Group. • AEL-EEEM. Energy Efficiency in Electrical Motors. • AEL-EMSS. Electrical Machines Soft Starter • AEL-EMCF. Electrical Machines Control through Frequency Controller. • AEL-EMRP. Electrical Machines Relays Protection Trainer. • AEL-ACINT. AC Three-Phase Induction Motor of Squirrel Cage Trainer. • AEL-ACDHT. AC Dahlander Three-Phase Induction Motor Trainer. • AEL-DCSET. DC Series Excitation Motor Trainer. • AEL-DCSHT. DC Shunt Excitation Motor Trainer. • AEL-DCCOT. DC Compound Excitation Motor Trainer. • AEL-DCSPT. DC Separately Excited Motor Trainer. • AEL-UMT. Universal Motor Trainer. • AEL-ACRLT. AC Three-Phase Reluctance Motor Trainer. • AEL-ACSPT. Asynchronous Single-Phase Motor with Split Phase Trainer. • AEL-SERIN/CA-1kW. Computer Controlled Advanced Industrial Servosystems Trainer - 1 kW (for AC Motors). • AEL-AI13. Modular Trainer for Electrotecnics (RLC Circuits, Electrostatics, Motors, Transformers, Lighting). • AEL-AI13-C. Modular Trainer for Electrotecnics (Motors). • AEL-C-04S. Dynamics Loads, with SCADA. <p>Fault Simulator Trainers in Electrical Machines</p> <ul style="list-style-type: none"> • AEL-ESAM. Fault Simulation Trainer in Electrical motors. • AEL-ESAE. Electrical Faults Simulation Trainer. • AEL-MMRT. Motor Management Relays Trainer. 	<p style="text-align: center;"><u>Applications</u></p> <p>Generators/Motors Applications</p> <ul style="list-style-type: none"> • AEL-ACINA. Applications of AC Three-Phase Induction Motors of Squirrel Cage. • AEL-ACDHA. Applications of AC Dahlander Three-Phase Induction Motors. • AEL-ACWRA. Applications of AC Three-Phase Induction Motors of Wound Rotor. • AEL-ACLA. Applications of AC Linear Motor Operations. • AEL-DCSEA. Applications of DC Series Motors. • AEL-DCSHA. Applications of DC Shunt Motors. • AEL-DCCOA. Applications of DC Compound Motors. • AEL-DCSPA. Applications of DC Separately Excited Motors. • AEL-DCGEA. Applications of DC Generators. • AEL-UMA. Applications of Universal Motors. • AEL-STMA. Applications of Stepper Motors. • AEL-DCPMA. Applications of DC Permanent Magnet Motors. • AEL-DCBRA. Applications of DC Brushless Motors. • AEL-ACRLA. Applications of AC Three-Phase Reluctance Motors. • AEL-ACSPA. Applications of Asynchronous Single-Phase Motor with Split Phase. • AEL-AI12. Modular Application (AC Motors). • AEL-IMSU. General Applications of AC Induction Motors. <div style="border: 1px solid black; padding: 5px; margin-top: 20px; text-align: center;"> <p>See catalogue of: AEL-3. Electrical Machines Lab</p> </div>

AEL-4. ELECTROMECHANICAL CONSTRUCTIONS LAB

AEL-4.1. Transformers Construction	AEL-4.2. Electrical Motors Construction
<p style="text-align: center;"><u>Applications</u></p> <p>Single-Phase Transformers Construction</p> <ul style="list-style-type: none"> • AEL-SPTC. Single-Phase Transformer Construction Kit. <p>Three-Phase Transformers Construction</p> <ul style="list-style-type: none"> • AEL-TPTC. Three-Phase Transformer Construction Kit. <p>Professional Practices in wiring Transformers</p> <ul style="list-style-type: none"> • AEL-PSPTC. Single-Phase Transformer wiring. • AEL-PTPTC. Three-Phase Transformer wiring. <div style="border: 1px solid black; padding: 5px; margin-top: 20px; text-align: center;"> <p>These applications are in this catalogue: AEL-4. Electromechanical Constructions Lab</p> </div>	<p style="text-align: center;"><u>Applications</u></p> <p>Cut Away Electrical Motors</p> <ul style="list-style-type: none"> • AEL-EMT1-S. Cut away DC independent excitation motor-generator. • AEL-EMT2-S. Cut away DC series excitation motor-generator. • AEL-EMT3-S. Cut away DC shunt excitation motor-generator. • AEL-EMT4-S. Cut away DC compound excitation motor-generator. • AEL-EMT5-S. Cut away DC shunt-series compound excitation motor. • AEL-EMT6-S. Cut away AC synchronous three-phase motor alternator. • AEL-EMT7-S. Cut away asynchronous three-phase motor of squirrel cage. • AEL-EMT8-S. Cut away asynchronous three-phase motor with wound rotor. • AEL-EMT9-S. Cut away Dahlander three-phase motor. • AEL-EMT10-S. Cut away asynchronous three-phase motor of two independent speeds. • AEL-EMT11-S. Cut away asynchronous single-phase motor with starting capacitor. • AEL-EMT12-S. Cut away universal motor. • AEL-EMT14-S. Cut away repulsion motor, single-phase with short circuited brushes. • AEL-EMT15-S. Cut away DC permanent magnet motor. • AEL-EMT16-S. Cut away asynchronous single-phase motor with starting and running capacitor. • AEL-EMT17-S. Cut away asynchronous three-phase motor of squirrel cage with "Y" connection. • AEL-EMT18-S. Cut away DC Brushless motor. • AEL-EMT19-S. Cut away stepper motor. • AEL-EMT20-S. Cut away asynchronous single-phase motor with split phase. • AEL-EMT21-S. Cut away three-phase reluctance motor. • AEL-EMT22-S. Cut away single-phase shaded pole motor. <p>Transparent and Functional Electrical Motors</p> <ul style="list-style-type: none"> • AEL-EMT1-T. Transparent and functional DC independent excitation motor-generator. • AEL-EMT2-T. Transparent and functional DC series excitation motor-generator. • AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator. • AEL-EMT4-T. Transparent and functional DC compound excitation motor-generator. • AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator. • AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator. • AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage. • AEL-EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor. • AEL-EMT9-T. Transparent and functional Dahlander three-phase motor. • AEL-EMT10-T. Transparent and functional asynchronous three-phase motor of two independent speeds. • AEL-EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacitor. • AEL-EMT12-T. Transparent and functional universal motor. • AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushes. • AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting and running capacitor. • AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage with "Y" connection. • AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase. • AEL-EMT21-T. Transparent and functional three-phase reluctance motor. • AEL-EMT22-T. Transparent and functional single-phase shaded pole motor. <p>Removable Electrical Motors</p> <ul style="list-style-type: none"> • AEL-DIM-KIT. 4 Disassembly Induction Motors Kit. • AEL-TPIC. Three-Phase Induction Motor Construction. • AEL-SPIC. Single-Phase Induction Motor Construction with starting and running capacitor. • AEL-DCMC. DC Motor Construction. <p>Dissectable and Configurable Electrical Motors System</p> <ul style="list-style-type: none"> • AEL-EMT-KIT. Dissectable and Configurable Advanced Electrical Motor. <p>Professional practices in wiring Electrical Motors</p> <ul style="list-style-type: none"> • AEL-PSPIM. Single-Phase Induction Motor wiring. • AEL-PTSIM. Three-Phase Induction Motor wiring.

AEL-5. POWER SYSTEMS AND SMART GRID TECHNOLOGY LAB		
AEL-5.1. Generation Trainers	AEL-5.2. Distribution and Transmission Trainers	AEL-5.3. Loads Trainers
<p style="text-align: center;"><u>Applications</u></p> <p>Basic Synchronization Applications</p> <ul style="list-style-type: none"> • AEL-MOSC. Manual Operations of Synchronization Circuits. <p>Advanced Synchronization Applications</p> <ul style="list-style-type: none"> • AEL-EESD. Advanced Digital Synchronization Trainer. <p>Wind Energy</p> <ul style="list-style-type: none"> • AEL-WPP. Wind Power Plants with Double Feed Induction Generator. • AEL-WPT. Wind Power Trainer with Permanent Magnets Synchronous Generator. • AEL-WPPI. Wind Power Plants with Induction Generator. 	<p style="text-align: center;"><u>Applications</u></p> <p>Introduction to Transmission and Distribution Power Systems</p> <ul style="list-style-type: none"> • AEL-TI-01. Study of the Regulation of the Distribution Transformer (with TAP). • AEL-TI-02. Analysis of Three-phase Power Lines. <p>Basic Distribution and Transmission Trainers</p> <ul style="list-style-type: none"> • AEL-AE1A. Aerial Line Model. • AEL-TDTR. Distribution Transformer with Voltage Regulator. • AEL-PSCL. Parallel and Series Transmission Lines. <p>Advanced Distribution and Transmission Trainers</p> <ul style="list-style-type: none"> • AEL-TSSG. Transmission Systems with Synchronous Generator. • AEL-HVDC. High Voltage DC Transmission Lines. 	<p style="text-align: center;"><u>Applications</u></p> <p>Basic Load Controller Trainers</p> <ul style="list-style-type: none"> • AEL-MRPC. Manual Reactive Power Compensation. • AEL-APFC. Single-phase Automatic Power Factor Compensation. • AEL-EFCFP. Advanced Power Factor Controller. • AEL-DLT. Dynamic Loads Trainer • AEL-AIB. Reactive Power Compensation (Power Factor Correction). • AEL-AE6. Energy Counters Control Trainer. <p>Advanced Loads Control</p> <ul style="list-style-type: none"> • AEL-FUSG. Final User Smart Grid Trainer. • AEL-FUSG-M. Final User Smart Grid-Smart Meter Trainer. • AEL-FUSG-E. Final User Smart Grid-Smart Energy Trainer. • AEL-FUSG-N. Final User Smart Grid-Net Metering Trainer.
AEL-5.4. Relays Protection Trainers		
<p style="text-align: center;"><u>Applications</u></p> <p>Fundamental Concepts</p> <ul style="list-style-type: none"> • AEL-CTFP. Current Transformer Fundaments for Protections Devices. • AEL-VTFP. Voltage Transformer Fundaments for Protections Devices. <p>Relays Protection Trainers</p> <ul style="list-style-type: none"> • AEL-ERP. Protection Relays Test Trainer. <p>Protection Systems in Electrical Loads</p> <ul style="list-style-type: none"> • AEL-CPT-01. Electrical Machines Protection. • AEL-CPT-02. Motor Management Relay. <p>Protection Systems for Generators</p> <ul style="list-style-type: none"> • AEL-GPRE. Generator Protection Relay Trainer. 	<p style="text-align: center;"><u>Applications</u></p> <p>Protection Systems for Transmission and Distribution Lines</p> <ul style="list-style-type: none"> • AEL-TPT-01. Overcurrent Time Protection Relay for Lines. • AEL-TPT-02. Overvoltage and Undervoltage Protection Relay. • AEL-TPT-03. Directional Power Protection Relay. • AEL-TPT-04. Earth-Fault Voltage Protection Relay. • AEL-TPT-05. Protection Relay of Parallel-Connected Lines. • AEL-TPT-06. High Speed Distance Protection Relay. 	
AEL-5.5. Compact Smart Grid Power Systems Applications		
<p style="text-align: center;"><u>Applications</u></p> <ul style="list-style-type: none"> • AEL-CPSS-01S. Compact Smart Grid Power Systems Application, with Automatic Control Generation, Transmission Line and Loads, with SCADA. • AEL-CPSS-02S. Compact Smart Micro-Grids Power Systems Application, with Automatic Control Generation and Loads, with SCADA. • AEL-CPSS-03S. Compact Smart Grid Power Systems Application with Two Parallel Generators, Two Distribution Lines and Loads, with SCADA. 		
AEL-5.6. Modular Smart Grid Power Systems Applications		
Generation Systems	Transmission/Distribution Systems	Loads Systems
<p style="text-align: center;"><u>Applications</u></p> <p>Automatic Control Generation Systems options</p> <p><u>Synchronization Studies</u></p> <ul style="list-style-type: none"> • AEL-GCA-P-02S. Generation System with Automatic Control of Synchronous Generator, Synchronization and Protection Relays, with SCADA. (*) • AEL-GCA-02S. Generation System with Automatic Control of Synchronous Generator and Synchronization, with SCADA. (*) • AEL-GCA-P-03S. Automatic Synchronization System of Synchronous Generator with Servomotor and Protection Relays, with SCADA. (*) • AEL-GCA-03S. Automatic Synchronization System of Synchronous Generator with Servomotor, with SCADA. (*) <p><u>Isolated Grid Studies</u></p> <ul style="list-style-type: none"> • AEL-GCA-P-01S. Generation System with Automatic Control of Synchronous Generator in an Isolated Grid and Protection Relays, with SCADA. (*) • AEL-GCA-01S. Generation System with Automatic Control of Synchronous Generator in an Isolated Grid, with SCADA. (*) <p>Manual Control Generation Systems options</p> <p><u>Synchronization Studies</u></p> <ul style="list-style-type: none"> • AEL-GCM-P-02S. Generation System with Manual Control of Synchronous Generator, Synchronization and Protection Relays, with SCADA. (*) • AEL-GCM-02S. Generation System with Manual Control of Synchronous Generator and Synchronization, with SCADA. (*) • AEL-GCM-P-03S. Manual Synchronization System of Synchronous Generator with Servomotor and Protection Relays, with SCADA. (*) • AEL-GCM-03S. Manual Synchronization System of Synchronous Generator with Servomotor, with SCADA. (*) <p><u>Isolated Grid Studies</u></p> <ul style="list-style-type: none"> • AEL-GCM-P-01S. Generation System with Manual Control of Synchronous Generator in an Isolated Grid and Protection Relays, with SCADA. (*) • AEL-GCM-01S. Generation System with Manual Control of Synchronous Generator in an Isolated Grid, with SCADA. (*) <p>Additional Generation Systems options</p> <ul style="list-style-type: none"> • AEL-GAD-01S. Pumping Power Plant, with SCADA. (*) • AEL-GAD-02S. Auto-Start Diesel Generator Trainer for Recovery of the Energy System due to Black-Outs, with SCADA. (*) • AEL-GAD-03S. Automatic Generation System with Two Parallel Generators, with SCADA. (*) • AEL-GAD-04S. Hydroelectric Power Plant, with SCADA. (*) <p>(*) Available application without SCADA, application reference without the last "S".</p> <p>Each application can work individually or combined with other applications to form systems simulators (Generation + Transmission/Distribution + Loads).</p>	<p style="text-align: center;"><u>Applications</u></p> <p>Transmission and Distribution Power Systems options</p> <p><u>One Line and Regulation Transformer Studies</u></p> <ul style="list-style-type: none"> • AEL-T-P-01S. Transmission and Distribution Power Systems with Regulation Transformer and Protection Relays, with SCADA. (*) • AEL-T-01S. Transmission and Distribution Power Systems with Regulation Transformer, with SCADA. (*) <p><u>Two Aerial Lines Studies</u></p> <ul style="list-style-type: none"> • AEL-T-P-02S. Transmission and Distribution Power Systems with Two Aerial Parallel Lines and Protection Relays, with SCADA. (*) • AEL-T-02S. Transmission and Distribution Power Systems with Two Aerial Parallel Lines, with SCADA. (*) <p><u>Additional Studies Possibilities</u></p> <ul style="list-style-type: none"> • AEL-T-P-04S. Electrical Distribution Grids Trainer with Protections Relays, with SCADA. (*) • AEL-T-04S. Electrical Distribution Grids Trainer, with SCADA. (*) • AEL-T-03S. Power Flow Control in Meshed Networks, with SCADA. (*) <p>(*) Available application without SCADA, application reference without the last "S".</p> <p>Each application can work individually or combined with other applications to form systems simulators (Generation + Transmission/Distribution + Loads).</p>	<p style="text-align: center;"><u>Applications</u></p> <p>Conventional Loads options</p> <ul style="list-style-type: none"> • AEL-C-P-02S. Loads Systems with Automatic Power Factor Compensation and Protection Relays, with SCADA. (*) • AEL-C-02S. Loads Systems with Automatic Power Factor Compensation, with SCADA. (*) • AEL-C-P-01S. Loads Systems with Manual Power Factor Compensation and Protection Relays, with SCADA. (*) • AEL-C-01S. Loads Systems with Manual Power Factor Compensation, with SCADA. (*) <p>Special Loads options</p> <ul style="list-style-type: none"> • AEL-C-03S. Complex Load, Power Consumption Measurement and Peak Load Monitoring, with SCADA. (*) <p>(*) Available application without SCADA, application reference without the last "S".</p> <p>Each application can work individually or combined with other applications to form systems simulators (Generation + Transmission/Distribution + Loads).</p>
AEL-5.7. Modular Smart Grid Power Systems Simulators		
<ul style="list-style-type: none"> • AEL-MPSS-01. Modular Smart Grid Power Systems Simulator, with Automatic Control Generation, Transmission Line, Loads and Protection Relays, with SCADA. • AEL-MPSS-02. Modular Smart Grid Power Systems Simulator, with Automatic Control Generation, Transmission Line and Loads, with SCADA. • AEL-MPSS-03. Modular Smart Grid Power Systems Simulator, with Manual Control Generation, Transmission Line, Loads and Protection Relays, with SCADA. • AEL-MPSS-04. Modular Smart Grid Power Systems Simulator, with Manual Control Generation, Transmission Line and Loads, with SCADA. 		

See catalogue of: **AEL-5. Power Systems and Smart Grid Technology Lab**

Alarms:

- N-ALA01 Intrusion Alarm Station (8 circuits).
- N-ALA02 Fire Alarm Station with battery.
- N-ALA03 Coded Electronic key.
- N-ALA04 Intrusion Alarm Station by radio with programming (PC).

Audio:

- N-AUD01 Analog Sound Regulator.
- N-AUD02 Digital Sound Regulator.
- N-AUD03 Warnings Emitter Module.
- N-AUD04 Speaker of 2", 2W, 8 ohm.
- N-AUD05 Speaker of 4", 7W, 8 ohm.
- N-AUD06 Basic Audio Central.
- N-AUD07 Advanced Audio Central.
- N-AUD08 Background Music Regulator 3W.
- N-AUD09 Background Music Regulator 5W.
- N-AUD10 Double Background Music Regulator.
- N-AUD11 Plug for Mono Speaker.
- N-AUD12 Plug for Stereo Speakers.
- N-AUD13 Digital Controls, Walkman Input and Earphones Output.
- N-AUD14 FM Digital Turner Controls + Earphones Output.
- N-AUD15 Digital Controls for Transmission and Reception of Warnings, Earphones Output and Walkman Input.
- N-AUD16 2 Channel Digital Controls with Inter-communicator and Display.
- N-AUD17 FM Digital Tuner Controls.
- N-AUD18 Warning Selector, 9 zones.
- N-AUD19 Amplifier (30 W).
- N-AUD20 Analog Sound Regulator (mono-stereo).

Bells:

- N-TIM01 Bell 70 dB.
- N-TIM02 Buzzer 80 dB, 230 V.
- N-TIM03 2 Bells.
- N-TIM04 2 Buzzers.
- N-TIM05 Bell + Buzzer.
- N-TIM06 2 Buzzers 125/230 V.
- N-TIM07 2 Buzzers with Tone Regulator.
- N-TIM08 2 Piezoelectric Buzzers.
- N-TIM09 2 Tones domestic Bell (230 Vac).
- N-TIM10 2 Buzzers 24 Vac.
- N-TIM11 Bell 24 Vac.
- N-TIM12 Bell 230 Vac.

Brakes:

- FRE-FE Electronic Brake.
- DI-FRE Pendular Dynamo Brake.
- FREND Dynamo Brake.
- FRENP Magnetic Powder Brake.
- FRECP Eddy Current Brake.
- FYWL Flywheel.

Busbars:

- N-BUS01 Generation Busbar.
- N-BUS02 Coupling Busbar.
- N-BUS03 Grid Busbar.
- N-BUS04 Emitter Transport Busbar.
- N-BUS05 Receptor Transport Busbar.
- N-BUS06 Distribution Busbar.
- N-BUS07 Power Circuit Breaker.

Commutators:

- N-COM01 2 Positions Commutator, 1 inverter.
- N-COM02 2 Positions Commutator, 2 inverters.
- N-COM03 2 Positions Commutator, 1 NO + 1 NC.
- N-COM04 3 Positions Commutator, 1 inverter.
- N-COM05 3 Positions Commutator, 2 inverters.
- N-COM06 2 Positions Rotary Commutator with return to 0 (Power).
- N-COM07 2 Positions Rotary Commutator with return to 0 (Control).
- N-COM08 2 Positions Rotary Commutator with Key.
- N-COM09 4 Positions Rotary Commutator + Stop.
- N-COM10 Rotary Commutator for Voltmeter.
- N-COM11 Rotary Commutator for Ammeter.
- N-COM12 Commutator/ Switch.
- N-COM13 Double Commutator.
- N-COM14 2 Commutators.
- N-COM15 2 Commutators, 1 6 A.
- N-COM16 2 Commutators with Light.
- N-COM17 2 Inverters.
- N-COM18 2 Inverters with Light.
- N-COM19 Commutator + Inverter.
- N-COM20 Commutator + Group of 2 Switches.
- N-COM21 Inverter + Group of 2 Commutators.
- N-COM22 Commutator with Light + Inverter with Light.
- N-COM23 Commutator Group + Bell Push-Button + Switch.
- N-COM24 Commutator + Push-Button with Symbol to be chosen by the Customer.
- N-COM25 Removable Key Commutator, 2 Positions, 5A.
- N-COM26 Key Commutator, 2 Positions, with Interlock, 5A.
- N-COM27 Commutator with Label-Holder with Light.
- N-COM28 Group of 2 Commutators.
- N-COM29 Push-Button Group + Commutator.
- N-COM30 Commutator with Puller.

- N-COM31 4 Positions Rotary Commutator.
- N-COM32 3 Positions Rotary Commutator.
- N-COM33 Commutator with zero point.
- N-COM34 Commutator 20 A.
- N-COM35 Lighting Commutator.
- N-COM36 Lighting Commutator with zero point.
- N-COM37 Commutator with Luminous Screen (bell, bulb, wc, alarm...).

Contactors:

- N-CON01 3-pole Contactor (24 Vac).
- N-CON02 3-pole Contactor (220 Vac).
- N-CON03 3-pole Contactor (12 Vdc).
- N-CON04 3-pole Contactor, work retarded (24 Vac).
- N-CON05 3-pole Contactor, work retarded (220 Vac).
- N-CON06 3-pole Contactor, work retarded (12 Vdc).
- N-CON07 3-poles Contactor, rest retarded (24 Vac).
- N-CON08 3-poles Contactor, rest retarded (220 Vac).
- N-CON09 3-poles Contactor, rest retarded (12 Vdc).
- N-CON10 3-pole Contactor-Inverter (24 Vac).
- N-CON11 3-pole Contactor-Inverter (220 Vac).
- N-CON12 3-pole Contactor-Inverter (12 Vdc).
- N-CON13 4-pole Contactor (24 Vac).
- N-CON14 4-pole Contactor (220 Vac).
- N-CON15 4-pole Contactor (12 Vdc).

Control:

- N-CTR01 Basic Control Module.
- N-CTR02 Advanced Control Module.
- N-CTR03 Burglar Control Module.
- N-CTR04 Power Module 15 W.
- N-CTR05 Power Module 72 W.
- N-CTR06 Modem Module.
- N-PFD Power Flow Distribution Module.
- N-MSM Manual Synchronization Module.
- N-ASYB Basic Synchronization Module.
- N-AVR/P Automatic Voltage Regulator.
- N-ASY3PH Three-phase Automatic Synchroscope.
- N-BTBINV Back to Back Inverter.

Detectors:

- N-DET01 Flooding Detector.
- N-DET02 Gas Detector.
- N-DET03 Fitted Power Supply.
- N-DET04 Fitted Flooding Detector.
- N-DET05 Gas Detector for domestic control.
- N-DET06 Smoke Detector.
- N-DET07 Ionization Smoke Detector.
- N-DET08 Optic Smoke Detector.
- N-DET09 Intrusion Detector for domestic control.
- N-DET10 Water Electro-valve.
- N-DET11 Probe for Water Electro-valve.
- N-DET12 Gas Electro-valve.
- N-DET13 Wireless Intrusion Detector RF.
- N-DET14 Wireless Panic Push-button RF.
- N-DET15 Wireless 1-channel Receptor RF.
- N-DET16 Battery Module for domestic control.
- N-DET17 Temperature Probe.
- N-DET18 Passive Infrared Detector PIR.
- N-DET19 Twilight Detector.
- N-DET20 Light Detector.
- N-DET21 Fire Detector through Ionization.
- N-DET22 Fire Thermal Detector.
- N-DET23 Gas Electronic Detector.
- N-DET24 CO Detector with relay output (230 V, 50 Hz).
- N-DET25 Microwaves Detector/Switch.
- N-DET26 Open Door Magnetic Detector.
- N-DET27 Glass Break Detector.
- N-DET28 Inertia Detector.
- N-DET29 Passive Infrared Presence Detector.
- N-DET30 Microwave Presence Detector.
- N-DET31 Thermo-velocimetric Detector.
- N-DET32 Magnetic Proximity Detector.
- N-DET33 Optic Proximity Detector.
- N-DET34 CO Detector.
- N-DET35 Passive Infrared Alarm-Detector.

EIB Technology modules:

- N-LREG Lighting regulator.
- N-BOU Binary output.
- N-UDIM Universal dimmer.
- N-PUSHM Pushbuttons module.
- N-ACTS Actuator for the shutters.
- N-MOTS Motor for the shutters.
- N-TREG Temperature regulator.
- N-AVAL Actuator for the valve.
- N-COMM Communication module.
- N-MOVS Motion Sensor.
- N-SMDE Smoke detector.
- N-PLAM Plugs with lamps.
- N-CSW Clock switch.
- N-TCH Touch panel.
- N-SEC Scenery/event controller.

Faults Simulation:

N-SAV01	Simulation of 2 Earth Electrodes with Variable Resistance.
N-SAV02	Simulation Equipment of 3 different strange masses.
N-SAV03	Equipotential Collector with 2 strange masses.
N-SAV04	3-Phase + neutral System and AC/DC load, with earth fault simulation.
N-FAULT	Fault Injection module.
N-FMAC	Fault Injection module for three-phase induction motors.

Fuses:

N-FUS01	Fuses 20 A (include 2-5-10-20 A).
N-FUS02	Fuses 32 A (include 8-16-20-32 A).
N-FUS03	3 Fuse-holders 16 A, 380 Vac (include 2,4,6,10,16A).
N-FUS04	3 Fuse-holders 10 A, 230 Vac (include 2,4,6,10 A).
N-FUS05	5 Sectionalizing Fuse-holders (until 25 A, include fuses 6 A).
N-FUS06	Rail Mount Fuse-holder + Panel Mount Fuse-holder.
N-FUS07	3 Panel Mount Fuse-holders.
N-FUS10	Module with 3 fuse-holders and power fuses.
N-FUS11	4 Panel Mount Fuses.

Indicators:

N-IND01	Nurse Panel.
N-IND02	Patient Room Panel.
N-IND03	Luminous Calling Panel.

Intercom-Interphone System:

N-POR01	Phones Power Supply.
N-POR02	Phone.
N-POR03	Interphone.
N-POR04	Video Camera.
N-POR05	Phone / Monitor.
N-POR06	Lock.
N-POR07	Digital Station.
N-POR08	Video - Interphone Power Supply.

Lamps:

N-LAM01	Lamps.
N-LAM02	Auxiliary Lamps (3 lamps, 24 Vac).
N-LAM03	3 Push-buttons and Lamps.
N-LAM04	3 Push-buttons and Lamps (24 Vac).
N-LAM05	Lamp-holder.
N-LAM06	Signs Indicator.
N-LAM07	Emergency Light.
N-LAM08	2 Lamp-holders + Incandescent Lamps.
N-LAM08B	Incandescent Lamp.
N-LAM09	Fluorescent Lamp.
N-LAM10	2 Halogen Lamps.
N-LAM11	2 Turning Halogen Lamps.
N-LAM12	Halogen Lamp with Transformer.
N-LAM13	2 Low Consumption Fluorescent Lamps.
N-LAM14	Direction Indicator Lamp (24 Vac).
N-LAM15	Number Indicator Lamp (24 Vac).
N-LAM16	Halogen Lamp.
N-LAM20	Auxiliary lamps (4 lamps).
N-LAM26	Lighting Module.
N-LAM30	Luminous panel, 24 V.
N-LAM32	LED Lamp.
LAMP4	4 Lamps Panel.

Loads:

N-CAR01	Fixed Resistive Load, 150 ohm, 500 W.
N-CAR02	Double Fixed Resistive Load, 150 ohm, 500 W.
N-CAR03	Fixed Resistive Load (custom-made).
N-CAR04	Variable Resistive Load, 150 ohm, 500 W.
N-CAR05	Double Variable Resistive Load, 150 ohm, 500 W.
N-CAR06	Variable Resistive Load (custom made).
N-CAR07	3-phase Variable Resistive Load, 3 x 150 ohm, 500 W.
N-CAR08	3-phase Variable Resistive Load (custom made).
N-CAR09	Capacitive Load 4 x 7 µF.
N-CAR10	Capacitive Load.
N-CAR11	3-phase Capacitive Load.
N-CAR12	Inductive Load 0-33-78-140-193-236 mH.
N-CAR13	Inductive Load (custom made).
N-CAR14	3-phase Inductive Load.
N-CAR15	Current Transformer Load.
N-CAR16	Voltage Transformer Load.
N-CAR17	Line Capacitor.
N-CAR18	Aerial Line Model.
N-CAR18/A	Rheostat for Equivalent Circuit of an Electric Line.
N-CAR18/B	Inductance for Equivalent Circuit of an Electric Line.
N-CAR18/C	Capacitor for Equivalent Circuit of an Electric Line.
N-CAR19	Single-phase Commutable Capacitor Load.
N-CAR20	Diodes and Thyristors.
N-CAR21	Inductive and Capacitive Loads.
N-CAR22	AC Starting Rheostat.
N-CAR23	DC Starting Rheostat.
N-CAR24	Field Rheostat.
N-CAR30	Inductances Module.
N-CAR31	Capacitors Module.
N-CAR32	Rectifier Diodes Module.
N-CAR33	Resistive Components Module.

N-CAR34	Single-phase rectifier diodes.
N-REF	Resistor Load with commutator.
N-REFT	Three-phase Resistor Load with commutator.
N-REFT300	300 Ohms Three-phase Fixed Resistor Module.
N-IND	Variable Inductive Load with commutator.
N-INDT	Three-phase Variable Inductive Load with commutator.
N-CON	Variable Capacitor Load with commutator.
N-CONT	Three-phase Variable Capacitor Load with commutator.
N-REV	Variable Resistor.
N-REVT	Three-phase Variable Resistor.
N-RCL3R	Resistive, Inductive and Capacitive Loads Module.
N-RCL3R/B	Universal Loads Module.
N-CAR19T3	Three-Phase Bank of Commutable Capacitors Module.
N-CAR19T3D	Three-Phase Digital Bank of Commutable Capacitors Module.
N-CAR35T3	Three-Phase Bank of Commutable Resistors Module.
N-CAR35T3D	Three-Phase Digital Bank of Commutable Resistors Module.
N-CAR36T3	Three-Phase Bank of Commutable Inductances Module.
N-CAR36T3D	Three-Phase Digital Bank of Commutable Inductances Module.
N-CAR19T4D	Three-Phase Digital Capacitor Banks Module.
N-CAR19S4D	Single-Phase Digital Capacitor Banks Module.
N-CAR35T3/1.2K	1.2KW Three-Phase step-variable resistor load Module.
N-CAR36T3/0.9K	0.9Kvar Three-Phase step-variable inductive load Module.
N-CAR19T3/0.8K	0.8Kvar Three-Phase step-variable capacitive load Module.

Meters:

N-MED01	DC Micro-ammeter (0-100 microA).
N-MED02	DC Micro-ammeter (0-600 microA).
N-MED03	DC Milliammeter (0-100 mA).
N-MED04	DC Milliammeter (0-600 mA).
N-MED05	DC Ammeter (0-1.5 A).
N-MED06	DC Ammeter (custom-made).
N-MED07	AC Milliammeter (0-100 mA).
N-MED08	AC Milliammeter (0-600 mA).
N-MED09	AC Ammeter (0-2.5 A).
N-MED10	AC Ammeter (0-5 A).
N-MED11	AC Ammeter (0-10 A).
N-MED12	AC Ammeter (custom-made).
N-MED13	DC Millivoltmeter (0-100 mV).
N-MED14	DC Millivoltmeter (0-600 mV).
N-MED15	DC Voltmeter (0-5 V).
N-MED16	DC Voltmeter (0-50 V).
N-MED17	DC Voltmeter (0-200 V).
N-MED18	DC Voltmeter (custom-made).
N-MED19	AC Voltmeter (0-10 V).
N-MED20	AC Voltmeter (0-60 V).
N-MED21	AC Voltmeter (0-250 V).
N-MED22	AC Voltmeter (0-400Vac).
N-MED23	AC Voltmeter (custom-made).
N-MED24	AC Double Voltmeter.
N-MED25	Pointer Frequency Meter (45-65 Hz).
N-MED26	Frequency Meter.
N-MED27	Reed Frequency Meter 60 Hz.
N-MED28	Reed Double Frequency Meter 46-64 Hz.
N-MED29	Tachymetric Voltmeter (custom made).
N-MED30	1-Phase Phasemeter 230 V.
N-MED31	3-Phase Phasemeter 400 V.
N-MED32	1-Phase Wattmeter 230 V.
N-MED33	3-Phase Balanced Wattmeter 440 V.
N-MED34	3-Phase Balanced Wattmeter (4 wires) 440 V.
N-MED35	3-Phase Unbalanced Wattmeter (3 wires) 440 V.
N-MED36	3-Phase Unbalanced Wattmeter with neutral (4 wires) 440 V.
N-MED37	3-Phase Unbalanced Wattmeter (3 systems) 440 V.
N-MED38	1-Phase Varmeter 230 V.
N-MED39	3-Phase Balanced Varmeter 440 V.
N-MED40	3-Phase Balanced Varmeter (4 wires) 440 V.
N-MED41	3-Phase Unbalanced Varmeter (3 wires) 440 V.
N-MED42	3-Phase Unbalanced Varmeter with neutral (4 wires) 440 V.
N-MED43	3-Phase Unbalanced Varmeter (3 systems) 440 V.
N-MED44	Phase Sequence Indicator.
N-MED45	1-Phase Synchronization Equipment.
N-MED46	3-Phase Synchronization Equipment.
N-MED47	Pulse Counter.
N-MED48	Hour Counter 24 V / 50 Hz.
N-MED49	Hour Counter.
N-MED50	Hour Counter 12 - 36 Vdc.
N-MED51	Insulation Indicator 440 V.
N-MED52	Insulation Indicator 440 V with optic and acoustic signalling.
N-MED53	Sound Tester of Continuity.
N-MED54	1-Phase Maximum Current Meter + Alarm.
N-MED55	3-Phase Maximum Current Meter, 4 wires.
N-MED56	Maximum Power Meter.
N-MED57	3-Phase Active Energy Meter.
N-MED58	3-Phase Reactive Energy Meter.
N-MED59	Chronometer.
N-MED63	Synchroscope.
N-MED64	Phase Sequence Indicator.

Continue...

Meters: (continuation)

N-MED65	Digital Multimeter.
N-MED65/A	Advanced Digital Multimeter.
N-MED66	Indicator of Phase Presence / Absence.
N-MED67	Thermometer (Room Temperature).
N-MED68	Hygrometer.
N-MED69	Hygrostat.
N-MED70	Quartz Analog Clock.
N-MED71	Digital Alarm Clock (with Thermometer and 2 Alarms).
N-MED72	Energy Counter.
N-MED73	1-Phase Light Counter.
N-MED74	3-Phase Light Counter.
N-MED75	Digital Meteorological Station.
N-MED76	Thermostat for Heating.
N-MED77	Thermostat for Heating and Refrigeration.
N-MEDV	Analog Voltmeter.
N-MEDI	Analog Ammeter.
N-TMEDV	Three-phase Analog Voltmeter.
N-TMEDI	Three-phase Analog Ammeter.
N-MPDM	Mechanical Power Digital Measurement Unit.
N-MUAD	Electric Power Data Acquisition System.
N-TM	Torque Measurement Unit.
STRO	Stroboscope.
TECNEL/T	Tachogenerator.
TECNEL/TM	Optical Speed Meter.
N-EAL	Network Analyzer Unit.
N-EALAR	Network Analyzer Unit with active and reactive energy counters.
N-EALD	Network Analyzer Unit with Computer Data Acquisition.
N-EALDG	Network Analyzer Unit with Computer Data Acquisition + Oscilloscope Display.
N-EAL-DC	DC Network Analyzer Unit.
N-EALDC/G	DC Generator Analyzer.
N-EAM-VA	Analog Measurement Unit.
N-EAM-DC	Analog Measurement Unit. (DC)
N-EME-SA	Advanced Synchronous Module.
LOCL	Load Cell.
N-DMM	Dynamometer.
N-ASY	Synchroscope Module.
N-EMSD	Advanced Digital Synchroscope Module.
N-MSM	Manual Synchronization Module.
N-CTT	Data Concentrator Module.
N-SM	Smart Meter Module.
BRLA	Compass to observe the rotating magnetic field.

Motor Controllers:DC Motor Controllers

N-WCC/M	DC Motor Speed Controller.
N-WCC	Advanced DC Motor Speed Controller.
N-VVPP/B	Stepper Motor Controller (manual control).
N-VVPP	Stepper Motor Controller (manual control and automatic control).

AC Motor Controllers

N-WCA/M	AC Motor Speed Controller.
N-WCA	Advanced AC Motor Speed Controller.
N-WCA4K	4 kW Motor Controller Module.
N-DFGC	Double-feed Generator Control Module.
N-WCA5K.	5 kW Motor Speed Controller.

Motors:DC Motors

EMT1	DC Independent excitation motor-generator.
EMT2	DC Series excitation motor-generator.
EMT3	DC Shunt excitation motor-generator.
EMT4	DC Compound excitation motor-generator.
EMT5	DC Shunt-series compound excitation motor.
EMT12	Universal Motor.
EMT15	DC Permanent magnet motor.
EMT18	DC Brushless motor.
EMT19	Stepper motor.

AC Motors

EMT6	AC Synchronous three-phase motor alternator.
EMT6-B	Permanent magnets synchronous three-phase generator.
EMT6/1K	1KW Three-phase Synchronous Machine.
EMT7	Asynchronous three-phase motor of squirrel cage.
EMT7-B	Asynchronous three-phase motor of squirrel cage (4 poles).
EMT7-C	Asynchronous three-phase motor of squirrel cage (8 poles).
EMT8	Asynchronous three-phase motor with wound rotor.
EMT8DF	Double Feed Induction Generator.
EMT8-DF	1.5KW Three-Phase Induction Motor with Slip Rings and Wound Rotor.
EMT9	Dahlander three-phase motor.
EMT10	Asynchronous three-phase motor of two independent speeds.
EMT11	Asynchronous single-phase motor with starting capacitor.

EMT12	Universal Motor.
EMT14	Repulsion motor, single phase with short circuited brushes.
EMT16	Asynchronous single-phase motor with starting and running capacitor.
EMT17	Asynchronous three-phase motor of squirrel cage with «Y» connection.
EMT20	Asynchronous single-phase motor with split phase.
EMT21	Three-phase reluctance motor.
EMT22	Single-phase shaded pole motor.
EMT23	Linear Motor.
GMG4K	4 kW Generator-Group.
GMG4.5K3PH	4.5 KW Generator-Motor Group.
GMG1.5K3PH	1.5KW Slip Ring Generator-Motor Group.
N-SERV1K	1 kW Servomotor Module.

Motors (cut away):

EMT1-S	Cut away DC independent excitation motor-generator.
EMT2-S	Cut away DC series excitation motor-generator.
EMT3-S	Cut away DC shunt excitation motor-generator.
EMT4-S	Cut away DC compound excitation motor-generator.
EMT5-S	Cut away DC shunt-series compound excitation motor.
EMT6-S	Cut away AC synchronous three-phase motor alternator.
EMT7-S	Cut away asynchronous three-phase motor of squirrel cage.
EMT8-S	Cut away asynchronous three-phase motor with wound rotor.
EMT9-S	Cut away Dahlander three-phase motor.
EMT10-S	Cut away asynchronous three-phase motor of two independent speeds.
EMT11-S	Cut away asynchronous single-phase motor with starting capacitor.
EMT12-S	Cut away universal motor.
EMT14-S	Cut away repulsion motor, single phase with short circuited brushes.
EMT15-S	Cut away DC permanent magnet motor.
EMT16-S	Cut away asynchronous single-phase motor with starting and running capacitor.
EMT17-S	Cut away asynchronous three-phase motor of squirrel cage with «Y» connection.
EMT18-S	Cut away DC Brushless motor.
EMT19-S	Cut away stepper motor.
EMT20-S	Cut away asynchronous single-phase motor with split phase.
EMT21-S	Cut away three-phase reluctance motor.
EMT22-S	Cut away single-phase shaded pole motor.

Motors (transparent and functional):

EMT1-T	Transparent and functional DC independent excitation motor-generator.
EMT2-T	Transparent and functional DC series excitation motor-generator.
EMT3-T	Transparent and functional DC shunt excitation motor-generator.
EMT4-T	Transparent and functional DC compound excitation motor-generator.
EMT5-T	Transparent and functional DC shunt-series compound excitation motor.
EMT6-T	Transparent and functional AC synchronous three-phase motor alternator.
EMT7-T	Transparent and functional asynchronous three-phase motor of squirrel cage.
EMT8-T	Transparent and functional asynchronous three-phase motor with wound rotor.
EMT9-T	Transparent and functional Dahlander three-phase motor.
EMT10-T	Transparent and functional asynchronous three-phase motor of two independent speeds.
EMT11-T	Transparent and functional asynchronous single-phase motor with starting capacitor.
EMT12-T	Transparent and functional universal motor.
EMT14-T	Transparent and functional repulsion motor, single phase with short circuited brushes.
EMT16-T	Transparent and functional asynchronous single-phase motor with starting and running capacitor.
EMT17-T	Transparent and functional asynchronous three-phase motor of squirrel cage with «Y» connection.
EMT20-T	Transparent and functional asynchronous single-phase motor with split phase.
EMT21-T	Transparent and functional three-phase reluctance motor.
EMT22-T	Transparent and functional single-phase shaded pole motor.

Motors (disassembly):

EMT5-D	Disassembly DC shunt-series compound excitation motor.
EMT7-D	Disassembly asynchronous three-phase motor of squirrel cage.
EMT8-D	Disassembly asynchronous three-phase motor with wound rotor.
EMT16-D	Disassembly asynchronous single-phase motor with starting and running capacitor.
EMT20-D	Disassembly asynchronous single-phase motor with split phase.

Continue...

Overvoltage:

N-SOB01	1-Pole Transient Overvoltage Limiter.
N-SOB02	1-Pole + neutral Transient Overvoltage Limiter.
N-SOB03	3-Pole Transient Overvoltage Limiter.
N-SOB04	3-Pole + neutral Transient Overvoltage Limiter.
N-SOB05	2-Pole Transient Overvoltage Limiter (Analog Telephonic Lines).
N-SOB06	2-Pole Transient Overvoltage Limiter (Digital Telephonic Lines).
N-SOB07	2-Pole Permanent Overvoltage Limiter.
N-SOB08	Transient Overvoltage Double Limiter.

PLC modules:

N-EME-PLCE	Electrical Machines PLC Unit.
N-EME-PLCEA	Advanced PLC Unit.
N-PLC01	PLC01 Control Module.
N-PLC02	PLC02 Control Module.
N-PLC03	PLC03 Control Module.
N-PLC04	PLC04 Control Module.
N-PLC05	PLC05 Control Module.
N-PLC06	PLC06 Control Module.

Power Supply:

N-ALI01	Industrial Main Power Supply.
N-ALI02	Main Power Supply.
N-ALI03	AC Auxiliary Power Supply.
N-ALI04	DC Auxiliary Power Supply (+12,0,-12Vdc).
N-ALI05	Jumpers.
N-ALI06	Adjustable AC Power Supply.
N-ALI07	Adjustable DC Power Supply.
N-ALI08	Standby Battery, 12 Vdc.
N-ALI10	Power Supply Module.
N-ACPWS	AC Motor Power Supply.
N-DCPWS	DC Motor Power Supply.
N-EME-U	Electrical Machines Unit - Universal Power Supply.
N-PWFI	Three-phase supply with low voltage protection 400 V/16A.

Push Buttons:

N-PUL01	Emergency Stop Push-Button (220 Vac).
N-PUL02	Mushroom Push-Button (24 Vac).
N-PUL03	Push-Buttons with Light (220 Vac).
N-PUL04	Push-Buttons with Light (24 Vac).
N-PUL05	Power Circuit 3 Push-Buttons.
N-PUL06	Control Circuit 3 Push-Buttons.
N-PUL07	Box of 3 Push-Buttons for Industrial use.
N-PUL08	Box of 3 Auxiliary Push-Buttons.
N-PUL09	Push-Button with Auxiliary Light (230 Vac).
N-PUL10	Push-Button with Auxiliary Light (24 Vac).
N-PUL11	2 Double Push-Buttons (230 Vac).
N-PUL12	2 Double Push-Buttons(24 Vac).
N-PUL13	2 Positions Actuators.
N-PUL14	4 Positions Actuators.
N-PUL15	Hanging Push-Button.
N-PUL16	Push-Button for Industrial use.
N-PUL17	Double Push-Button for Industrial use.
N-PUL18	Waiver Push-Button.
N-PUL19	Bell Push-Button /Open the Door.
N-PUL20	2 Bell Push-Buttons.
N-PUL21	2 Bell Push-Buttons with Light.
N-PUL22	2 Light Push-Buttons.
N-PUL23	2 Push-Buttons with Symbol to be chosen by the Customer.
N-PUL24	2 Light Push-Buttons with pilot-light.
N-PUL25	2 Disconnecting Push-Buttons (NC) with Symbol to be chosen by the Customer.
N-PUL26	2 Push-Buttons with Green/Red pilot-light 24 Vdc.
N-PUL27	Neutral Push-Button.
N-PUL28	Neutral Push-Button with Light.
N-PUL29	2 Push-Buttons Group for Blinds (without Interlock).
N-PUL30	2 Push-Buttons Group for Blinds (with Interlock).
N-PUL31	2 Push Buttons Group (2 inputs + 2 outputs).
N-PUL32	2 Push Buttons Group (1 input + 2 outputs).
N-PUL33	Push-Button with Label-holder with Light.
N-PUL34	Pull Push-Button.
N-PUL35	Push-Button with Label-holder/Commutator with Label-holder.
N-PUL36	Push-Button / Key Commutator.
N-PUL37	Push-Buttons with / without Interlocking, 1NO+1NC.
N-PUL38	Push-Buttons with / without Interlocking, 2NO.
N-PUL39	Lighting Push-Button with Light, NO+NC.
N-PUL40	Lighting Push-Button with Light, NC.
N-PUL41	Lighting Push-Button without Light, NC.
N-PUL42	Push-Button with Luminous Screen (bell, bulb, wc, alarm...).
N-PUL43	Touch-Type Push-Button with Time Delay.
N-PUL44	Numbered Light Push-Buttons (24 Vac).
N-PUL45	2 Double Chamber Push-Buttons.

N-PUL48

N-PUL50

N-PUL51

Regulators:

N-REG01	Continuous Voltage Regulator 5-12-24 Vdc.
N-REG02	Voltage Electronic Regulator (300 W).
N-REG03	Voltage Electronic Regulator (1000 W).
N-REG04	Voltage Electronic Regulator (500 VA).
N-REG05	Reactive Energy Regulator.
N-REG06	Voltage Electronic Regulator (Switch) Module.
N-REG07	Voltage Electronic Regulator (Switch/Commutator) 40 to 500W/230 Vac.
N-REG08	Electronic Regulator for Fluorescent Lamps (Switch / Commutator).
N-REG09	Electronic Regulator for Halogen Lamps with Transformer.
N-REG10	Universal Electronic Regulator (Switch/Commutator) 40 to 420W/230 Vac.
N-REG11	Touch Type Voltage Electronic Regulator.
N-REG12	Infrared Voltage Regulator.
N-REG13	Infrared Remote Control.
N-REG14	Light Intensity Regulator (1000 W, 230 Vac).
N-REG15	Tap Regulator Module.
N-VREG	Voltage Regulator Module.
N-CNV	Level controller.
N-CFP	Advanced Power Factor Controller Module.
N-CFPS	Single-phase Automatic Power Factor Controller.

Relays:

N-REL01	Thermal Relay (1 - 1.6 A).
N-REL02	Thermal Relay (1.6 - 2.5 A).
N-REL03	Thermal Relay (2.5 - 4 A).
N-REL04	Thermal Relay (4 - 6 A).
N-REL05	Thermal Relay / 3-pole Phase fault (0.8 - 1.2 A).
N-REL06	Thermal Relay / 3-pole Phase fault (1.8 - 2.6 A).
N-REL07	Thermal Relay / 3-pole Phase fault (2.6 - 3.7 A).
N-REL08	Time Overcurrent Electronic Relay (0.3 - 1.5 A).
N-REL09	Time Electronic Relay against Overcurrents (1.2 - 7 A).
N-REL10	Instantaneous Relay.
N-REL11	Time Relay (0.6-60 sec.).
N-REL12	Time Relay (3 - 300 sec.).
N-REL13	Monostable Relay.
N-REL14	Bistable Relay.
N-REL15	Astable Relay.
N-REL16	Solid-state Relay, 10 A, 230 V.
N-REL17	Solid-state Relay, 25 A, 230 V.
N-REL18	Solid-state Relay, 12 A, 400 V.
N-REL19	2 Solid-state Relays, 10 A, 230 V.
N-REL20	1-Phase Directional Relay.
N-REL21	Overvoltage Relay.
N-REL21B	Subvoltage Relay.
N-REL22	Multi-function Protection Relay (software included).
N-REL23	Overcurrent Relay and Fault to Earth.
N-REL23/A	Earth Leakage Relay.
N-REL23/B	Overcurrent Relay.
N-REL24	Auxiliary Relay.
N-REL25	Detection Relay of Insufficient Voltage.
N-REL26	Reactive Energy Regulator Relay.
N-REL27	Current Control Relay.
N-REL28	Voltage Control Relay.
N-REL29	Harmonics Detector Relay.
N-REL30	Synchronization Relay.
N-REL31	Domestic Control Relay 16 A, 230 Vac, 1NO + 1NC.
N-REL32	Domestic Control Relay 16 A, 230 Vac, 2NO.
N-REL33	Switch Relay 230 Vac.
N-REL34	Commutator Relay 230 Vac.
N-REL35	Switch Relay 24 Vdc.
N-REL36	Commutator Relay 24 Vdc.
N-REL37	Relay with Buzzer.
N-REL38	Current Relay (custom made).
N-REL39	Programmable Relay with Display and Software for PC computer.
N-REL41	Auxiliary relay with disconnection button.
N-REL45	Module with disjunctur.
N-REL46	Thermal Electric Motor Protection Module.
N-REL47	Thermal Relay.
N-REL50	Relays Module.
N-REL51	Reverse power relay.
N-DIF	Differential Protection.
N-DIFVS	Differential Protection with variable sensitivity.
N-DIFR	Differential Protection with automatic resetting.
N-TDIF	Three-phase Differential Protection.
N-TDIFVS	Three-phase Differential Protection with variable sensitivity.
N-TDIFFR	Three-phase Differential Protection with automatic resetting.
N-TSTF	Tester Protection module.
N-TSTF3	Tester Protection module (3-phase).

Continue...

Relays: (continuation)

N-MPS	Motor protection module.
N-GDP	Generator differential protection module.
N-REP	Rotor earth-fault protection module.
N-TOP	Time Overcurrent protection module.
N-ULP	Unbalanced Load protection module.
N-ERP-PGC01	Generator Protection and Control Relay Module.
N-ERP-PDF01	Differential Protection Relay Module.
N-ERP-MA01	Feeder Management Relay Module.
N-ERP-MF01	Digital Fault Simulator Module.
N-ERP-SFT01	Overcurrent Protection Relay Module.
N-ERP-PD01	Distance Protection Relay Module.
ERP-UB	Protection Relays Test Unit.
ERP-PDF	Differential Protection Relay Module.
ERP-MA	Feeders Management Relay Module.
ERP-SFT	Overcurrent and Earth Fault Protection Relay Module.
ERP-SDND	Directional/Non Directional Overcurrent Protection Relay Module.
ERP-PD	Distance Protection Relay Module.

Sensors:

N-SEN01	Instantaneous Micro-switch.
N-SEN02	MBB Micro-switch.
N-SEN03	BBM Micro-switch.
N-SEN01 / N-SEN02 / N-SEN03	Module Control.
N-SEN04	Inductive Proximity Sensor type PNP.
N-SEN05	Cylindrical Inductive Proximity Sensor.
N-SEN06	Flat Inductive Proximity Sensor Type PNP.
N-SEN07	Flat Inductive Proximity Sensor Type NPN.
N-SEN08	Cylindrical Inductive Rotation Control Sensor.
N-SEN09	Flat Inductive Rotation Control Sensor.
N-SEN10	Cylindrical Inductive Proximity Sensor (4 - 20 mA).
N-SEN11	Flat Inductive Proximity Sensor (4 - 20 mA).
N-SEN12	Flat Inductive Proximity Sensor (0 - 10 V).
N-SEN13	DC Cylindrical Capacitive Proximity Sensor.
N-SEN14	Cylindrical Capacitive Proximity Sensor.
N-SEN15	DC Rectangular Capacitive Proximity Sensor.
N-SEN16	AC Rectangular Capacitive Proximity Sensor.
N-SEN17	Ultrasonic Proximity Sensor.
N-SEN18	Cylindrical Photoelectric Sensor.
N-SEN19	Miniature Photoelectric Sensor.
N-SEN20	Compact Photoelectric Sensor.
N-SEN21	Barrier Photoelectric Sensor (Emitter).
N-SEN22	Barrier Photoelectric Sensor (Receptor).
N-SEN23	Reflecting Photoelectric Sensor (Emitter).
N-SEN24	Reflecting Photoelectric Sensor (Receptor).
N-SEN25	Level Magnetic Sensor.
N-SEN26	Presence and Motion Sensor (Wall).
N-SEN27	Presence and Motion Sensor (Ceiling).
N-SEN28	Cylindrical Inductive Proximity Sensor (2 wires).
N-SEN29	Cylindrical Inductive Proximity Sensor.

Signal Plugs:

N-TSE01	Telephony 4 Plugs.
N-TSE02	Telephony 6 Plugs.
N-TSE03	Radio -TV Plug (inductive) Unique.
N-TSE04	Radio -TV Plug (inductive) Intermediate.
N-TSE05	Radio -TV Plug (inductive) Final.
N-TSE06	Radio -TV Plug (inductive) Series.
N-TSE07	Radio -TV + Satellite Plug Unique.
N-TSE08	Radio -TV + Satellite Plug Intermediate.
N-TSE09	Radio -TV + Satellite Plug Final.
N-TSE10	Computer Connection RJ-45.
N-TSE11	Computer Connection RJ-11/12.
N-TSE12	Shaver Plug 115 / 230 V.

Signalling:

N-SEL01	Light Signalling Beacons (lamps).
N-SEL02	Blinking Signalling Beacons.
N-SEL03	3 Pilot-Lights.
N-SEL04	4 Pilot- Lights.
N-SEL05	Rotatory Light Halogen Lamp 70 W.
N-SEL06	Rotatory Light Incandescent Lamp 25 W.
N-SEL07	Industrial Siren.
N-SEL08	Autonomous Emergency Beacons.
N-SEL09	Double Luminous Signalling red-green.
N-SEL10	Double Luminous Signalling red-green 24 Vac.
N-SEL11	Stop / Go Signalling.
N-SEL12	Digital Indicator Voltmeter / Ammeter.
N-SEL13	Luminous Indicator, 1-Phase Voltage 230 Vac.
N-SEL14	Luminous Indicator of 3-Phase Voltage Fault.
N-SEL15	Lighting Luminous Indicator 230 Vac.

N-SEL16	Siren with Blinking Beacon 24 Vdc.
N-SEL17	Fire Indicators, Bell type.
N-SEL18	Emergency Fluorescent Lamp.
N-SEL19	2 Blinking Beacons.
N-SEL20	Water Proof Hublot + Water Proof Switch / Commutator.
N-SEL21	Indoor Siren.
N-SEL22	Beacon with Flasher Filament and Pyramidal Len.
N-SEL24	3 Blinking lamps, 24 V.
N-SEL40	Sound Element.

Sockets:

N-ENC01	1-Phase European Socket.
N-ENC02	1-Phase American Socket.
N-ENC03	1-Phase Industrial Socket.
N-ENC04	3-Phase Socket.
N-ENC05	3-Phase Socket with ground terminal + neutral.
N-ENC06	3-Phase Socket with ground terminal.
N-ENC07	3-Phase Industrial Socket with ground terminal.
N-ENC08	Universal Socket.
N-ENC09	2-pole European Socket with Safety Device.
N-ENC10	2-pole European Socket with Displaced ground terminal.
N-ENC11	2-pole European Socket with Lateral ground terminal and Safety Device.
N-ENC12	2-pole European Socket, French System.
N-ENC13	Mixed (European-American) 2-pole Polarized Socket with ground terminal.
N-ENC14	Wireless Socket / Receptor.
N-ENC15	British Socket with ground terminal.
N-ENC17	2 Domestic Sockets.
N-ENC18	2 Industrial Single-phase Sockets.
N-ENC20	2 industrial Three-phase Sockets.

Starters/Commutators:

N-ARR01	Manual Star-Delta Starter.
N-ARR02	Temporized Star-Delta Starter.
N-ARR03	Manual Auto-transformer Starter.
N-ARR04	Temporized Auto-transformer Starter.
N-ARR05	Manual Star-Delta Starter with Inversion.
N-ARR06	Temporized Star-Delta Starter with Inversion.
N-ARR07	Manual Dahlander Commutator, 2 Speeds.
N-ARR08	Temporized Dahlander Commutator, 2 Speeds.
N-ARR09	Manual Independent Windings Commutator, 2 speeds.
N-ARR10	Temporized Independent Windings Commutator, 2 speeds.
N-ARR11	Poles Commutation with Inversion.
N-ARR12	Direct Starter.
N-ARR13	Direct Starter with Inversion.
N-ARR14	Switches and Push-buttons Module for motor control.
N-ARR15	Compact Direct Starter.
N-ARR16	Electronic Soft Starter.

Switches: Differential Automatic Switches:

N-IAD01	1-pole + neutral Differential Automatic Switch, 6A, 30 mA, class A.
N-IAD02	1-pole + neutral Differential Automatic Switch, 10A, 30 mA, class A.
N-IAD03	1-pole + neutral Differential Automatic Switch, 10A, 30 mA, class AC.
N-IAD04	1-pole + neutral Differential Automatic Switch, 16A, 30 mA, class A.
N-IAD05	1-pole + neutral Differential Automatic Switch, 16A, 30 mA, class AC.
N-IAD06	1-pole + neutral Differential Automatic Switch, 25A, 30 mA, class A.
N-IAD07	1-pole + neutral Differential Automatic Switch, 25A, 30 mA, class AC.
N-IAD08	1-pole + neutral Differential Automatic Switch, 40A, 30 mA, class A.
N-IAD09	1-pole + neutral Differential Automatic Switch, 40A, 30 mA, class AC.
N-IAD10	2-pole Differential Automatic Switch 16A, 10 mA, class AC.
N-IAD11	2-pole Differential Automatic Switch 25A, 30 mA, class AC.
N-IAD12	2-pole Differential Automatic Switch 40A, 30 mA, class AC.
N-IAD13	3-pole + neutral Differential Automatic Switch, 25A, 300mA, class AC, instantaneous.
N-IAD14	3-pole + neutral Differential Automatic Switch, 25A, 300mA, class AC, selective.
N-IAD15	3-pole + neutral Differential Automatic Switch, 40A, 300mA, class AC, instantaneous.
N-IAD16	3-pole + neutral Differential Automatic Switch, 40A, 300mA, class AC, selective.
N-IAD17	4-pole + neutral Differential Automatic Switch, 63A, 300mA, class AC, instantaneous.
N-IAD18	4-pole + neutral Differential Automatic Switch, 63A, 300mA, class AC, selective.

Continue...

Switches: Magneto-thermal Automatic Switches:

N-IAM01	1-pole Magneto-thermal Automatic Switch 0.5 A, Curve C.
N-IAM02	1-pole Magneto-thermal Automatic Switch 1 A, Curve C.
N-IAM03	1-pole Magneto-thermal Automatic Switch 4 A, Curve C.
N-IAM04	1-pole Magneto-thermal Automatic Switch 10 A, Curve C.
N-IAM05	1-pole Magneto-thermal Automatic Switch 25 A, Curve C.
N-IAM06	1-pole Magneto-thermal Automatic Switch 40 A, Curve C.
N-IAM07	1-pole + neutral Magneto-thermal Automatic Switch, 1 A, Curve C.
N-IAM08	1-pole + neutral Magneto-thermal Automatic Switch, 4 A, Curve C.
N-IAM09	1-pole + neutral Magneto-thermal Automatic Switch, 10A, Curve C.
N-IAM10	1-pole + neutral Magneto-thermal Automatic Switch, 25A, Curve C.
N-IAM11	1-pole + neutral Magneto-thermal Automatic Switch, 40A, Curve C.
N-IAM12	2-pole Magneto-thermal Automatic Switch, 0.5A, Curve C.
N-IAM13	2-pole Magneto-thermal Automatic Switch, 1 A, Curve C.
N-IAM14	2-pole Magneto-thermal Automatic Switch, 4 A, Curve C.
N-IAM15	2-pole Magneto-thermal Automatic Switch, 10 A, Curve C.
N-IAM16	2-pole Magneto-thermal Automatic Switch, 25 A, Curve C.
N-IAM17	2-pole Magneto-thermal Automatic Switch, 40 A, Curve C.
N-IAM18	3-pole Magneto-thermal Automatic Switch, 0.5A, Curve C.
N-IAM19	3-pole Magneto-thermal Automatic Switch, 1 A, Curve C.
N-IAM20	3-pole Magneto-thermal Automatic Switch, 4 A, Curve C.
N-IAM21	3-pole Magneto-thermal Automatic Switch, 10 A, Curve C.
N-IAM22	3-pole Magneto-thermal Automatic Switch, 25 A, Curve C.
N-IAM23	3-pole Magneto-thermal Automatic Switch, 40 A, Curve C.
N-IAM24	3-pole + neutral Magneto-thermal Automatic Switch, 6A, Curve C.
N-IAM25	3-pole + neutral Magneto-thermal Automatic Switch, 10 A, Curve C.
N-IAM26	3-pole + neutral Magneto-thermal Automatic Switch, 16 A, Curve C.
N-IAM27	3-pole + neutral Magneto-thermal Automatic Switch, 25 A, Curve C.
N-IAM28	3-pole+neutral Magneto-thermal Automatic Switch, 40 A, Curve C.
N-IAM29	4-pole Magneto-thermal Automatic Switch, 0.5A, Curve C.
N-IAM30	4-pole Magneto-thermal Automatic Switch, 1 A, Curve C.
N-IAM31	4-pole Magneto-thermal Automatic Switch, 4 A, Curve C.
N-IAM32	4-pole Magneto-thermal Automatic Switch, 10 A, Curve C.
N-IAM33	4-pole Magneto-thermal Automatic Switch, 16 A, Curve C.
N-IAM34	4-pole Magneto-thermal Automatic Switch, 25 A, Curve C.
N-IAM35	4-pole Magneto-thermal Automatic Switch, 40 A, Curve C.

Switches: General Switches:

N-INT01	1-pole Load Switch.
N-INT02	2-pole Load Switch.
N-INT03	3-pole Load Switch.
N-INT04	4-pole Load Switch.
N-INT05	1-pole Rotary Switch.
N-INT06	3-pole Section Switch, 12 A.
N-INT07	3-pole Section Switch, 20 A.
N-INT08	3-pole Section Switch + Safety Stop, 12 A.
N-INT09	3-pole Section Switch + Safety Stop, 20 A.
N-INT10	Twilight Switch.
N-INT11	Twilight Switch with programmer clock.
N-INT12	Analogical Hour Switch.
N-INT13	Digital Hour Switch.
N-INT14	1-pole 2 Switches.
N-INT15	2 Switches with Light.
N-INT16	2-pole Switch (16 A).
N-INT17	2-pole Switch (16 A) with Light.
N-INT18	1-pole Switch + 1-pole Switch with Light.

N-INT19	1-pole Switch + 2-pole Switch.
N-INT20	1-pole Switch with Light + 2-pole Switch with Light.
N-INT21	Switch + Commutator Group + Bell Push-Button.
N-INT22	2 Switches for Blinds.
N-INT23	Group of 2 Switches.
N-INT24	Switch / Commutator for Card.
N-INT25	Wireless Switch / Commutator (Emitter).
N-INT26	Pastille Receptor (Receptor).
N-INT27	Touch Type Electronic Switch / Commutator by TRIAC.
N-INT28	Touch Type Electronic Switch / Commutator by Relay.
N-INT29	Infrared Switch / Commutator by TRIAC.
N-INT30	Infrared Switch / Commutator by Relay.
N-INT31	Intrusion Switch / Detector from 40 to 300W.
N-INT32	Intrusion Switch / Detector.
N-INT33	1-pole Fuse Switch, 16 A.
N-INT34	1-pole Fuse Switch with neutral, 16 A.
N-INT35	2-pole Fuse Switch, 16 A.
N-INT36	3-pole Fuse Switch, 16 A.
N-INT37	3-pole Fuse Switch with neutral, 16 A.
N-INT38	1-pole Lighting Switch, 16 A.
N-INT39	2-pole Lighting Switch, 16 A.
N-INT40	3-pole Lighting Switch, 16 A.
N-INT41	3-pole Lighting Switch with neutral, 25 A.
N-INT42	Lighting Switch with Control Lamp.
N-INT43	1-pole Telecontrol Switch.
N-INT44	2-pole Telecontrol Switch.
N-INT45	3-pole Telecontrol Switch.
N-INT46	Remote Control Switch (heating, refrigeration...).
N-INT47	Switch with Luminous Screen (bell, bulb, wc, alarm...).
N-INT48	1-pole Switch + 1-pole Push-button.
N-INT51	2 Switches, push-button type.
N-SFC	Limit switch.
N-SWT4	Four position selector (measuring point selector).

Switches: Special Switches:

N-INX01	DC 1-pole Special Automatic Switch 1 A, Curve C.
N-INX02	DC 1-pole Special Automatic Switch 2 A, Curve C.
N-INX03	DC 1-pole Special Automatic Switch 6 A, Curve C.
N-INX04	DC 1-pole Special Automatic Switch 10 A, Curve C.
N-INX05	DC 2-pole Special Automatic Switch 1 A, Curve C.
N-INX06	DC 2-pole Special Automatic Switch 2 A, Curve C.
N-INX07	DC 2-pole Special Automatic Switch 6 A, Curve C.
N-INX08	DC 2-pole Special Automatic Switch 10 A, Curve C.
N-INX09	Remote-controlled Switch.
N-INX10	1-pole + neutral Overvoltage Protection.
N-INX11	3-pole + neutral Overvoltage Protection.
N-INX12	Overvoltage Switchable Protection with Luminous Indicator.
N-INX13	RJ-11 Fine Protection - Analog Telephony.
N-INX14	RJ-45 Fine Protection - Digital Telephony.

Test Units:

N-UND01	Brake Control Unit.
N-UND02	Differential Switches Test Unit.
N-UND03	Automatic Switches Test Unit.

Time Control:

N-CTI01	Multi-function Timer.
N-CTI02	24 Hours Timer without Operation Reserve (1NO).
N-CTI03	24 Hours Timer with Operation Reserve (1NO).
N-CTI04	Weekly Timer per hours with Operation Reserve (1NO).
N-CTI05	24 Hours Timer without Operation Reserve (1NONC).
N-CTI06	24 Hours Timer with Operation Reserve (1NONC).
N-CTI07	24 Hours / Week Digital Timer (2NONC).
N-CTI08	Astronomical Digital Timer (2NO).
N-CTI09	Stairs Timer.
N-CTI10	Automatic of Stairs.

Continue...

Transformers:

N-TRA01	1-Phase Power Transformer 220-400/12-24 Vac, 100 VA.
N-TRA02	1-Phase Power Transformer 220-400/115-230 Vac, 1000 VA.
N-TRA03	1-Phase Power Transformer.
N-TRA04	3-Phase Power Transformer 380 / 220 V, 630 VA.
N-TRA05	3-Phase Power Transformer 220 / 127 V, 1000 VA.
N-TRA06	3-Phase Power Transformer.
N-TRA07	Isolating Transformer 230 / 24-12 Vac, 16 A.
N-TRA08	Isolating Transformer 230 / 24-12 Vac, 40 A.
N-TRA09	3-Phase Isolating Transformer 230 - 380/230-380, 500VA.
N-TRA10	Current Transformer 25 / 5 A.
N-TRA11	Current Transformer 40 / 5 A.
N-TRA12	3-Phase Current Transformer.
N-TRA13	1-Phase Auto-transformer.
N-TRA14	3-Phase Auto-transformer.
N-TRA15	Current Adding Transformer, 2 inputs, 15 VA.
N-TRA16	Current Adding Transformer, 3 inputs, 15 VA.
N-TRA17	Current Adding Transformer, 4 inputs, 15 VA.
N-TRA18	Petersen Coil.
N-TRA19	Transformer for Experiments (custom made).
N-TRA20	1-Phase Variable Voltage Transformer 220 / 350 VA.
N-TRA21	Electronic Transformer 60 W.
N-TRA22	Electronic Transformer 105 W.
N-TRA23	Transformer with Switch 230/12V,16 A.
N-TRA26	Module with 110-220V input transformer and 24V, 3A output.
TRA28	Three-phase Transformer.
N-TRA29	Three-phase Transformer.
N-TRA30	Three-phase Isolating Transformer 24Vac/380Vac.
N-TRA31	Current Transformer 1000/1.
N-TRANS01	Single-phase Power Transformer.
N-TRANS03	Three-phase Autotransformer.
N-TRANS/3	Three-phase Transformer.
TRANS3/5KGR	5KW Three-Phase Grid Transformer.
N-TRANS3/5KSU	5KW Three-Phase Step-Up Transformer Module.
TRANS3/5KR	5kW Step-Down Transformer with voltage regulator.
N-TRANS3/1KR	Three-Phase Regulation Transformer.
TRANS3/5KSU	5KW Three-Phase Step-Up Transformer.
N-TRMC	Current Transformer.
N-TRTC	Three-Phase Current Transformer.
N-TRMV	Voltage Transformer.
N-TRTV	Three-Phase Voltage Transformer.
N-AUTR	Variable Auto-Transformer.
N-AUTR3PH	Three-phase Variable Auto-transformer.
N-EMPTA	Auxiliary Transformer and Protection Module.
N-ETT	Three-phase and Single Phase Transformer Unit.
N-TPPT	Three-phase Power Transformer Unit.
STC	Single-phase transformer core.
TTC	Three-phase transformer core.

Wireless modules:

N-IOWM	Wireless Outputs Module.
N-WISM	Wireless Intrusion Sensor Module.
N-WLDM	Wireless Leak detector Module.
N-WLSM	Wireless Light Sensor Module.
N-WMSM	Wireless Motion Sensor Module.
N-WSDM	Wireless Smoke Detector Module.
N-WSM	Wireless Switches Module.

Others:

N-VAR01	Motor for Blinds / Curtains.
N-VAR05	Tones Dialing Telephone.
N-VAR07	Kit: Burglar Alarm Central.
N-VAR08	Monitor.
N-VAR09	Frequency Variator.
N-VAR16	Electromagnetism Kit with group of motor/generator.
VAR17	Dismantled Transformer Kit.
VAR18	Electrostatic Kit.
N-HPM	Home Power Module.
MWMT	Manual Winding Machine for Motors and Transformers.
CWC	Copper wire coil.
DPP	Water tank.
N-CPUB	Electrical Control Panel Basic Unit.
CPKIT1	Electrical Control Panel Kit 1.
FTT	Flooding transparent tank.
OTT	Output transparent tank.
WP	Water pump.
N-ADAM	AC/DC/AC Converter Module.
N-AE1	Transmission Lines Simulation Module.
N-AE1C	Commutable Transmission Line Simulation Unit.
N-AE1CD	Commutable Transmission Line Simulator.
N-AE1CD-L1	Line Model 1.
N-AE1CD-L2	Line Model 2.
N-DCTL	DC Transmission Line.
N-FRT	Fault Ride Through Module.
BAT	Battery.
N-INV01	Power Inverter (300W).
N-DCTL	DC Transmission Line.
N-PFD	Power Flow Distribution Module.
EH	Electric Heating Module.
PPINV	Photovoltaic Panel with Inverter.
SWTI	Small Wind Turbine with Inverter.
FVP85	85W Photovoltaic Panel.

*Specifications subject to change without previous notice, due to the convenience of improvements of the product.



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