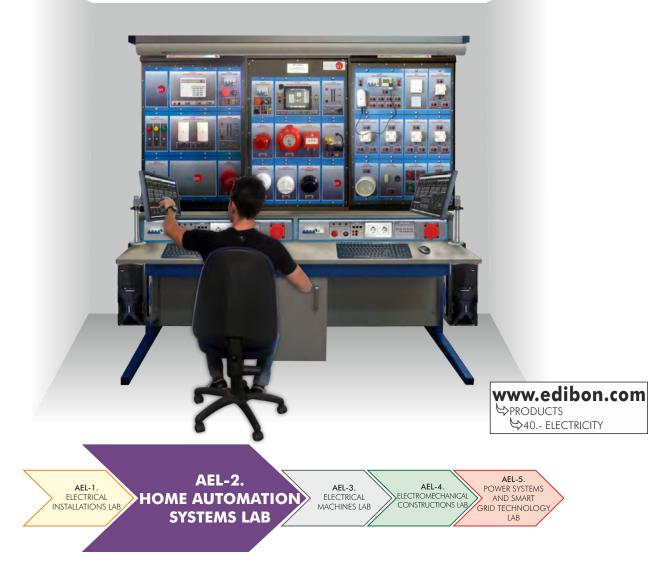


# **Advanced Electrical Laboratories** (AEL-LABS): Home Automation Systems Lab

AEL-2



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.









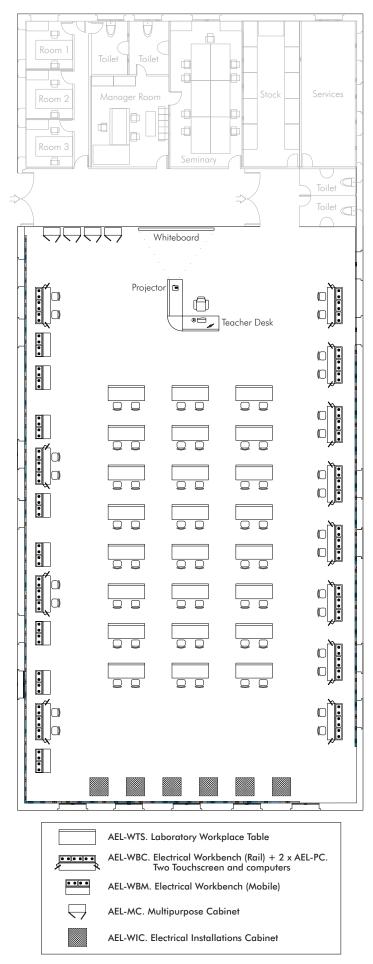
ISO 9000: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)

Page 1

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

Worlddidac Quality Charter Certificate and Worlddidac Member





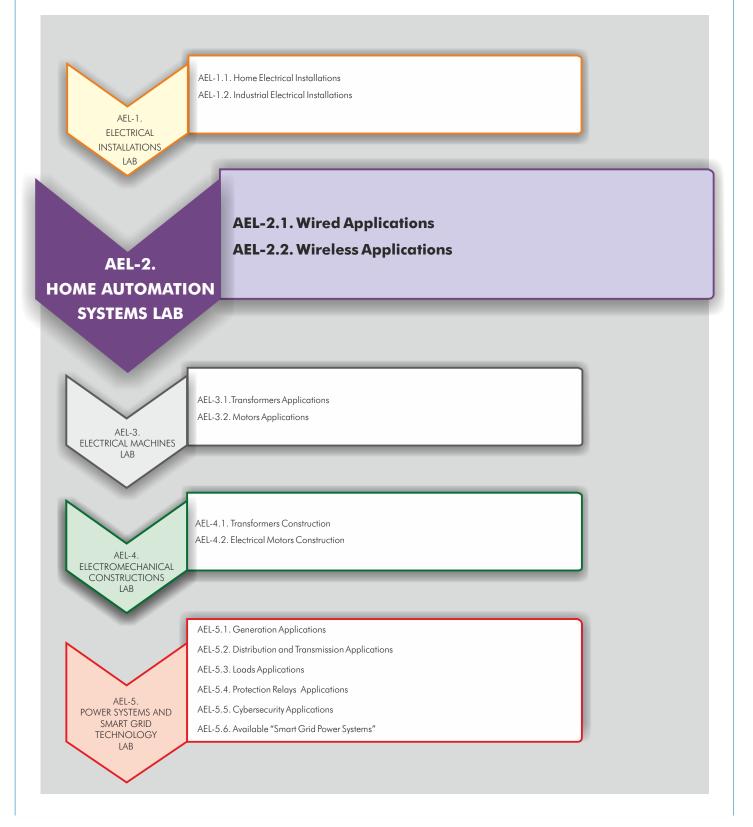
EDIBON, a company with more than 35 years of experience designing and implementing training systems, has a wide variety of applications adapted to XXI century new technologies.

Apart from providing a solid theoretical basis, EDIBON units and applications 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-2. Home Automation Systems Lab."



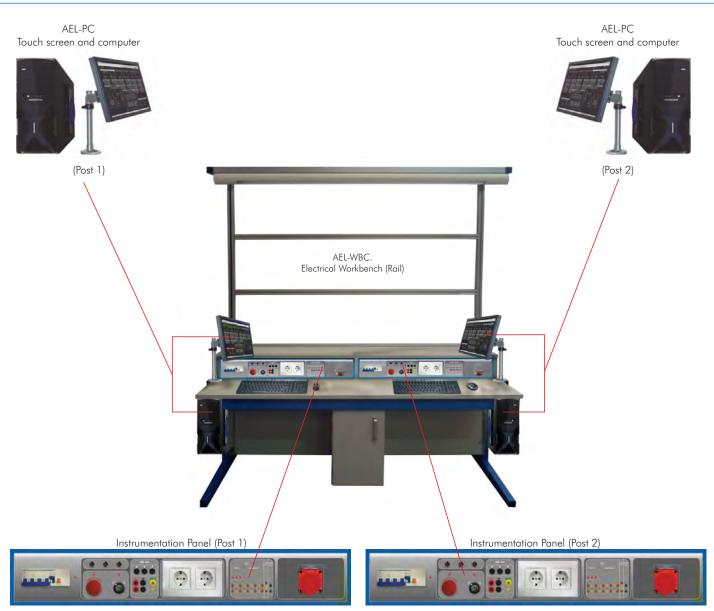
# AEL-2. Home Automation Systems Lab

The AEL-2. Home Automation Systems Lab is formed by:

AEL-WBC. Electrical Workbench (Rail) AEL-WBR. Electrical Workbench (Rack) . . . . . . . 0 ... . . .... .... 0 ++Applications (to be mounted on rail) Applications + Rack AEL-AD33 AEL-AD3A AEL-AD33 + N-RACK-A AEL-AD3A + N-RACK-A +Learning Software Packages 100 295

# **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.

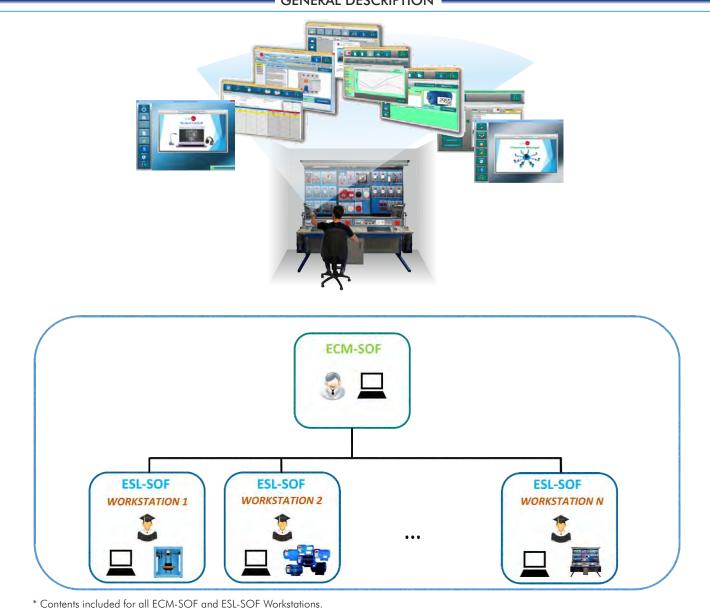
Optional:

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.

# Learning Software Packages GENERAL DESCRIPTION



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

#### Interactive Computer Aided Instruction Software System

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

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

# - ESL-SOF. EDIBON Student Labsoft (Student Software):

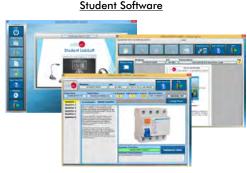
ESL is the application addressed to the Students that helps them to understand the oretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session.

Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge. NOTE: Will be necessary acquire a license per student.

Instructor Software

Example of some Software Screens:





# List of Applications

# AEL-2. HOME AUTOMATION SYSTEMS LAB

	IATION SYSTEMS LAB
AEL-2.1. Wired Applications	AEL-2.2. Wireless Applications
Applications           Home Automation General Applications           • AEL-AD1A. Robbery Alarm Advanced Application.           • AEL-AD1B. Robbery Alarm Application.           • AEL-AD3A. Fire Alarm Advanced Application.           • AEL-AD3B. Fire Alarm Advanced Application.           • AEL-AD3B. Fire Alarm Application.           • AEL-AD15A. Position Control Advanced Application.           • AEL-AD15B. Position Control Advanced Application.           • AEL-AD15B. Position Control Application.           • AEL-AD15B. Position Control Application.           • AEL-AD25A. Control Application for Home Electric Service through the telephone.           • AEL-AD22. Flooding Control Application.           • AEL-AD30. Gas and Smoke Detection Application.           • AEL-AD31. Movement and Sound Detection Application.           • AEL-AD31. Movement and Sound Detection Application.	<u>Applications</u> Home Automation General Applications • AEL-AD28A. Complete Home Automation Application with ZigBee Wireless Protocol • AEL-AD28B. Advanced Home Automation Application with ZigBee Wireless Protocol • AEL-AD28C. Home Automation Application with ZigBee Wireless Protocol. • AEL-AD23. Wireless Intrusion Detection Application (RF).
<ul> <li>AEL-AD40. Remote Control Application Via Telephone.</li> <li>KNX/EIB Applications</li> <li>AEL-KNX1. KNX/EIB Shutter Control Application.</li> <li>AEL-KNX2. KNX/EIB Heating Control Application.</li> <li>AEL-KNX3. KNX/EIB Security Control Application.</li> <li>AEL-KNX4. KNX/EIB Lighting Control Application.</li> <li>AEL-KNX5. KNX/EIB Energy Management Application.</li> <li>AEL-SCS. Building Automation and Control Networks BacNet Application.</li> <li>AEL-DALI. DALI Installations Application.</li> </ul>	

The Home Automation Applications Lab (AEL-2) covers a great variety of applications with the technology most employed nowadays in the field of automation systems. Basically, these are divided into: wiring application and wireless applications.

Wiring Applications: On this area, EDIBON covers applications such as fire alarm systems, cutting edge anti-burglar alarm systems, sensors positioning systems, motion detection systems, etc.

Wireless Applications: On this area, EDIBON includes devices, in which the user can program smart devices, such as motion sensors, temperature sensors, smart relays, etc. so that a smart environment can be created with the latest technology in this field, the ZigBee communication.

On the other hand, it includes automated systems with EIB technology with applications to control lighting systems, heating systems, safety systems, etc.

The complete Home Automation Systems Lab (AEL-2) 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 homogeneous 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:

 $2 \, \mathrm{x} \, \mathrm{Control}$  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:

#### ICAI. Interactive Computer Aided Instruction Software System:

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

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

Innovative features:

User Data Base Management.

Administration and assignment of Workgroups, Tasks and Training sessions.

Creation and Integration of Practical Exercises and Multimedia Resources.

Custom Design of Evaluation Methods.

Creation and assignment of Formulas & Equations.

Equation System Solver Engine.

Updatable Contents.

Report generation, User Progression Monitoring and Statistics.

#### ESL-SOF. EDIBON Student Labsoft (Student Software).

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

Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

#### Student Log-In & Self-Registration.

Existing Tasks checking & Monitoring.

Default contents & scheduled tasks available to be used from the first session.

Practical Exercises accomplishment by following the Manual provided by EDIBON.

Evaluation Methods to prove your knowledge and progression.

Test self-correction.

Calculations computing and plotting.

Equation System Solver Engine.

User Monitoring Learning & Printable Reports.

Multimedia-Supported auxiliary resources.

For more information see ICAI catalog. Click on the following link: www.edibon.com/en/files/equipment/ICAI-ELEC/catalog



ECM-SOF. EDIBON Classroom Manager Software Application main screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



ERS. EDIBON Results & Statistics Program Package - Student Scores Histogram



ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

Student Software



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



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Staticstics Program Package-Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

Specifications (continuation)

# **Applications:**

#### AEL-2.1 Wired Applications

-Home Automation General Applications

# AEL-AD1A. Robbery Alarm Advanced Application.

The Robbery Alarm Advanced Application, "AEL-AD1A", is designed with the aim to show different burglar alarms to the students. This application is composed of the next types of sensors: glass break detector and motion sensors. The application also includes alarms that can be activated by the previous sensors. These alarms are: indoor siren with adjustable volume and three pilot lights. All these alarms can be controlled by a central application, allowing the students to simulate different scenes and understand the operation of these devices.

### The AEL-AD1A includes the following modules:

- N-ALIO2. Domestic Main Power Supply.
- N-ALI03. AC Auxiliary Power Supply.
- N-DET27. Glass Break Detector.
- N-INT32. Intrusion Switch/Detector with Relay 1000 W.
- N-SEL03. 3-Pilots Lights.
- N-SEL21. Indoor Siren
- N-VAR07. Kit: Burglar Alarm Central + Infrared ele. + battery.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD1A/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD1A can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

• N-RACK-A.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- Checking and measuring on the main power supply.
- Checking the working of the auxiliary power supply.
- 3.-Using the pilot lights as visual alarms.
- 4.- Using the siren as visual and acoustic alarm.
- 5.-Using the glass break detector to activate alarms.
- 6.-Using the infrared sensors to motion detection and activation of alarms.
- 7.-Manage the working of the alarms with the central station.
- 8.-Simulate real situations and combine the different types of sensors with the alarms.

For more information see **AEL-AD1A** catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD1A/catalog



AEL-AD1A

#### AEL-2.1 Wired Applications

-Home Automation General Applications

# AEL-AD1B. Robbery Alarm Application.

The Robbery Alarm Application, "AEL-AD1B", is designed with the aim to show different burglar alarms to the students. This application is composed of the next types of sensors: glass break detector and motion sensors. The application also includes alarms that can be activated by the previous sensors. These alarms are: indoor siren with adjustable volume and three pilot lights. The Burglar Alarm Center, included in the Robbery Alarm Advanced Application, "AEL-AD1A", is not included in this application. With this application the students can simulate different scenes and understand the operation of these devices.

The AEL-AD1B includes the following modules:

- N-ALIO2. Domestic main power supply.
  N-ALIO3. AC Auxiliary Power Supply.
  N-DET27. Glass Break Detector.
  N-INT32. Intrusion Switch/Detector with
- Relay 1000 W.
- N-SEL03. Three-Pilots Lights.
- N-SEL21. Indoor Siren.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD1B/ICAI) to reinforce knowledge about this field.

This software is formed by:

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

• ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD1B can be mounted on rack (option A) or on rail (option B):

#### Option A:

This application needs the following racks:

• N-RACK-M.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- Checking and measuring of the main power supply.
- Checking the working of the auxiliary power supply.
- 3.- Checking the operation of the pilot lights.
- 4.- Checking the operation of the siren.
- Checking the operation of the glass break detector.
- Checking the operation of the infrared sensors.

7.- Simulate real situations and combine the different types of sensors with the alarms.

For more information see **AEL-AD1B** catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD1B/catalog



AEL-AD1B

#### AEL-2.1 Wired Applications

-Home Automation General Applications

# AEL-AD3A. Fire Alarm Advanced Application.

The Fire Alarm Advanced Application, "AEL-AD3A", is designed with the aim to study different types of fire alarms. This complete application includes several types of sensors and alarms. The sensors included are a smoke detector, an ionized air detector and a temperature detector. These sensors activate the following alarms, also included: indoor siren, bell type alarm and a water solenoid valve to extinguish the fire. All these devices are controlled by a fire alarm station with battery, just in case the fire damages the electrical system. This application will be used by students to simulate several situations caused by fires and study the operation of each device.

#### The AEL-AD3A includes the following modules:

• N-ALI02.	Domestic Main Power Supply.	
• N-ALI03.	AC Auxiliary Power Supply.	
•N-ALA02.	Fire Alarm Station with	
	Battery.	
• N-SEL21.	Indoor Siren.	
•N-SEL17.	Fire Alarm Bell + Push-button	
• N-DET06.	Smoke Detector for domestic	
	control.	
• N-DET10.	Water Electrovalve.	
• N-DET21.	Fire detector through	
	ionization.	
• N-DET22.	Fire thermal detector.	

#### Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD3A/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD1B can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

• N-RACK-A.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.-Checking and measuring the main power supply.
- Checking the working of the auxiliary power supply.
- 3.-Checking the operation and control of the Fire Alarm Application.
- 4.-Simulate situations in two safety zones managed by the Fire Alarm Application.
- Checking the operation of the air ionization sensor.
- 6.-Checking the operation of the temperature sensor.
- 7.-Checking the operation of the smoke detector.
- 8.- Checking the operation of the indoor siren.
- 9.- Checking the operation of the bell.
- 10.- Checking the operation of the water solenoid valve.
- 11.- Combine the different types of sensors with the alarms to simulate varied situations.

For more information see **AEL-AD3A** catalog. Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD3A/catalog



AEL-AD3A

#### AEL-2.1 Wired Applications

-Home Automation General Applications

# AEL-AD3B. Fire Alarm Application.

The Fire Alarm Application, "AEL-AD3B", is designed with the aim to study different types of fire alarms. This application includes several types of sensors and one alarm. The sensors included are a smoke detector and an ionized air detector. These sensors activate the indoor siren. All of these devices are controlled by a fire alarm station with battery, just in case the fire damages the electrical system. This application will be used by students to simulate several situations caused by fires and study the operation of each device.

The AEL-AD3B includes the following modules:

• N-ALI02.	Domestic Main Power Supply.	
•N-ALI03.	AC Auxiliary Power Supply.	
•N-ALA02.	Fire Alarm Station with	
	Battery.	
•N-SEL21.	Indoor Siren.	
• N-DET06.	Smoke Detector.	
• N-DET21.	Fire detector through	
	ionization.	

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD3B/ICAI) to reinforce knowledge about this field.

This software is formed by:

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

• ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD3B can be mounted on rack (option A) or on rail (option B):

#### Option A:

This application needs the following racks:

• N-RACK-M.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules.

#### Some Practical Possibilities:

- Checking and measuring the main power supply.
- Checking the working of the auxiliary power supply.
- Checking the operation and control of the Fire Alarm Station.
- Simulate situations in two safety zones managed by the Fire Alarm Station.
- 5.- Checking the operation of the air ionization sensor.
- 6.-Checking the operation of the smoke detector.
- 7.- Checking the operation of the indoor siren.

For more information see **AEL-AD3B** catalog.

Click on the following link: www.edibon.com/en/files/equipment/

AEL-AD3B/catalog



AEL-AD3B

#### AEL-2.1 Wired Applications

-Home Automation General Applications

### AEL-AD15A. Position Control Advanced Application.

The Position Control Advanced Application, "AEL-AD15A", is designed to study different types of position sensors and their possible applications. For that purpose, this application includes the following sensors: a PNP type inductive sensor, which works with DC and detects metals in a specific distance range; a capacity proximity sensor, to detect both metals and no metals; other inductive sensor, which works with AC and detects any metal; and finally a presence and movement sensor to detect moving objects. This last type is the most used in automatic lighting, alarms, etc. To check the operation of these sensors, three pilot lights and one halogen lamp are included. All these sensors can be used in several industrial processes, such as water level detection in a tank, or home automation, such as automatic lighting. With this application, the student will acquire some practical ideas about the operation of these devices.

The AEL-AD15A includes the following modules:

- N-ALIO2. Domestic Main Power Supply.
- N-ALI03. AC Auxiliary Power Supply.
- N-LAM16. Incandescent Lamp.
- N-SEL03. Three-Pilots Lights.
- N-SEN04. Inductive Proximity Sensor Type PNP.
- N-SEN14. Capacitive Proximity Sensor.
- N-SEN29. Inductive Proximity Sensor.
- N-SEN26. Presence and Movement Sensor (Wall).

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD15A/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD15B can be mounted on rack (option A) or on rail (option B):

#### Option A:

This application needs the following racks:

• N-RACK-M.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.- Checking and measuring on of the main power supply.
- 2.- Checking the working of the auxiliary power supply.
- 3.- Checking the operation of the inductive sensor type PNP.
- 4.- Checking the operation of the capacitive sensor.
- 5.-Checking the operation of the AC inductive sensor.
- 6.-Body detection tests with the different types of sensors and materials.
- 7.-Body movement detection tests.

8.-Real applications of a detection system.

For more information see **AEL-AD15A** catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD15A/catalog



AEL-AD15A

#### AEL-2.1 Wired Applications

-Home Automation General Applications

# AEL-AD15B. Position Control Application.

The Position Control Application, "AEL-AD15B", is designed to study different types of position sensors and their possible applications. For that propose, this application includes the following sensors: a PNP type inductive sensor, which works with DC and detects metals in a specific distance range; a capacity proximity sensor, to detect both metals and no metals and other inductive sensor, which works with AC and detects any metal. The application also includes three pilot-lights to check the working of these sensors, which can be used in several industrial processes, such as water level detection in a tank, or to control objects in an assembly line, etc. With this application, the student will acquire some practical ideas about the operation of these devices.

The AEL-AD15B includes the following modules:

• N-ALI02. Domestic Main Power Supply. • N-ALI03. AC Auxiliary Power Supply. • N-SEL03. Three-Pilots Lights. • N-SEN04. Cylindrical Inductive Proximity Sensor Type PNP. • N-SEN14. AC Cylindrical Capacitive Proximity Sensor. • N-SEN29. AC Cylindrical Inductive Proximity Sensor. • N-INT14. Two single-pole switches.

#### Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD15B/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD15B can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

• N-RACK-M.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.- Checking and measuring on of the main power supply.
- Checking the working of the auxiliary power supply.
- 3.-Checking the operation of the inductive sensor type PNP.
- 4.-Checking the operation of the capacitive sensor.
- 5.- Checking the operation of the AC inductive sensor.
- 6.-Body detection tests with the different types of sensors and materials.
- 7.- Real applications of a detection system.

For more information see  $\ensuremath{\textbf{AEL-AD15B}}$  catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD15B/catalog



AEL-AD15B

#### AEL-2.1 Wired Applications

Home Automation General Applications

### AEL-AD25A. Control System for Home Electric Services through the Telephone.

The Control System for Home Electric Services through the Telephone, "AEL-AD25A", is a system designed to study some home safety applications. This system includes the most common ones, such as the flooding control, gas leakage detection or intrusion detection. To control all these applications, a remote control central via telephone is also included. It allows the user to access the system remotely and execute actions in emergency situations. These applications are described below:

#### - AEL-AD22. Flooding Control Application:

The Flooding Control Aplication, "AEL-AD22", is designed to know and study the operation of the most common flooding control systems. This application has two parts. On one hand, there is a water tank divided into two parts: one to simulate the flooding and the other one to evacuate water. There is a solenoid valve to exchange the water through a water pump between both parts. On the other hand, the application includes the following elements: two flood detectors, one of them wilt in a pilot lights module that can be built-in, a pilot lights module that can be activated by sensors and an indoor siren. Therefore, this application allows the Therefore, this application allows the student to learn about the operation of

flooding control systems. The AEL-AD22 includes the following modules:

- N-ALI02. Domestic Main Power Supply.
- N-ALI03. Auxiliary Power AC Supply.
- Fitted Power Supply (gas and flooding N-DET03.
- detector) • N-DET01 Flooding Detector.
- N-DET04. Fitted Flooding Detector.
- N-SEL03. Three-Pilots Lights.
- N-SEL21 Indoor Siren.

#### - AEL-AD23. Wireless Intrusion detection Application (RF):

The Wireless Intrusion Detection Application (RF), "AEL-AD23", is designed with the aim to understand the operation of a wireless intrusion detection system. For that, this application includes a wireless presence detector that works via infrared radiation, detecting temperature changes, a panic pushbutton to use in emergency situations and a wireless receptor that receives the signals from all sensors. In order to check the operation of these devices, the application also includes a pilot light module and a bell and buzzer module, which can be activated by the sensors. Thus, the user can check different types of intrusion alarms.

The AEL-AD23 includes the following modules:

- N-ALI02. Domestic Main Power Supply. AC A Auxiliary Power • N-ALI03.
- Supply. • N-DET13.
- Wireless Intrusion Detector RF. • N-DFT14
- Wireless Panic Push-Button RF.
- N-DET15. Wireless One Channel Receptor RF.
- N-SEL01. Light Signaling Beacons.
- N-TIM05. Bell + Buzzer.

#### - AEL-AD30. Gas and Smoke Detection Application:

The Gas and Smoke Detection Application, "AEL-AD30", is designed to study the

operation of a gas leak detection and fire prevention system. This application includes two types of sensors. On one hand, there is a gas detector capable to detect explosive and toxic gases, such as natural gas, propane, butane, etc. It can also detect smoke from combustion, so it is a very complete sensor. On the other hand, there is an optic smoke detector, capable to detect visible gases, although it must not be installed close to water heaters to avoid a false positive result. The application also includes a solenoid valve to close the gas circuit in case of leakage. The student can simulate with all of these devices some emergency situations to understand the operation of the main gas detection systems in the market.

The AEL-AD30 includes the following modules:

• N-ALI02.	Domestic Main Power
	Supply.
• N-ALI03.	AC Auxiliary Power
	Supply.
<ul> <li>N-DET02.</li> </ul>	Gas Detector.
<ul> <li>N-DET03.</li> </ul>	Fitted Power Supply (gas
	and flooding detector).
• N-DET36.	Smoke Detector.
• N-DET12.	Gas electrovalve.

#### - AEL-AD40. Remote Control Application Via Telephone:

The Remote Control Application Via Telephone, "AEL-AD40", is designed to study the operation of a remote control system via telephone, in other words, for the remote control of sensors, alarms, etc. installed in a house, office, etc. With this application, the user can simulate real situations, such as a flooding, a gas leakage, an intrusion or other accident detected by sensors, which trigger, an alarm. In that case, the system cuts off the supply and warns the user. Then, through dialing codes, the user can take decisions on the system. To make this possible, the application includes control module to connect the rest of detection modules to control them, and a telephone to introduce the dialing codes.

The AEL-AD40 includes the following modules:

- N-ALI02. Domestic Main Power Supply.
- N-CTR01. Control Module.
- N-VAR05. Tone Dialing Telephone. Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD15B/ICAI) to reinforce knowledge about this field. This soft ۰r

is somware is for	nea by:	
• ECM-SOF.	edibon	Classroom
		(Instructor
	Software).	
• ESL-SOF.	EDIBON	Student
	Labsoft	(Student
	Software).	

The application AEL-AD15B can be mounted on rack (option A) or on rail (option B):

Option A:

- This application needs the following racks:
  - N-RACK-M.

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

Option B:

This application can be mounted on rail. Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules.









AEL-AD25A

Specifications (continuation)

Applications:		
	AEL-2.1 Wired Applications	
	Home Automation General Applications -	
AEL-AD25A. Control System for	Home Electric Services through the Telephon	<b>1e.</b> (Continuation).
Some Practical Possibilities:		
<ol> <li>Checking and measuring on the power supply.</li> </ol>	ne main	
<ol><li>Checking the working of the power supply.</li></ol>	auxiliary	
<ol> <li>Checking the working of pilot-I connecting as visual alarms.</li> </ol>	ights by	
<ol> <li>Checking the working of the built- supply.</li> </ol>	n power	
5Checking the operation of the detector.	flooding	Ť LE
6Checking the operation of the flood detector.	built-in	The second secon
7 Checking the operation of the sim as visual and acoustic alarm.	en, used	
8 Simulate floods and evacuations water tank and the electrovalve.	with the	
<ol> <li>Checking the working of the bell - module using as acoustic alarm.</li> </ol>	+ buzzer	
10 Checking the working of the light s beacons module, using as visual c		
11 Checking the working of the emergency pushbutton.		
12Use of the alarms with the	wireless	
intrusion detector. 13 Control of gas electrovalve thro	ugh the	
smoke sensor.	ugii me	
14 Real applications of a gas le control system.	eakages	
15 Configuration of the Control Mod	le	
16 Control of the flooding detector the Control Module.		
17 Control of the gas detector thro Control Module.	ugh the	
18 Control of the motion detector thro Control Module.	bugh the	
For more information see AEL-,	AD25A	
catalog.		
Click on the following link:		
www.edibon.com/en/files/ec	juipment/	
AEL-AD25A/catalog		

AEL-AD25A

#### AEL-2.1 Wired Applications

-Home Automation General Applications

# AEL-AD22. Flooding Control Application.

The Flooding Control Aplication, "AEL-AD22", is designed to know and study the operation of the most common flooding control systems. This application has two parts. On one hand, there is a water tank divided into two parts: one to simulate the flooding and the other one to evacuate water. There is a solenoid valve to exchange the water through a water pump between both parts. On the other hand, the application includes the following elements: two flood detectors, one of them built-in, a pilot light module that can be activated by sensors and an indoor siren. Therefore, this application allows the student to learn about the operation of flooding control systems.

The AEL-AD22 includes the following modules:

- N-ALI02. Domestic Main Power Supply.
- N-ALI03. AC Auxiliary Power Supply.
- N-DET03. Fitted Power Supply (gas and flooding detector).
- N-DET01. Flooding Detector.
- N-DET04. Fitted Flooding Detector.
- N-SEL03. Three-Pilots Lights.
- N-SEL21. Indoor Siren.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD22/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD22 can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

• N-RACK-M.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.-Checking and measuring on the main power supply.
- 2.- Checking the working of the auxiliary power supply.
- Checking the working of pilot-lights by connecting as visual alarms.
- 4.-Checking the working of the built-in power supply.
- 5.-Checking the operation of the flooding detector.
- 6.-Checking the operation of the built-in flood detector.
- Checking the operation of the siren, used as visual and acoustic alarm.
- 8.-Simulate floods and evacuations with the water tank and the electrovalve.

For more information see AEL-AD22 catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD22/catalog



AEL-AD22

#### AEL-2.1 Wired Applications

-Home Automation General Applications

# AEL-AD30. Gas and Smoke Detection Application.

The Gas and Smoke Detection Application, "AEL-AD30", is designed to study the operation of a gas leak detection and fire prevention system. This application includes two types of sensors. On one hand, there is a gas detector capable to detect explosive and toxic gases, such as natural gas, propane, butane, etc. It can also detect smoke from combustion, so it is a very complete sensor. On the other hand, there is an optic smoke detector, capable to detect visible gases, although it must not be installed close to water heaters to avoid a false positive result. The application also includes a solenoid valve to close the gas circuit in case of leakage. The student can simulate with all of these devices some emergency situations to understand the operation of the main gas detection systems in the market.

The AEL-AD30 includes the following modules:

- N-ALIO2. Domestic Main Power Supply.
- N-ALI03. AC Auxiliary Power Supply.
- N-DET02. Gas Detector.
- N-DET03. Fitted Power Supply (gas and flooding detector).
- N-DET36. Smoke Detector.
- N-DET12. Gas electrovalve.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD30/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD30 can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

• N-RACK-M.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.-Checking and measuring on the main power supply.
- 2.-Checking the working of the auxiliary power supply.
- 3.- Checking the working of the built-in power supply module.
- 4.-Control of gas electrovalve through the smoke sensor.
- 5.-Smoke detection tests with the smoke sensor.
- 6.- Real applications of a gas leakages control system.

For more information see AEL-AD30 catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD30/catalog



AEL-AD30

#### AEL-2.1 Wired Applications

-Home Automation General Applications

# AEL-AD31. Movement and Sound Detection Application.

The Movement and Sound Detection Application, "AEL-AD31", is an application designed to understand the operation of the most common intrusion detector. The intrusion detector of this application consists of a device made up of magnets, which can be located in windows or doors. So when it detects the opening of a window or door, it sends an alarm signal. It can also send the alarm signal when it detects sound above a threshold. To check the operation of this device, the application includes a bell, two halogen lamps, two switches with light, two incandescent lamps and two pushbuttons with light. In other words, the sensor can be connected to any of these elements to simulate real situations, so the student can understand its operation.

The AEL-AD31 includes the following modules:

•N-ALI02.	Domestic Main Power Supply.
•N-INT15.	Two Switches with Light.
• N-LAM08.	Two Lamp-holders +
	Incandescent Lamps
• N-INT31.	Intrusion Detector from 40 to 300 W.
•N-LAM10.	Two Halogen Lamps.
•N-PUL22.	Two Pushbuttons with Light.
• N-TIM05.	Bell + Buzzer.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD31/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD31 can be mounted on rack (option A) or on rail (option B):

### Option A:

This application needs the following racks:

• N-RACK-A.

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

Option B:

This application can be mounted on rail. Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.-Movement and sound detection controlled through switches.
- 2.- Movement and sound detection controlled through push-buttons.
- 3.- Testing of the intrusion sensor.
- 4.- Simulate an intrusion through the intrusion detector and the bell + buzzer module.

For more information see **AEL-AD31** catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD31/catalog



AEL-AD31

#### AEL-2.1 Wired Applications

Home Automation General Applications

# AEL-AD40. Remote Control Application Via Telephone.

The Remote Control Application Via Telephone, "AEL-AD40", is designed to study the operation of a remote control system via telephone, in other words, for the remote control of sensors, alarms, etc. installed in a house, office, etc. With this application, the user can simulate real situations, such as a flooding, a gas leakage, an intrusion or other accident detected by sensors, which trigger an alarm. In that case, the system cuts off the supply and warns the user. Then, through dialing codes, the user can take decisions on the system. To make this possible, the application includes a control module to connect the rest of detection modules to control them, and a telephone to introduce the dialing codes.

The AEL-AD40 includes the following modules:

- N-ALI02. Domestic Main Power Supply.
- N-CTR01. Control Module.
- N-VAR05. Tones Dialing Telephone.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD40/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD40 can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

• N-RACK-M.

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

### Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.-Checking and measuring on the main power supply.
- 2.- Configuration of the Control Module.
- 3.-Control the simulation of the flooding detector through the Control Module.
- 4.- Control the simulation of the gas detector through the Control Module.
- 5.-Control the simulation of the motion detector through the Control Module.

For more information see **AEL-AD40** catalog.

Click on the following link: www.edibon.com/en/files/equipment/ AEL-AD40/catalog



AEL-AD40

#### AEL-2.1 Wired Applications

#### - KNX/EIB Applications

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A

# AEL-KNX1. KNX/EIB Shutter Control Application.

The KNX/EIB Shutter Control Application "AEL-KNX1", has been designed by Edibon to show the users the working of shutter control, intended to improve the energy efficiency and the comfort of their occupants. Blind and shutter control can be done manually through switches or automatically with a constant close loop control with which the shutter and blind position is automatically adapted. These two methods allow us to get energy savings whenever the KNX devices are programmed properly.

The purpose of the AEL-KNX1 is to give the students a complete practical and theoretical tlearning in the installations and programming of the most important KNX elements focused in blind and shutter control systems, characteristic of sensors, actuators, etc.

KNX shutter actuators are responsible for carrying interior blinds or curtains at the appropriate level dynamically to obtain or avoid direct solar radiation through shading depending on temperature in each season.

KNX Weather Station is able to measure different variables useful in establishing energy efficiency actions and control strategies. Knowing precisely the outside temperature, if it is day or night, automatic summer/winter adaption, if it's raining, wind speed, solar azimuth and the level of external brightness is very useful for efficient programming blinds and internal blinds motorized in a building.

KNX Room Controllers are responsible for providing user control of blinds and shutters, with its keypads and displays representing states with the position of the blind and monitoring all the variables sent by the weather station.

Thanks to these three control elements can be established control policies, based on automatic controls and simultaneously give all control to the user if they want to change before specific situations.

To take a maximum experience with the KNX/EIB Shutter Control Application is very recommendable to acquire the rest of the KNX offered by Edibon: AEL-KNX2, AEL-KNX3, AEL-KNX4 and AEL-KNX5. The combination of all these applications allow the student to design a complete intelligent bus system implemented by a KNX System.

In addition, this application requires the ETS latest generation KNX software to program different scenes, import of KNX projects, setting of sensors and actuators, etc.

The AEL-KNX1 includes the following modules:

• N-KNX34.	KNX/EIB L	-	Iramming
	Interface M	odule	
• N-KNX18.	KNX/EIB Module.	Power	Supply

• N-KNX14.	KNX/EIB Light Sensor Module.		
• N-KNX24.	KNX/EIB Shutter/Blind Actuator Module.		
• N-KNX20.	KNX/EIB Push-Button Module.		
Additional and reco	ommended modules:		
• N-KNX23.	KNX/EIB Shutter Motor Module.		
• N-KNX21.	KNX/EIB Room Controller Module.		
• N-KNX30.	KNX/EIB Touch Panel Module.		
• N-KNX25.	KNX/EIB Single Line Extending Bus Module.		

KNIV/EID Link+ Company Maralul

N-KNX2. KNX/EIB Additional Power Supply Module.

• N-KNX32. KNX/EIB Weather Station Module.

Required programming software:

• ETS. KNX Engineering Tool Software.

Additional applications:

• AEL-KNX2.	KNX/EIB Heating Control Application.
• AEL-KNX3.	KNX/EIB Security Control Application.
• AEL-KNX4.	KNX/EIB Lighting Control Application.
• AEL-KNX5.	KNX/EIB Energy Management Application.
• AEL-BCS.	Building Automation and

- Control Networks BacNet Application.
- AEL-DALI. DALI Installations Application.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-KNX1/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-KNX1 can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks: • N-RACK-M.

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

#### Option B:

This application can be mounted on rail.



AEL-KNX1

Applications:		
	AEL-2.1 Wired Applications	
	KNX/EIB Applications	
AEL-KNX1. KNX/EIB Shutter Control Some Practical Possibilities:	<b>Application.</b> (Continuation) 14 Programming of lighting regulation cont	ol. 💦 🗣 🗍 🥅
1 Study of the fundamentals of a Kt	NX/EIB For more information see <b>AEL-KNX1</b> catalog.	
installation BUS.	Click on the following link:	
2 Programming of on-off smart switc	hes to www.edibon.com/en/files/equipment	nt/ 📥 📩 🛅
demonstrate KNX/EIB switching opera	tions. AEL-KNX1/catalog	AEL-KNX1
3 Programming of switching for lights co	ontrol.	
4 Study of preparation and instal	lation	
methods of a KNX/EIB project.		
5 Utilization of conventional switches	s in α	
KNX/EIB project.		
6 Programming of the control of shutt	er and	
curtains.		
7 Programming the 3 way swit	ching	
equivalent circuit.		
Some practical possibilities with addition	al and	
recommended modules:		
8 Programming the touch panel accord	ling to	
different scenes.		
9 Checking all parameters in the touch	panel.	
10 Centralized control of the	main	
configurations in the touch panel.		
11 Extending a bus system through a sing	le-line	
topology.		
12 Manual control over the main actuate	rs.	
13 Study of the weather conditions of	control	
against disturbances variables.		

# AEL-2.1 Wired Applications

# AEL-KNX2. KNX/EIB Heating Control Application.

The KNX/EIB Heating Control Application, "AEL-KNX2", has been designed by Edibon to show the users the most important KNX elements used in the most advanced heating control installations. Temperature control is carried out through temperature sensors and actuators that enable/disable the boiler with a constant integrated close loop control.

The purpose of the AEL-KNX2 is to give the students a complete practical and theoretical learning in the installations and programming of the most important KNX elements focused in heating control systems, characteristic of sensors, actuators, study of energy consumption with these heating control systems, etc.

To take a maximum experience with the KNX/EIB Heating Control Application is very recommendable to acquire the rest of the KNX offered by Edibon: AEL-KNX1, AEL-KNX3, AEL-KNX4 and AEL-KNX5. The combination of all these applications allows the student to design a complete intelligent bus system implemented by a KNX System.

In addition, this application requires the ETS latest generation KNX software to program different scenes, import of KNX projects, setting of sensors and actuators, etc.

The AEL-KNX2 includes the following modules:

• N-KNX34.	KNX/EIB USB Programming Interface Module.	
• N-KNX18.	KNX/EIB Power Supply Module.	The
• N-KNX29.	KNX/EIB Temperature Sensor Module.	rack O
• N-KNX1.	KNX/EIB Heating Actuator Module.	
Additional and rec	ommended modules:	
• N-KNX31.	KNX/EIB Valve Actuator Module.	
• N-KNX30.	KNX/EIB Touch Panel Module.	0
• N-KNX25.	KNX/EIB Single Line Extending Bus Module.	

• N-KNX2. KNX/EIB Additional Power Supply Module.

—— KNX/EIB Ap	plications —	
ation.		
• N-KNX32.	KNX/EIB Weather Station Module.	
•N-KNX17.	KNX/EIB Movement Sensor (	
Required program	ming software:	
• ETS.	KNX Engineering Tool Software.	
	Software.	AEL-KNX2
Additional applica	tions:	

• AEL-KNX1.	KNX/EIB Application	Control
• AEL-KNX3.	KNX/EIB Application	Control

- AEL-KNX4. KNX/EIB Lighting Control
   Application.
- AEL-KNX5. KNX/EIB Energy Management
   Application.
- AEL-BCS. Building Automation and Control Networks BacNet Application.
- AEL-DALI. DALI Installations Application.
- Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-KNX2/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-KNX2 can be mounted on rack (option A) or on rail (option B):

#### Option A:

This application needs the following racks:

• N-RACK-M.

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

#### Option B:

This application can be mounted on rail.

Applications:	opecifications (communicity)	
	AEL-2.1 Wired Applications	
	——— KNX/EIB Applications———	
AEL-KNX2. KNX/EIB Heating Control App Some Practical Possibilities:	lication. (Continuation) 13 Manual control over the main actuators.	
Some rractical rossibilities:	13 Manual control over the main actuators.	👒 🏹 📜 🔎
1 Study of the fundamental of a KNX/EIB	14 Study of the weather conditions control	
installation BUS.	against disturbances variables.	
2 Programming of temperature sensor and	For more information see <b>AEL-KNX2</b> catalog.	
actuators through ETS software for room	Click on the following link:	AEL-KNX2
temperature control.	www.edibon.com/en/files/equipment/	
3 Study of temperature control against	AEL-KNX2/catalog	
disturbances variables.		
4 Study of preparation and installation		
methods of a KNX/EIB project.		
5 Study how the instruction is transferred to		
adequate the temperature.		
Some practical possibilities with additional and		
recommended modules:		
6 Observe the operation of the valve against		
control instruction.		
7 Checking the heat regulation.		
8 Presence control for the appropriate		
operation of heating controller.		
9 Programming the touch panel according to		
different scenes.		
10 Checking all parameters in the touch panel.		
11 Centralized control of the main		
configurations in the touch panel.		
12 Extending a bus system through a single-line		
topology.		

#### AEL-2.1 **Wired Applications**

### AEL-KNX3. KNX/EIB Security Control Application

The KNX/EIB Security Control Application, "AEL-KNX3", has been designed by Edibon to show the users the most important KNX elements used in security alarm control systems with KNX technology.

The purpose of the AEL-KNX3 is to give the students a complete theoretical-practical learning in the installations and programming of the most important KNX elements focused in security alarm control devices, characteristic of sensors, actuators, etc.

To take a maximum experience with the KNX/EIB Security Control Application is very recommendable to acquire the rest of the KNX offered by Edibon: AEL-KNX1, AEL-KNX2, AEL-KNX4 and AEL-KNX5. The combination of all these applications allows the student to design a complete intelligent bus system implemented by a KNX System.

In addition, this application requires the ETS latest generation KNX software to program different scenes, import of KNX projects, setting of sensors and actuators, etc.

The AEL-KNX3 includes the following modules:

A

	ioues me following moubles.	
• N-KNX34.	KNX/EIB USB Programming Interface Module.	
• N-KNX18.	KNX/EIB Power Supply Module.	• A Expan
• N-KNX5.	KNX/EIB Binary Output Module.	In c sof
• N-KNX4.	KNX/EIB Binary Input Module.	kno
Additional and rec	commended modules:	Thi
• N-KNX12.	KNX/EIB Fire/Smoke Module.	
• N-KNX13.	KNX/EIB Flooding Sensor Module.	
• N-KNX3.	KNX/EIB Barrier Sensor Module.	The c
• N-KNX17.	KNX/EIB Movement Sensor Module.	rack (d Op
• N-KNX26.	KNX/EIB Siren Module.	-
• N-KNX6.	KNX/EIB Bolt Switch Module.	
• N-KNX7.	KNX/EIB Broken Glass Module.	
• N-KNX33.	KNX/EIB Window/Door ContactModule.	Ор
• N-KNX19.	KNX/EIB Proximity Sensor Module.	-
• N-KNX15.	KNX/EIB Magnetic Card ReaderModule.	t t

	plications-
ation.	piceirons
• N-KNX11.	KNIX/EID Einenenist Danden
• IN-KINAT I.	KNX/EIB Fingerprint Reader
	Module.
• N-KNX30.	KNX/EIB Touch Panel Module.
• N-KNX35.	KNX/EIB Infrared 📻 🥏
	Transmitter/Receiver Module.
• N-KNX25.	KNX/EIB Single Line Extending
	Bus Module.
• N-KNX2.	KNX/EIB Additional Power
	Supply Module.
Required program	ming software:
• ETS.	KNX Engineering Tool

KNX/EIB Shutter Control



AEL-KNX3

• AEL-KNX2. KNX/EIB Heating Control Application. • AEL-KNX4. KNX/EIB Lighting Control Application. • AEL-KNX5. KNX/EIB Energy Management Application. • AEL-BCS. Building Automation and Control Networks BacNet Application.

Software.

Application.

AEL-DALI. DALI Installations Application.

nsion learning software:

Additional applications:

• AEL-KNX1.

addition, Edibon provides expansion learning ftware (AEL-KNX3/ICAI) to reinforce owledge about this field.

is software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- EDIBON Student Labsoft • ESL-SOF. (Student Software).

application AEL-KNX3 can be mounted on (option A) or on rail (option B):

#### otion A:

This application needs the following racks: • N-RACK-A.

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

# otion B:

This application can be mounted on rail.

#### AEL-2.1 Wired Applications

# AEL-KNX3. KNX/EIB Security Control Application. (Continuation)

Some Practical Possibilities:

- 1.-Study of the fundamental of a KNX/EIB installation BUS.
- Programming of on-off smart switches to demonstrate KNX/EIB switching operations.
- 3.- Programming of switching security system control.
- Study of preparation and installation methods of a KNX/EIB project.
- 5.-Utilization of conventional switches in an EIB project.
- 6.- Programming the 3 way switching equivalent circuit.
- 7.-Make complex logics with binary inputs and outputs.
- Make a wide security network with several units with binary inputs and outputs.
- Some practical possibilities with additional and recommended modules:
- 9.- Programming the touch panel according to different scenes.
- 10.- Extending a bus system through a single-line topology.
- 11.- Programming of several alarms to protect the system.
- 12.- Programming of fire sensor for alert fire in the room.
- 13.- Programming of smoke detector for a complete protection against fire.
- 14.- Programming of flooding protection.
- 15.- Study of the operation of an infrared barrier security.
- 16.- Study of protection against intruders with a movement sensor.
- 17.-Verify the state of a room with the touch panel.
- Programming of the siren alarm to inform of an event.
- 19.- Programming of the complete entrance protection with door and bolt sensor.
- 20.- Notification of a broken glass.

21.- Checking the window state.

KNX/EIB Applications

- 22.- Programming of proximity sensor for distance protection.
- 23.- Use of magnetic card for control access.
- 24.- Programming of the magnetic reader for card recognition.
- 25.- Programming of the fingerprint recognition.
- 26.- Centralized control of the main configurations in the touch panel.
- 27.- Extending a bus system through a single-line topology.
- 28.- Manual control over the main actuators.
- For more information see AEL-KNX3 catalog.
- Click on the following link:

www.edibon.com/en/files/equipment/ AEL-KNX3/catalog AEL-KNX3

# AEL-KNX4. KNX/EIB Lighting Control Application.

The KNX/EIB Lighting Control Application, "AEL-KNX4", has been designed by EDIBON to show the students the most important KNX elements used in the most advanced lighting control installations. Lighting control can be done through two methods: switching on and off the lights according to the sun light intensity or with a constant close loop control with which the light intensity is automatically adapted. These two methods allow to get energy savings whenever the KNX devices are programmed properly.

The purpose of the AEL-KNX4 is to give the students a complete practical and theoretical training in the installations and programming of the most important KNX elements focused in lighting control systems, characteristic of sensors, actuators, comparison of energy consumption with different lighting control systems and the conventional lighting elements, etc.

To take a maximum experience with the KNX/EIB Lighting Control Application is very recommendable to acquire the rest of the KNX offered by Edibon, AEL-KNX1, AEL-KNX2, AEL-KNX3 and AEL-KNX5. The combination of all these applications allows the student to design a complete intelligent bus system implemented by a KNX System.

In addition, this application requires the ETS latest generation KNX software to program different scenes, import of KNX projects, setting of sensors and actuators, etc.

The AEL-KNX4 includes the following modules:

• N-KNX34.	KNX/EIB USB Programming Interface Module.
•N-KNX18.	KNX/EIB Power Supply Module.
• N-KNX14.	KNX/EIB Light Sensor Module.
• N-KNX28.	KNX/EIB Switch Actuator Module.
• N-KNX8.	KNX/EIB Dimming Actuator Module.
•N-KNX16.	KNX/EIB Manual Switches Module.
• N-LAM08.	2 Lamps-holders + Incandescent Lamps 40 W.
• N-LAM32.	1 Led Lamp.
Additional and rec	ommended modules:
•N-KNX17.	KNX/EIB Movement Sensor Module.
• N-KNX27.	KNX/EIB Staircase Sensor Module.

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AEL- Wired Ap			
	onlications-		
ation.	opilearions		
• N-KNX22.	KNX/EIB Scene Controller Module.		
•N-KNX10.	KNX/EIB Energy Meter Module.		E
• N-KNX30.	KNX/EIB Touch Panel Module.	1	
• N-KNX25.	KNX/EIB Single Line Extending Bus Module.		o
• N-KNX2.	KNX/EIB Additional Power SupplyModule.	AEL-KNX4	
Required program	nming software:		
• ETS.	KNX Engineering Tool Software.		
Additional applic	ations:		
• AEL-KNX1.	KNX/EIB Shutter Control		
	Application.		
•AEL-KNX2.	KNX/EIB Heating Control Application.		
• AEL-KNX3.	KNX/EIB Security Control Application.		
• AEL-KNX5.	KNX/EIB Energy Management Application.		
• AEL-BCS.	Building Automation and Control Networks BacNet Application.		
• AEL-DALI.	DALI Installations Application.		
Expansion learnir	ng software:		
In addition, Ed	ibon provides expansion learning		
software (AB	EL-KNX4/ICAI) to reinforce		
knowledge abo	out this field.		
This software is	formed by:		
• ECM-SOF	EDIBON Classroom Manager (Instructor Software).		
• ESL-SOF.	EDIBON Student Labsoft (StudentSoftware).		
The application	AEL-KNX4 can be mounted on		
rack (option A) or	on rail (option B):		

# Option A:

This application needs the following racks: • N-RACK-M.

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

### Option B:

This application can be mounted on rail.

Applications:		
	AEL-2.1 Wired Applications	
	KNX/EIB Applications	
AEL-KNX4. KNX/EIB Lighting Control App		
Some Practical Possibilities:	15 Checking all parameters in the touch panel.	
1Study of the fundamental of a KNX/EIB	16 Extending a bus system through a single-line	
installation BUS.	topology.	
2Programming of on-off smart switches to	For more information see <b>AEL-KNX4</b> catalog.	
demonstrate KNX/EIB switching operations.	Click on the following link:	AEL-KNX4
3Programming of switching and dimmers for	www.edibon.com/en/files/equipment/	
lights control.	AEL-KNX4/catalog	
4Study of preparation and installation methods		
of a KNX/EIB project.		
5Utilization of conventional switches in an EIB		
project.		
6Programming the 3 way switching equivalent		
circuit.		
7 Regulate the brightness.		
8Study of the brightness control.		
9Manual control over the actuators.		
Some practical possibilities with additional and		
recommended modules:		
10 Programming the presence control for		
lighting efficient operation.		
11 Programming of staircase lighting timers.		
12 Programming of several light scene control.		
13 Check the consumption against different		
types of lights.		
14 Programming the touch panel according to		

different scenes.

#### AEL-2.1 Wired Applications

# AEL-KNX5. KNX/EIB Energy Management Application

The KNX/EIB Energy Management Application, "AEL-KNX5", has been designed by Edibon to show the students the most important KNX elements used in the most advanced energy management systems.

The purpose of the AEL-KNX5 is to give the students a complete practical and theoretical learning in the installations and programming of the most important KNX elements focused in the efficient usage of the resources, the optimization of the control of different parameters, etc.

To take a maximum experience with the KNX/EIB Energy Management Application is very recommendable to acquire the rest of the KNX offered by Edibon, AEL-KNX1, AEL-KNX2, AEL-KNX3 and AEL-KNX4. The combination of all these applications allows the student to design a complete intelligent bus system implemented by a KNX System.

In addition, this application requires the ETS latest generation KNX software to program different scenes, import of KNX projects, setting of sensors and actuators, etc.

The AEL-KNX5 includes the following modules:

	*
•N-KNX34.	KNX/EIB USB Programming
	Interface Module.
• N-KNX18.	KNX/EIB Power Supply
	Module.
• N-KNX9.	KNX/EIB Electronic Control
	Module.
• N-KNX8.	KNX/EIB Dimming Actuator
	Module.
• N-KNX10.	KNX/EIB Energy Meter
	Module.
• N-KNX21.	KNX/EIB Room Controller
	Module.
Additional and rec	ommended modules:
• N-KNX30.	KNX/EIB Touch Panel Module.
• N-KNX25.	KNX/EIB Single Line Extending
	Bus Module.
• N-KNX2.	KNX/EIB Additional Power
	Supply Module.
• N-KNX29.	KNX/EIB Temperature Sensor
	Module.

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• N-KNX17. KNX/EIB Movement Sensor Module.

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• N-KNX14.	KNX/EIB Light Sensor Module.
• N-KNX28.	KNX/EIB Switch Actuator Module.
• N-KNX4.	KNX/EIB Binary Input Module.
• N-KNX5.	KNX/EIB Binary Output Module.
• N-LAM08.	2 Lamps-holders + Incandescent Lamps 40 W.

AEL-KNX5

Additional applications: • AEL-KNX1. KNX/EIB Shutter Control

• N-LAM32.

	Applicatio	n.	
• AEL-KNX2.	KNX/EIB	Heating	Control

Application.

1 Led Lamp.

• AEL-KNX3. KNX/EIB Security Control Application.

• AEL-KNX4. KNX/EIB Lighting Control Application.

• AEL-BCS. Building Automation and Control Networks BacNet Application

• AEL-DALI. DALI Installations Application.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-KNX5/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-KNX5 can be mounted on rack (option A) or on rail (option B):

# Option A:

This application needs the following racks:

• N-RACK-A.

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

### Option B:

This application can be mounted on rail.

Applications:		
	AEL-2.1 Wired Applications	
	——— KNX/EIB Applications———	
AEL-KNX5. KNX/EIB Energy Management . Some Practical Possibilities:	<b>Application.</b> (Continuation) 18 Programming the touch panel according to	
1Study of the fundamental of a KNX/EIB	different scenes.	
installation BUS.	19 Checking all parameters in the touch panel.	
2Programming of on-off smart switches to	20 Centralized control of the main charges in the	
demonstrate KNX/EIB switching operations.	touch panel.	
3 Programming of switching and dimmers for	21 Extending a bus system through a single-line	AEL-KNX5
complete control.	topology.	
4Study of preparation and installation methods	For more information see <b>AEL-KNX5</b> catalog.	
of a KNX/EIB project.	Click on the following link:	
5Utilization of conventional switches in an EIB	www.edibon.com/en/files/equipment/	
project.	AEL-KNX5/catalog	
6Programming the 3 way switching equivalent		
circuit.		
7Automatic regulation of consumption		
according to the required conditions.		
8Centralized control with an electronic control		
module.		
9Comparison of switching and dimming		
control consumption according to the required conditions.		
10Visualize the instantaneous energy		
consumption.		
Some practical possibilities with additional and		
recommended modules:		
11 Presence control for an efficient operation.		
12 Study of the brightness control.		
13 Visualize the brightness control with a LED or		
an incandescent lamp.		
14 Switching and dimming the brightness.		
15Compare the efficient of a LED and		
incandescent lamp.		
16 Compare the efficient of modern installations		
with the older ones.		
17 Make complex logics with binary inputs and		
outputs.		

#### AEL-2.1 Wired Applications

#### - KNX/EIB Applications-

# AEL-BCS. Building Automation and Control Networks BacNet Application.

Some Practical Possibilities:

- 1.- Study of fundamentals of BacNet installations.
- 2.- Programming BacNet devices.
- 3.- Configuration of directions for KNX devices recognition.
- 4.- Commissioning and testing of BacNet-KNX installation.

For more information see **AEL-BCS** catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-BCS/catalog



AEL-BCS

# The AEL-BCS includes the following module:

• N-BAC1. BacNet-KNX Gateway Module.

The Building Automation and Control Networks

BacNet Application, "AEL-BCS", is conceived in

such a way to integrate cognitive and hands-on

learning into an overall concept linking together

theory and practice and thus allowing specific

targeting of handling skills. On this way, the

BacNet System shows the students the most

important applications and functions used with this

This system gives the students a complete practical

and theoretical learning in the installations and

programming of the most important BacNet

Additional applications:

standard protocol.

elements.

• AEL-KNX1.	KNX/EIB Shutter Control
	Application.
• AEL-KNX2.	KNX/EIB Heating Control
	Application.
• AEL-KNX3.	KNX Security Control
	Application.
• AEL-KNX4.	KNX/EIB Lighting Control
	Application.
• AEL-KNX5.	KNX/EIB Energy Management
	Application.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-BCS/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

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

Option A:

This application needs the following racks:

• N-RACK-M.

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

Option B:

This application can be mounted on rail. Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules.

#### AEL-2.1 Wired Applications

# ——— KNX/EIB Applications

#### AEL-DALI. DALI Installations Application.

The DALI Installations Application, "AEL-DALI", is designed by Edibon to study the most important subjects related to DALI technology, giving special hands-on training on this field.

The AEL-DALI consists of different modules to study the functionality of the most important components in the field of the DALI control systems. These components are, for example the DALI controller, external buttons, DALI-Controlled brightness and motion sensor. With this modules can be studied energy saving schedules, energy efficiency, lighting automation, on-off functions and discharge lamps using DALI control. In addition to these modules, a network analyzer is optionally provided to study energy savings by comparing DALI technology with conventional lighting installations.

The DALI controller module can be programmed by the user to get the following functions: automatic and semi-automatic motion sensing, regulation of constant light output, scene setting, push-button function, on-off function, staircase function (timer function), addressing capabilities.

The DALI Installations Application provides simplified wiring and high level control (flexibility) for an easy and hands-on learning.

The AEL-DALI includes the following modules:

- N-ALIO2. Domestic Main Power Supply.
- N-DAC. DALI Controller Module.
- N-LED1. LED Lamps Module.
- N-MSE1. DALI Motion sensor Module.
- N-PUS1. DALI Push-buttons Module.
- N-SFU1. Staircase Module.
- N-LAM10. Two Halogen Lamps.
- Additional and recommended modules:
  - N-MED60. Network Analyzer.
- N-TCP1. DALI Touch Control Panel Module.
- N-DKG. DALI-KNX Gateway.

This application can be extended with the following applications:

- AEL-KNX1. KNX/EIB Shutter Control Application.
- AEL-KNX2. KNX/EIB Heating Control Application.
- AEL-KNX3. KNX Security Control Application.
- AEL-KNX4. KNX/EIB Lighting Control Application.
- AEL-KNX5. KNX/EIB Energy Management Application.
- AEL-BCS. Building Automation and Control Networks BacNet Application.
- Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-DALI/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

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

Option A:

- This application needs the following racks:
  - N-RACK-M. (2 units)

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. Some Practical Possibilities:

- 1.- Connection of automatic and semiautomatic motion sensor to the main controller.
- Programming and regulation of constant light output.
- 3.- Scene setting.
- 4.- Testing the push-button function
- 5.- Testing of on-off lights function
- 6.- Staircase function (timer function)
- 7.- System analysis software
- 8.- Addressing capabilities.
- 9.- Comparison conventional lighting energy consumption and DALI lighting systems.

For more information see **AEL-DALI** catalog. Click on the following link:

www.edibon.com/en/files/equipment/

AEL-DALI/catalog



AEL-DALI

Specifications (continuation)

Applications:

#### AEL-2.2 Wireless Applications

-Home Automation General Applications

# AEL-AD28A. Complete Home Automation Application with ZigBee Wireless Protocol.

The Complete Home Automation Application with ZigBee Wireless Protocol, "AEL-AD28A", is a cutting-edge home automation application.

It consists of a set of modules designed to cover different areas within the home automation field: emergency simulation system, safety system and energy management system.

Besides, the AEL-AD28A includes software to develop several control configurations depending on the user's needs. Different virtual scenes, including sensors, actuators, energy meters, control relays, etc., can be developed with the software.

The AEL-AD28A is a flexible home automation application, that is to say, the user will be able to develop several programs to simulate different real situations: emergency states, safety conditions and smart energy management. The versatility of the AEL-AD28A is based, to a great extent, on the Zig-Bee communications protocol. One of the main characteristics of this protocol is the fact that it does not need any control wiring, since all sensors and actuators communicate with each other through radio frequency, behaving as nodes and transmitters.

Finally, the AEL-AD28A includes a set of practical exercises that allow the student to learn the different possibilities that current home automation systems offer from the safety, energy control and home automation points of view.

The AEL-AD28A includes the following modules:

- N-HPM. Home power module.
- N-WMSM. Wireless Motion Sensor Module.
- N-WLSM. Wireless light sensor module.
- N-WISM. Wireless intrusion sensor.
- N-IOWM. Wireless output module. (8 units)
- N-WSM. Wireless switch module. (4 units)
- N-LAM16. Incandescent lamp.
- N-SEL04. Four pilot lights.
- N-TIM05. Bell + Buzzer.
- N-WLDM. Wireless leak detector module.
- N-WSDM. Wireless smoke detector module.
- N-DET12. Gas electro-valve.
- N-DET10. Water electrovalve.

### Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD28A/ICAI) to reinforce knowledge about this field. This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD28A can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks: • N-RACK-A. (2 units).

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. Some Practical Possibilities:

- 1.- Control and program the maximum consumption accumulated by the loads.
- 2.- Program the inputs and outputs of the panel and control them wirelessly.
- 3.- Design and wiring of an automatic lighting control system.
- Design and wiring a burglar alarm using the intrusion and motion sensors with the buzzer.
- 5.- Design a temperature control system.
- Design and wiring a gas leakages control system and a fire alarm.
- 7.- Fire simulation to activate the water solenoid valve through the wireless smoke detector module.
- 8.- Combine all home electric modules and control them wirelessly.

For more information see **AEL-AD28A** catalog. Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD28A/catalog





AEL-AD28A

#### AEL-2.2 Wireless Applications

Home Automation General Applications

# AEL-AD28B. Advanced Home Automation Application with ZigBee Wireless Protocol.

The Advanced Home Automation Application with ZigBee Wireless Protocol, "AEL-AD28B", is a cutting-edge home automation application. It consists of a set of modules designed to cover different areas within the home automation field: safety system and energy management system.

Besides, the AEL-AD28B includes software to develop several control configurations depending on the user's needs.

The AEL-AD28B is a flexible home automation system, that is to say, the user will be able to develop several programs to simulate different real situations.

The versatility of the AEL-AD28B is based, to a great extent, on the Zig-Bee communications protocol. One of the main characteristics of this protocol is the fact that it does not need any control wiring, since all sensors and actuators communicate with each other through radio frequency, behaving as nodes and transmitters.

Finally, the AEL-AD28B includes a set of practical exercises that allow the student to learn the different possibilities that current home automation systems offer from the safety, energy control and home automation points of view.

The AEL-AD28B includes the following modules:

- N-HPM. Home power module.
- N-WMSM. Wireless motion sensor module.
- N-WLSM. Wireless light sensor module.
- N-WISM. Wireless Intrusion sensor.
- N-IOWM. Wireless output module. (6 units).
- N-WSM. Wireless switch module. (4 units).
- N-LAM16. Incandescent lamp.
- N-SEL04. Four pilot lights.
- N-TIM05. Bell + Buzzer.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD28B/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD28B can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

- N-RACK-A.
- 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.  $O_{\text{rational}}$ 

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.- Control and program the maximum consumption accumulated by the loads.
- 2.- Program the inputs and outputs of the panel and control them wirelessly.
- 3.- Design and wiring of a automatic lighting control system.
- Design and wiring a burglar alarm using the intrusion and motion sensors with the buzzer.
- 5.- Design and wiring a temperature control system.
- 6.- Program the motion sensor to illuminate different zones.
- 7.- Combine all home electric modules and control them wirelessly.

#### For more information see **AEL-AD28B** catalog. Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD28B/catalog





AEL-AD28B

#### AEL-2.2 Wireless Applications

Home Automation General Applications

# AEL-AD28C. Home Automation Application with ZigBee Wireless Protocol.

The Home Automation Application with ZigBee Wireless Protocol, "AEL-AD28C", is a home automation application, which is composed by a set of modules that cover different areas of home automation field, such as, wireless control of lighting, energy management or wireless intrusion sensor.

Besides, the AEL-AD28C includes software to develop several control configurations depending on the user's needs.

It is a flexible home automation application, that is to say, the user will be able to develop several configurations to simulate different real situations.

The versatility of the AEL-AD28C is based, to a great extent, on the Zig-Bee communications protocol. One of the main characteristics of this protocol is the fact that it does not need any control wiring, since all sensors and actuators communicate with each other through radio frequency, behaving as nodes and transmitters.

Finally, the AEL-AD28C includes a set of practical exercises, which allows the student to learn the different possibilities that current home automation systems offer.

The AEL-AD28C includes the following modules:

- N-HPM. Home Power Module.
- N-IOWM. Wireless output module (4 units).
- N-WISM. Wireless Instrusion Sensor.
- N-WSM. Wireless Switch Module.
- N-LAM16. Incandescent Lamp (2 units).
- N-SEL04. Four pilot lights.
- N-TIM05. Bell + Buzzer.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD28C/ICAI) to reinforce knowledge about this field.

This software is formed by:

- ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD28C can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

• N-RACK-A.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- 1.-Programming the maximum consumed energy.
- 2.- Lights remote control.
- 3.- Bell and buzzer remote control.
- 4.- Programming the lights switching on/off.
- 5.-Simulation of a typical home automation system.
- 6.- Programming the bell and buzzer together with the red and green pilot lights.

For more information see **AEL-AD28C** catalog.

Click on the following link:

www.edibon.com/en/files/equipment/

AEL-AD28C/catalog



AEL-AD28C

#### AEL-2.2 Wireless Applications

-Home Automation General Applications

# AEL-AD23. Wireless Intrusion Detection Application (RF).

The Wireless Intrusion Detection Application (RF), "AEL-AD23", is designed with the aim to understand the operation of a wireless intrusion detection system. For that, this application includes a wireless presence detector that works via infrared radiation, detecting temperature changes, a panic pushbutton to use in emergency situations and a wireless receptor that receives the signals from all sensors. In order to check the operation of these devices, the application also includes a pilot light module and a bell and buzzer module, which can be activated by the sensors. Thus, the user can check different types of intrusion alarms.

The AEL-AD23 includes the following modules:

- N-ALIO2. Domestic Main Power Supply.
- N-ALI03. AC Auxiliary Power Supply.
- N-DET13. Wireless Intrusion Detector RF.
- N-DET14. Wireless Panic Push-Button RF.
- N-DET15. Wireless One Channel Receptor RF.
  - N-SEL01. Light Signaling Beacons.
  - N-TIM05. Bell + Buzzer.

Expansion learning software:

In addition, Edibon provides expansion learning software (AEL-AD23/ICAI) to reinforce knowledge about this field.

This software is formed by:

- •ECM-SOF. EDIBON Classroom Manager (Instructor Software).
- ESL-SOF. EDIBON Student Labsoft (Student Software).

The application AEL-AD23 can be mounted on rack (option A) or on rail (option B):

Option A:

This application needs the following racks:

• N-RACK-M.

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

Option B:

This application can be mounted on rail.

Optionally the AEL-WBC. Electrical Workbench (Rail) can be supplied to mount the modules. Some Practical Possibilities:

- Checking and measuring on the main power supply.
- 2.- Checking the working of the auxiliary power supply.
- Checking the working of the bell + buzzer module using as acoustic alarm.
- Checking the working of the light signaling beacons module, using as visual alarm.
- 5.-Checking the working of the wireless emergency pushbutton.
- 6.- Use of the alarms with the wireless intrusion detector.
- 7.-Real application of a wireless intrusion detection system.

For more information see AEL-AD23 catalog.

Click on the following link:

www.edibon.com/en/files/equipment/ AEL-AD23/catalog



AEL-AD23

AEL-1. ELECTRIC	AL INSTALLATIONS LAB
AEL-1.1. Home Electrical Installations	AEL-1.2. Industrial Electrical Installations
<section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header>	Applications         Industrial Control Engineering Applications         • AEL-CM1. Logical Control Operations Application.         • AEL-CM2. Application of Manual Starters and Velocity Commutators with Asynchronous Motors.         • AEL-CM3. Automatic Control Operations II Application.         • AEL-CM4. Automatic Control Operations with Contactors and Sensors IV Application.         • AEL-MED. Industrial Installations Monitoring Application.         • AEL-AD33. Single-Phase Installations Faults Application.         • AEL-AD33T. Three-phase Installations Faults Application.         • AEL-PRTS. Protective Relaying Application.         • AEL-AE5. Protection Relays Control Application.         • AEL-AE5. Protection Relays Control Application.         • AEL-AI13-A. Electrotechnics Application Focused on RLC Circuits.
www.edibon.com/en/	AEL-2.2. Wireless Applications
Applications Home Automation General Applications	Applications Home Automation General Applications
<ul> <li>AEL-AD1A. Robbery Alarm Advanced Application.</li> <li>AEL-AD1B. Robbery Alarm Advanced Application.</li> <li>AEL-AD3A. Fire Alarm Advanced Application.</li> <li>AEL-AD3B. Fire Alarm Application.</li> <li>AEL-AD15A. Position Control Advanced Application.</li> <li>AEL-AD15B. Position Control Advanced Application.</li> <li>AEL-AD15B. Position Control Application.</li> <li>AEL-AD25A. Control Application for Home Electric Service through the telephone.</li> <li>AEL-AD22. Flooding Control Application.</li> <li>AEL-AD30. Gas and Smoke Detection Application.</li> <li>AEL-AD31. Movement and Sound Detection Application.</li> <li>AEL-AD40. Remote Control Application Via Telephone.</li> </ul> <b>KNX/EIB Applications</b> <ul> <li>AEL-KNX1. KNX/EIB Shutter Control Application.</li> <li>AEL-KNX2. KNX/EIB Heating Control Application.</li> </ul>	<ul> <li>AEL-AD28A. Complete Home Automation Application with ZigBee Wireless Protocol.</li> <li>AEL-AD28B. Advanced Home Automation Application with ZigBee Wireless Protocol.</li> <li>AEL-AD28C. Home Automation Application with ZigBee Wireless Protocol.</li> <li>AEL-AD23. Wireless Intrusion Detection Application (RF).</li> </ul>

#### AEL-3. ELECTRICAL MACHINES LAB

#### AEL-3.1.

#### **Transformers Applications**

#### Applications

• AEL-SPTT. Single-Phase Transformer Application.

AEL-TPTT. Three-Phase Transformer Application.

AEL-AI13-D. Modular Application for Electrotecnics (Transformers).

AEL-3.2.

#### Motors Applications

#### **Applications**

#### AC Electrical Motors Applications

- AEL-EEEM. Energy Efficiency in Electrical Motors Application.
- AEL-EMSS. Electrical Machines Soft Starters Application.
- AEL-EMCF. Application Electrical Machines Control through Frequency Controller.
- AEL-AI13. Modular Application for Electrotecnics (RLC Circuits, Electrostatics, Motors, Transformers, Lighting).
- AEL-Al13-C. Modular Application for Electrotecnics (Motors).
- AEL-EMRP. Electrical Machines Relays Protection Application.
- AEL-SERIN/CA-1k. Computer Controlled Advanced Industrial Servo systems Application- 1 kW (for AC Motors).
- AEL-MMRT. Motor Management Relays Application.
- AEL-PRTS. Industrial Protective Relaying Training Application.
- AEL-ACEMT. AC Electrical Motors Application.
- Option 1 (EMT7): Study of Three-Phase Asynchronous Motor of Squirrel cage.
- Option 2 (EMT8): Study of Three-Phase Asynchronous Motor of wound rotor
- Option 3 (EMT9): Study of Three-Phase Dahlander Motor.
- Option 4 (EMT10): Study of Asynchronous three-phase motor of two independent speeds.
- Option 5 (EMT11): Study of Asynchronous single-phase motor with starting capacitor.
- Option 6 (EMT12): Study of Universal Motor.
- Option 7 (EMT16): Study of Asynchronous single-phase motor with starting and running capacitor.
- Option 8 (EMT20): Study of Asynchronous single-phase motor with split phase.
- Option 9 (EMT21): Study of Three-Phase Reluctance Motor.
- AEL-ACINA. Application of AC Three-Phase Induction Motor of Squirrel Cage.
- AEL-ACDHA. Application of AC Dahlander Three-Phase Induction Motor.
- AEL-ACWRA. Application of AC Three-Phase Induction Motor of Wound Rotor.
- AEL-ACLA. Application of AC Linear Motor Operations.
- AEL-ACRLA. Application of AC Three-Phase Reluctance Motor.
- AEL-ACSPA. Application of Asynchronous Single-Phase Motor with Split Phase.
- AEL-AI12. Modular Application (AC Motors).
- AEL-IMSU. General Application of AC Induction Motor.
- AEL-ACEMA. AC Electrical Motors Applications.
- Option 1 (EMT7): Study of Three-Phase Asynchronous Motor of Squirrel cage.
- Option 2 (EMT8): Study of Three-Phase Asynchronous Motor of wound rotor.
- Option 3 (EMT9): Study of Three-Phase Dahlander Motor.
- Option 4 (EMT10): Study of Asynchronous three-phase motor of two independent speeds.
- Option 5 (EMT11): Study of Asynchronous single-phase motor with starting capacitor.
- Option 6 (EMT12): Study of Universal Motor.
- Option 7 (EMT16): Study of Asynchronous single-phase motor with starting and running capacitor.
- Option 8 (EMT20): Study of Asynchronous single-phase motor with split phase.
- Option 9 (EMT21): Study of Three-Phase Reluctance Motor.
- AEL-EEA. Alternator Study Application.
  AEL-EGMG24. Motor-Generator Group.

ALL-LOWG24. Molor-Generator Group

#### **DC Electrical Motors Applications**

- AEL-DCEMT. DC Electrical Motors Applications.
- Option 1 (EMT1): Study of DC Machine with independent excitation.
- Option 2 (EMT2): Study of DC Machine with Series excitation.
- Option 3 (EMT3): Study of DC Machine with shunt excitation.
- Option 4 (EMT4): Study of DC Machine with Compound excitation.
- Option 5 (EMT5): Study of all types of DC Machines.
- AEL-DCSHT. DC Shunt Excitation Motor Application.
- AEL-DCSEA. Application of DC Series Motor.
- AEL-DCSHA, Application of DC Shunt Motor.
- AEL-DCCOA. Application of DC Compound Motor.
- AEL-DCSPA. Application of DC Separately Excited Motor.
- AEL-DCGEA. Application of DC Generator.
- AEL-DCPMA, Application of DC Permanent Magnet Motor.
- AEL-DCBRA, Application of DC Brushless Motor.
- ALL DOLLAR DO EL DOLLAR MOTOR.
- AEL-DCEMA. DC Electrical Motors Applications.
- Option 1 (EMT1): Study of DC Machine with independent excitation.
- Option 2 (EMT2): Study of DC Machine with Series excitation.
- Option 3 (EMT3): Study of DC Machine with shunt excitation.
- Option 4 (EMT4): Study of DC Machine with Compound excitation.
- Option 5 (EMT5): Study of all types of DC Machines.
- Option 6: (EMT15): Study of Permanent Magnet DC Motor.
- Option 7: (EMT1): Study of DC Generator
- AEL-UMA. Application of Universal Motor.
- AEL-STMA. Application of Stepper Motor.

AEL-ESAM. Faults Simulation Application in Electrical Motors.
 AEL-ESAT. Faults Simulation Application in Transformers.

**Electrical Motors Faults Applications** 

See catalogue of: AEL-3. **Electrical Machines Lab** www.edibon.com/en/files/equipment/AEL-3/catalog

<ul> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor.</li> <li>AEL-EMT0-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor.</li> <li>AEL-EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacitar.</li> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT14-T. Transparent and functional universal motor.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase with short circuited brus.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting capacitor.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel capacitor.</li> </ul>	Electrical Machines Construction         Calabrais           Applications         Calabrais           Dissettile and Configurable Electrical Moders Application	AEL-4. ELECTROMECHANICAL CONSTRUCTIONS LAB				
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<ul> <li>Wring &amp; Construction of Motors, Generators and Transformers</li> <li>• AEL MOTC. Motors, Generators and Transformers Contruction Application.</li> <li>• AEL MOTC. Three Phase Transformer Contruction Kit.</li> <li>• AELDONG ATT. Dissembly Motors</li> <li>• AELDONG ATT. Dissembly Motors</li> <li>• AELDONG ATT. Dissembly Motors Sit.</li> <li>• AELDONG ATT. Dissembly Motors Sit.</li> <li>• AELDONG ATT. Dissembly Induction Motors Sit.</li> <li>• AELDONG ATT. A Dissembly Motor Company Advances Attended Attende</li></ul>	Wing & Construction of Motor, Generators and Transforms         =M372.5. Cut avony DC shut actabits motor-generator.           +VEL-MGTC. Motor, Generators and Transforms         =M33.5. Cut avony DC shut actabits motor-generator.           -VEL-MGTC. Motor, Generators K.         =M35.5. Cut avony DC shut actabits motor-generator.           -VEL-DMC-KIT. Disasembly Motors         =M35.5. Cut avony approbrances three phase motor of squired agos.           -VEL-DMC-KIT. Disasembly Motors KR.         =M35.5. Cut avony approbrances three phase motor of squired agos.           -VEL-DMC-KIT. Disasembly Induction Motors KR.         =M35.5. Cut avony approbrances three phase motor with would clost.           -VEL-DMC-KIT. Disasembly Induction Motors KR.         =M35.5. Cut avony approbrances three phase motor with starting capacitor.           -VEL-DMC-KIT. Disasembly Induction Motors KR.         =M35.5. Cut avony approbrances three phase motor with starting capacitor.           -VELT-S. Cut avony approbrances three phase motor with starting capacitor.         =M315.5. Cut avony approbrances three phase motor with starting capacitor.           -VELT-S. Cut avony approbrances transport avons.         =W315.5. Cut avony approbrances transport avons.           -VELT-S. Cut avony approbrances transport avons.         =W315.5. Cut avony approbrances transport avons.           -VELT-S. Cut avony approbrances transport avons.         =W315.5. Cut avony approbrances transport avons.           -VELT-S. Cut avony approbrances transport avons with starting capacitor.         =W115.5. Cu					
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<ul> <li>*AELFIPC. These-Phase Transformer Construction Kit.</li> <li>*EMT5-S. Cut away DC shurt-series compound excitation moto:</li> <li>*EMT5-S. Cut away DC shurt-series compound excitation moto:</li> <li>*AEL-DMA-KIT. 4 Disassembly Mators Generators Kit.</li> <li>*AEL-DMA-KIT. 4 Disassembly Induction Mators Kit.</li> <li>*AEL-DMA-KIT. Transportent on Mators Kit.</li> <li>*AEL-DMA-KIT. Transportent on Mators Kit.</li> <li>*AEL-MATA-T. Transportent on Matorskite And Processemble A Disassemble.</li> <li>*AEL-MATA-T. Transportent on Matorskite And Section Matorskite And Section Matorskite A</li></ul>	<ul> <li>+AEL-TPTC. Three-Phase Transformer Construction KB.</li> <li>FEMTS-S. Cutaway DCG shumt-senies compound excitation moto:</li> <li>FEMTS-S. Cutaway DCG shumt-senies compound excitation moto:</li> <li>FEMTS-S. Cutaway DCG shumt-senies compound excitation moto:</li> <li>FEMTS-S. Cutaway apprchemosa three phase motor alignment data.</li> <li>FEMTS-S. Cutaway apprchemosa three phase motor alignment data.</li> <li>FEMTS-S. Cutaway apprchemosa three phase motor with aurant or accitation.</li> <li>FEMTS-S. Cutaway apprchemosa single-phase motor with aurant or accitation.</li> <li>FEMTS-S. Cutaway apprchemosa three phase motor with abort discutted baselse.</li> <li>FEMTS-S. Cutaway DC Permiter motor with abort discutted baselse.</li> <li>FEMTS-S. Cutaway apprchemosa single-phase with short discutted baselse.</li> <li>FEMTS-S. Cutaway apprchemosa single-phase motor with abort ing capacitation.</li> <li>FEMTS-S. Cutaway DC Permiter motor.</li> <li>FEMTS-S. Cutaway DC Permiter motor.</li> <li>FEMTS-S. Cutaway DC Permiter motor.</li> <li>FEMTS-S. Cutaway apprchemosa single-phase motor with pathing capacitation.</li> <li>FEMTS-S. Cutaway CB and the single phase motor with pathing capacitation.</li> <li>FEMTS-S. Cutaway apprchemosa single-phase motor with pathing capacitation.</li> <li>FEMTS-S. Cutaway apprchemosa single-phase motor with pathing capacitation.</li> <li>FEMTS-S. Cutaway CB and the cutation motor generator.</li> <li>FEMTS-S. Cutaway CB and the cutation motor generator.</li> <li>FEMTS-S. Cutaway CB and the cutatint cutation.</li> <li>FEMTS-S. Cutaway CB and the cutatin</li></ul>	-				
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<ul> <li>EMT11.S. Cut owny asynchronous single-phase motor with starting capaciter.</li> <li>EMT12.S. Cut owny repulsion motor, single-phase with short circuited brushes.</li> <li>EMT12.S. Cut owny asynchronous single-phase motor with starting capaciter.</li> <li>EMT12.S. Cut owny asynchronous single-phase motor single</li></ul>	<ul> <li>EMT11-S. Cut oway capit-bronous single-phase motor with starting capacitor.</li> <li>EMT12-S. Cut oway capitalian motors, single-phase with short circuited brushes.</li> <li>EMT13-S. Cut oway Capitalian motors in the phase motor with starting capacitor.</li> <li>EMT13-S. Cut oway Capitalian motors in the phase motor with starting capacitor.</li> <li>EMT13-S. Cut oway Capitalian motors affree phase motor with starting capacitor.</li> <li>EMT13-S. Cut oway Capitalian motor with split phase.</li> <li>EMT13-S. Cut oway Capitalian motor with split phase.</li> <li>EMT13-S. Cut oway tapper motors.</li> <li>EMT13-S. Cut oway tapper motors.</li> <li>EMT23-S. Cut oway tapper and success the cutors of the cutors of the cutors of the cutors.</li> <li>EMT23-S. Cut oway tapper and success the cutors.</li> <li>EMT23-S. Cut oway tapper and functional DC dependent excitation motor-generator.</li> <li>AELE-EMT3-T. Transporent and functional DC submet excitation motor-generator.</li> <li>AELE-EMT3-T. Transporent and functional DC submet excitation motor-generator.</li> <li>AELE-EMT3-T. Transporent and functional DC submet excitation motor-generator.</li> <li>AELE-EMT3-T. Transporent and functional and with wound rotor.</li> <li>AELE-EMT3-T. Transporent and functional and work wound write.</li> <li>AELE-EMT3-T. Transporent and functional and work wound write.</li> <li>AELE-EMT3-T. Transporent and functional and work wound write.</li> <li>AELE-EMT3-T. Transporent and functional and work woun</li></ul>	,				
<ul> <li>EMT125. Cut away universal mator:</li> <li>EMT145. Cut away DC permanent reagent motor, single-phase with short circuited brushes.</li> <li>EMT145. Cut away DC permanent magnet motor.</li> <li>EMT145. Cut away DC permanent magnet motor.</li> <li>EMT175. Cut away single-phase motor of squirrel cage with "Y" connection.</li> <li>EMT175. Cut away single-phase motor.</li> <li>EMT195. Cut away single-phase motor.</li> <li>EMT195. Cut away single-phase motor.</li> <li>EMT125. Cut away single-phase motor.</li> <li>EMT205. Cut away single-phase motor.</li> <li>EMT205. Cut away single-phase motor.</li> <li>EMT225. Cut away single-phase motor with split phase.</li> <li>EMT225. Cut away single-phase motor away.</li> <li>EMT225. Cut away single-phase motor away.</li> <li>EMT225. Cut away single-phase motor with split phase.</li> <li>EMT225. Cut away single-phase motor.</li> <li>EMT225. Cut away single-phase motor away.</li> <li>EMT225. Cut away single-phase motor away.</li> <li>EMT225. Cut away single-phase motor.</li> <li>EMT225. Transporent and functional DC charle-sectation motor-generator.</li> <li>ELEMT37. Transporent and functional DC single-phase motor disquirel cage.</li> <li>ELEMT37. Transporent and functional approtomous three-phase motor disquirel cage.</li> <li>ELEMT37. Transporent and functional approtomous three-phase motor disquirel cage.</li> <li>ELEMT37. Transporent and functional approtomous three-phase motor disquirel cage.</li> <li>ELEMT37. Transporent an</li></ul>	<ul> <li>EMT12.5. Cut away universal moto:</li> <li>EMT14.5. Cut away universal moto:</li> <li>EMT14.5. Cut away universal moto:</li> <li>EMT14.5. Cut away septicison motor, single-phase motor with starting and running capacitor.</li> <li>EMT16.5. Cut away septichronous single-phase motor ef squirrel cage with "\" connection.</li> <li>EMT18.5. Cut away septichronous single-phase motor of squirrel cage with "\" connection.</li> <li>EMT19.5. Cut away septichronous single-phase motor of squirrel cage with "\" connection.</li> <li>EMT19.5. Cut away supportsonus single-phase motor with split phase.</li> <li>EMT20.5. Cut away supportsonus single-phase motor with split phase.</li> <li>EMT21.5. Cut away single-phase relucince motor.</li> <li>EMT22.5. Cut away single-phase motor with split phase.</li> <li>EMT21.5. Cut away single-phase relucince motor.</li> <li>EMT22.5. Cut away single-phase relucince motor.</li> <li>EMT22.5. Cut away single-phase relucince motor.</li> <li>EMT22.5. Cut away single-phase relucince motor.</li> <li>ELE-EMT1.7. Transporent and Functional DC sints accitation motor-generator.</li> <li>AELE-EMT3.7. Transporent and functional AC synchronous three-phase motor relemator.</li> <li>AELE-EMT3.7. Transporent and functional Active phase motor set iterator.</li> <li>AELE-EMT3.7. Transporent and functional Caynchronous three-phase motor with wound rotor.</li> <li>AELE-EMT3.7. Transporent and functional asynchronous single-phase motor with sound rotor.</li> <li>AELE-EMT3.7. Transporent and functional asynchronous single-phase motor with sound rotor.</li> <li>AELE-EMT3.7. Transporent and functional asynchronous single-phase motor with sound rotor.</li></ul>					
<ul> <li>EMT15-S. Cut away DC permanent magnet motor.</li> <li>EMT16-S. Cut away aganchronous single-phase motor of squirel cage with "Y" connection.</li> <li>EMT17-S. Cut away aganchronous single-phase motor of squirel cage with "Y" connection.</li> <li>EMT19-S. Cut away aganchronous single-phase motor with split phase.</li> <li>EMT19-S. Cut away aganchronous single-phase motor with split phase.</li> <li>EMT20-S. Cut away single-phase relation e motor.</li> <li>EMT20-S. Cut away single-phase relation e motor.</li> <li>EMT22-S. Cut away single-phase relation motor-generator.</li> <li>AEL-EMT21. Transporent and functional DC single sectation motor-generator.</li> <li>AEL-EMT31. Transporent and functional DC short sectation motor demotor distural cage.</li> <li>AEL-EMT31. Transporent and functional DC short sectation motor distural cage.</li> <li>AEL-EMT31. Transporent and functional DC short sectation motor distural cage.</li> <li>AEL-EMT31. Transporent and functional asynchronous three-phase motor distural cage.</li> <li>AEL-EMT31. Transporent and functional asynchronous three-phase motor with starting cago and the charactoned asynchronous single-phase motor with starting cago and functional asynchronous single-phase motor with starting cago and functional async</li></ul>	<ul> <li>EMT15-S. Cut away DC permanent magnet motor.</li> <li>EMT16-S. Cut away saynchronous single-phase motor with starting and running capacitor.</li> <li>EMT17-S. Cut away saynchronous three-phase motor of squirrel cage with "Y" connection.</li> <li>EMT19-S. Cut away pachtronous single-phase motor with split phase.</li> <li>EMT19-S. Cut away saynchronous single-phase motor with split phase.</li> <li>EMT20-S. Cut away saynchronous single-phase motor with split phase.</li> <li>EMT20-S. Cut away single phase shaded pole motor.</li> <li>EMT21-S. Cut away single phase motor agenerator.</li> <li>AEL-EMT21. Transporent and functional DC sintre sociation motor-generator.</li> <li>AEL-EMT3-T. Transporent and functional agenchronous shree-phase motor of squirrel cage.</li> <li>AEL-EMT3-T. Transporent and functional agenchronous shree-phase motor with starting capacities and functional agenchronous single-phase motor with starting capacities.</li> <li>AEL-EMT3-T. Transporent and functional agenchronous single-phase with short include bush and science and synchronous single-phase motor with starting running capacitie.</li> <li>AEL-EMT13-T. Transporent and functional agenchronous single-phase motor with starting running capaci</li></ul>					
<ul> <li>EMT16-S. Cut away asynchronous single-phase motor with starting and running capacitor.</li> <li>EMT17-S. Cut away asynchronous three-phase motor of squirrel cage with "Y" connection.</li> <li>EMT19-S. Cut away asynchronous single-phase motor of squirrel cage with "Y" connection.</li> <li>EMT19-S. Cut away asynchronous single-phase motor with split phase.</li> <li>EMT20-S. Cut away asynchronous single-phase motor with split phase.</li> <li>EMT20-S. Cut away single-phase shaded pole motor.</li> <li>EMT22-S. Cut away single-phase shaded pole motor.</li> <li>ELETTA. Transporent and Functional DC arise sectiation motor-generator.</li> <li>AELEMT3-T. Transporent and functional DC shunt sectiation motor-generator.</li> <li>AELEMT3-T. Transporent and functional DC shunt-sectiation motor-generator.</li> <li>AELEMT3-T. Transporent and functional DC shunt-sectiation motor-generator.</li> <li>AELEMT3-T. Transporent and functional DC shunt-sectiation motor differentor.</li> <li>AELEMT3-T. Transporent and functional DC shunt-sectian motor of aquirrel cage.</li> <li>AELEMT3-T. Transporent and functional daynchronous three-phase motor of squirrel cage.</li> <li>AELEMT3-T. Transporent and functional daynchronous three-phase motor of sagarrel cage.</li> <li>AELEMT10-T. Transporent and functional asynchronous single-phase motor with startin running capacitor.</li> <li>AELEMT11-T. Transporent and functional asynchronous sing</li></ul>	<ul> <li>EMT16-S. Cut away asynchronous single-phase motor with starting and running capacitor.</li> <li>EMT17-S. Cut away pachtronous single-phase motor disquired cage with "Y" connection.</li> <li>EMT18-S. Cut away spectronous single-phase motor with split phase.</li> <li>EMT20-S. Cut away single-phase motor.</li> <li>EMT21-S. Cut away single-phase motor with split phase.</li> <li>EMT21-S. Cut away single-phase should pole motor.</li> <li>EMT22-S. Cut away single-phase should pole motor.</li> <li>AEL-FTM. Transporent and Functional Electrical Motors</li> <li>AEL-EMT1-T. Transporent and functional DC should excitation motor-generator.</li> <li>AEL-EMT2-T. Transporent and functional DC should excitation motor-generator.</li> <li>AEL-EMT3-T. Transporent and functional DC should excitation motor-generator.</li> <li>AEL-EMT3-T. Transporent and functional AC synchronous three-phase motor disputine cape.</li> <li>AEL-EMT3-T. Transporent and functional AC synchronous three-phase motor disputine cape.</li> <li>AEL-EMT3-T. Transporent and functional asynchronous three-phase motor disputine cape.</li> <li>AEL-EMT3-T. Transporent and functional asynchronous three-phase motor disputine cape.</li> <li>AEL-EMT3-T. Transporent and functional asynchronous three-phase motor with starting capacital.</li> <li>AEL-EMT13-T. Transporent and functional asynchronous three-phase motor with starting capacital.</li> <li>AEL-EMT13-T. Transporent and functional asynchronous three-phase motor with starting capacital.</li> <li>AEL-EMT13-T. Transporent and functional asynchronous three-phase motor with starting capacital.</li> <li>AEL-EMT13-T. Transporent and functional asynchronous three-phase motor with starting capacital.</li> <li>AEL-EMT13-T. Transporent and functional</li></ul>		•EMT14-S. Cut away repulsion motor, single-phase with short circuited brushes.			
<ul> <li>EMT1 7-S. Cut away asynchronous three-phase motor of squirrel cage with "Y" connection.</li> <li>EMT1 9-S. Cut away to C Brushless motor.</li> <li>EMT1 9-S. Cut away asynchronous single-phase motor with split phase.</li> <li>EMT2 9-S. Cut away asynchronous single-phase motor with split phase.</li> <li>EMT2 9-S. Cut away asynchronous single-phase motor.</li> <li>EMT2 9-S. Cut away single-phase haded pole motor.</li> <li>EMT2 9-S. Cut away single-phase shaded pole motor.</li> <li>AEL-EMT1 -T. Transporent and functional Motors Application</li> <li>AEL-EMT3 -T. Transporent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT3 -T. Transporent and functional DC series excitation motor-generator.</li> <li>AEL-EMT4 -T. Transporent and functional DC submt secitation motor-generator.</li> <li>AEL-EMT4 -T. Transporent and functional DC shurt-series compound excitation motor-generator.</li> <li>AEL-EMT3 -T. Transporent and functional DC shurt-series compound excitation motor-generator.</li> <li>AEL-EMT3 -T. Transporent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT3 -T. Transporent and functional asynchronous three-phase motor asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT3 -T. Transporent and functional asynchronous single-phase motor with short crauted bus.</li> <li>AEL-EMT10 -T. Transporent and functional asynchronous single-phase wotor with stort in running capacito.</li> <li>AEL-EMT14 -T. Transporent and functional asynchronous single-phase motor with stort in running capacitor.</li> <li>AEL-EMT14 -T. Transporent and functional asynchronous single-phase motor with stort in running capacitor.</li> <li>AEL-EMT14 -T. Transporent and functional asynchronous single-phase mo</li></ul>	<ul> <li>EMT17-S. Cut away asynchronous three-phase motor of squirrel cage with "Y" connection.</li> <li>EMT178-S. Cut away asynchronous single-phase motor with split phase.</li> <li>EMT120-S. Cut away single-phase relactance motor.</li> <li>EMT21-S. Cut away single-phase the state of th</li></ul>		•EMT15-S. Cut away DC permanent magnet motor.			
<ul> <li>EMT18-S. Cut away DC Brushless motor.</li> <li>EMT19-S. Cut away stepper motor.</li> <li>EMT20-S. Cut away stepper notor.</li> <li>EMT20-S. Cut away stepper notor.</li> <li>EMT20-S. Cut away stepper and functional Electrical Motors</li> <li>AEL-FITM. Transparent and Functional Electrical Motors</li> <li>AEL-EMT1-T. Transparent and Functional DC independent excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC submt excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shurt excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shurt excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shurt excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional AC synchronous three-phase motor disquired cage.</li> <li>AEL-EMT3-T. Transparent and functional asynchronous three-phase motor disquired cage.</li> <li>AEL-EMT3-T. Transparent and functional asynchronous three-phase motor disquired cage.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous three-phase motor disquired cage.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous three-phase motor with sourd rotor.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous three-phase motor with sourd rotor.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous three-phase motor with starting capacitation motor-generation.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase wotor with starting capacitation.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous three-phase motor with starting capacitand functi</li></ul>	<ul> <li>EMT18-5. Cut away stepper motor.</li> <li>EMT19-5. Cut away stepper motor.</li> <li>EMT29-5. Cut away stepper motor.</li> <li>EMT29-5. Cut away stepper motor.</li> <li>EMT29-5. Cut away single-phase motor with split phase.</li> <li>EMT29-5. Cut away single-phase shaded pole motor.</li> <li>EMT29-5. Cut away single-phase shaded pole motor.</li> <li>EMT29-5. Cut away single-phase shaded pole motor.</li> <li>EMT29-5. Cut away single-phase motor with split phase.</li> <li>EMT29-5. Cut away single-phase shaded pole motor.</li> <li>EMT29-5. Cut away single-phase shaded pole motor.</li> <li>AEL-EMT1. Transporent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT3. Transporent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3. Transporent and functional DC shurt excitation motor-generator.</li> <li>AEL-EMT3. Transporent and functional Cosynchronous three-phase motor with wound rotor.</li> <li>AEL-EMT3. Transporent and functional asynchronous three-phase motor disquirel cage.</li> <li>AEL-EMT10. Transporent and functional asynchronous three-phase motor with wound rotor.</li> <li>AEL-EMT11. Transporent and functional asynchronous single-phase motor with storting running capacitor.</li> <li>AEL-EMT14. Transporent and functional asynchronous single-phase motor with storting running capacitor.</li> <li>AEL-EMT14. Transporent and functional asynchronous single-phase motor with storting running capacitor.</li> <li>AEL-EMT14. Transporent and functional asynchronous single-phase motor with storting running capacitor.</li> <li>AEL-EMT14. Transporent and functional asynchronous single-phase motor with storting running capacitor.</li> <li>AEL-EMT14. Tr</li></ul>					
<ul> <li>EMT19-S. Cut away stepper motor.</li> <li>EMT20-S. Cut away stepper motor.</li> <li>EMT20-S. Cut away stepper motor.</li> <li>EMT21-S. Cut away single-phase motor with split phase.</li> <li>EMT21-S. Cut away single-phase shaded pole motor.</li> <li>EMT22-S. Cut away single-phase shaded pole motor.</li> </ul>	<ul> <li>EMT19-5. Cut away stepper motor.</li> <li>EMT20-5. Cut away saynchronous single-phase motor with split phase.</li> <li>EMT21-5. Cut away single-phase haded pole motor.</li> <li>EMT22-5. Cut away single-phase shaded pole motor.</li> <li>EMT22-5. Cut away single-phase shaded pole motor.</li> <li>EMT22-5. Cut away single-phase shaded pole motor.</li> <li>AEL-FITM. Transporent and Functional Electrical Motors</li> <li>AEL-FITM. Transporent and functional Electrical Motors</li> <li>AEL-FITM. Transporent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT3-T. Transporent and functional DC surface scitation motor-generator.</li> <li>AEL-EMT3-T. Transporent and functional DC shurt excitation motor-generator.</li> <li>AEL-EMT3-T. Transporent and functional CS such sense scattation motor-generator.</li> <li>AEL-EMT3-T. Transporent and functional CS such sense motor with wound rotor.</li> <li>AEL-EMT9-T. Transporent and functional asynchronous three-phase motor dependent speed.</li> <li>AEL-EMT1-T. Transporent and functional asynchronous three-phase motor.</li> <li>AEL-EMT1-T. Transporent and functional asynchronous single-phase motor with starting capacition.</li> <li>AEL-EMT1-T. Transporent and functional asynchronous single-phase motor with starting capacition.</li> <li>AEL-EMT1-T. Transporent and functional asynchronous single-phase motor with starting capacition.</li> <li>AEL-EMT1-T. Transporent and functional asynchronous single-phase motor with starting capacition.</li> <li>AEL-EMT1-T. Transporent and functional asynchronous three-phase motor of squirel cage.</li> <li>AEL-EMT1-T. Transporent and functional asynchronous single-phase motor w</li></ul>		•EMT17-S. Cut away asynchronous three-phase motor of squirrel cage with "Y" connection.			
<ul> <li>EMT20-S. Cut away asynchronous single-phase motor with split phase.</li> <li>EMT21-S. Cut away three-phase reluctance motor.</li> <li>EMT22-S. Cut away single-phase shaded pole motor.</li> <li>Transparent and Functional Electrical Motors</li> <li>AEL-FTM. Transparent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT4-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT9-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT9-T. Transparent and functional DA synchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor with subting capor.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous single-phase motor with starting running capocitor.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor of squirrel capocitor.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor with starting running capocitor.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor of squirrel capocitor.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor of squirrel capocitor.</li> <li>AEL-EMT2-T. Transparent and functional asynchronous</li></ul>	<ul> <li>EMT20-S. Cut away asynchronous single-phase motor with split phase.</li> <li>EMT21-S. Cut away single-phase reluctance motor.</li> <li>EMT22-S. Cut away single-phase shaded pole motor.</li> <li>Transparent and Functional Electrical Motors</li> <li>AEL-EMT1-T. Transparent and Functional DC independent excitation motor-generator.</li> <li>AEL-EMT1-T. Transparent and functional DC sindependent excitation motor-generator.</li> <li>AEL-EMT2-T. Transparent and functional DC sindependent excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC some accitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional accitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional accitation motor generator.</li> <li>AEL-EMT3-T. Transparent and functional asynchronous three-phase motor alternator.</li> <li>AEL-EMT3-T. Transparent and functional asynchronous three-phase motor of surinel coge.</li> <li>AEL-EMT3-T. Transparent and functional asynchronous single-phase motor with starting capacition.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacition.</li> <li>AEL-EMT11-T. Transparent and functional repulsion motor, single-phase motor with starting capacition.</li> <li>AEL-EMT14-T. Transparent and functional repulsion motor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional expulsion motor.</li> <li>AEL-EMT14-T. Transparent and functional expulsion motor, single-phase motor with starting run</li></ul>		•EMT18-S. Cut away DC Brushless motor.			
<ul> <li>EMT21-S. Cut away three-phase reluctance motor.</li> <li>EMT22-S. Cut away single-phase shoded pole motor.</li> <li>Tansparent and Functional Electrical Motors</li> <li>AEL-FTM. Transparent and Functional Electrical Motors</li> <li>AEL-EMT1-T. Transparent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT2-T. Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shurt excitation motor development.</li> <li>AEL-EMT3-T. Transparent and functional Synchronous three-phase motor with wound rotor.</li> <li>AEL-EMT3-T. Transparent and functional Dahlander three-phase motor.</li> <li>AEL-EMT11-T. Transparent and functional Dahlander three-phase motor.</li> <li>AEL-EMT11-T. Transparent and functional Daspichronous single-phase motor with starting capacitation appendix and functional asynchronous single-phase motor with starting capacitation appendix and functional asynchronous single-phase motor with starting capacitation appendix and functional asynchronous single-phase motor of squirrel capacitation appendix and functional asynchronous single-phase motor of squirrel capacitation appendix and functional asynchronous single-phase motor of squirrel capacitation appendix and functional asynchronous single-phase motor of squirrel capacitation appendix and functional asynchronous single-phase motor with starting appredix.</li> <li>AEL-EMT1-T. Transparent and f</li></ul>	<ul> <li>EMT21-S. Cut away three-phase reluctance motor.</li> <li>EMT22-S. Cut away single-phase shaded pole motor.</li> <li>Transparent and Functional Electrical Motors</li> <li>AEL-FTM. Transparent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT1-T. Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC submit excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC submitseries compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC submitseries compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional CS synchronous three-phase motor alternator.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor of submit expedience and synchronous three-phase motor with wound rotor.</li> <li>AEL-EMT19-T. Transparent and functional asynchronous three-phase motor with starting capocition.</li> <li>AEL-EMT19-T. Transparent and functional asynchronous single-phase motor with starting capocition.</li> <li>AEL-EMT19-T. Transparent and functional asynchronous single-phase motor with starting running capocitor.</li> <li>AEL-EMT19-T. Transparent and functional asynchronous single-phase motor with starting running capocitor.</li> <li>AEL-EMT19-T. Transparent and functional asynchronous single-phase motor with starting running capocitor.</li> <li>AEL-EMT19-T. Transparent and functional asynchronous single-phase motor with starting running capocitor.</li> <li>AEL-EMT19-T. Transparent and functional asynchronous single-phase motor with starting running capocitor.</li> <li>AEL-EMT19-T. Transparent and functi</li></ul>		•EMT19-S. Cut away stepper motor.			
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<ul> <li>AEL-FTM. Transparent and Functional Motors Application</li> <li>AEL-EMT1-T, Transparent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT2-T, Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T, Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT4-T, Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT5-T, Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT5-T, Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T, Transparent and functional CS synchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T, Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT19-T, Transparent and functional asynchronous single-phase motor with starting capar.</li> <li>AEL-EMT12-T, Transparent and functional asynchronous single-phase motor with starting uning capacitor.</li> <li>AEL-EMT12-T, Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT12-T, Transparent and functional asynchronous single-phase motor with starting uning capacitor.</li> <li>AEL-EMT17-T, Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T, Transparent and functional asynchronous single-phase motor with starting uning capacitor.</li> </ul>	<ul> <li>AEL-FTM. Transparent and Functional Motors Application</li> <li>AEL-EMT1-T. Transparent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT2-T. Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt-excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt-excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT3-T. Transparent and functional asynchronous three-phase motor of squirel cage.</li> <li>AEL-EMT3-T. Transparent and functional asynchronous three-phase motor with starting capacit</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase with short circuited brushe.</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor with starting capacit</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor with starting capacit</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor with starting capacit</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor with starting capacit</li> <li>AEL-EMT1-T. Transparent and functional asynchronous single-phase motor of squirel cage "Y" connection.</li> <li>AEL-EMT2-T. Transparent and functional asynchronous single-phase motor of squirel cage "Y" connection.</li> </ul>		Transverse and Free direct Floridad Materia			
<ul> <li>AEL-EMTI-T. Transparent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT2-T. Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT4-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor of two independent speen AEL-EMT10-T. Transparent and functional asynchronous three-phase motor with starting capar.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor of squirrel capacity?</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous three</li></ul>	<ul> <li>AEL-EMT1-T. Transparent and functional DC independent excitation motor-generator.</li> <li>AEL-EMT2-T. Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT4-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT6-T. Transparent and functional asynchronous three-phase motor alternator.</li> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous single-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacition.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting capacition.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacition.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor of squirrel cage ray" connection.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous three-phase motor of squirrel cage ray" connection.</li> </ul>					
<ul> <li>AEL-EMT2-T. Transparent and functional DC series excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous single-phase motor dive independent spectration.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capaa.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting capaa.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous three-phase mo</li></ul>	<ul> <li>AEL-EMT2-T. Transparent and functional DC series excitation mator-generator.</li> <li>AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT4-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor of two independent speed</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacit</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>"Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional three-phase reluctance motor.</li> </ul>					
<ul> <li>AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT4-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor of wo independent spectrational durational asynchronous single-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacitor.</li> <li>AEL-EMT12-T. Transparent and functional repulsion motor, single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor of squirrel capacitor.</li> </ul>	<ul> <li>AEL-EMT3-T. Transparent and functional DC shunt excitation motor-generator.</li> <li>AEL-EMT4-T. Transparent and functional DC compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous single-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacitic</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> </ul>					
<ul> <li>AEL-EMT4-T. Transparent and functional DC compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT0-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT11-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT11-T. Transparent and functional asynchronous three-phase motor with starting capacitor.</li> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting capacitor.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting capacitor.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> </ul>	<ul> <li>AEL-EMT4-T. Transparent and functional DC compound excitation motor-generator.</li> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generator.</li> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous three-phase motor of two independent speed</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacities.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"Y" connection.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional asynchronous single-phase motor with split phase.</li> </ul>					
<ul> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-general AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous shree-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacitation.</li> <li>AEL-EMT11-T. Transparent and functional universal motor.</li> <li>AEL-EMT12-T. Transparent and functional repulsion motor, single-phase motor with starting capacitation.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitation.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel capacitation.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with split phase</li> </ul>	<ul> <li>AEL-EMT5-T. Transparent and functional DC shunt-series compound excitation motor-generate AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacities.</li> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushe</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"Y" connection.</li> <li>AEL-EMT21-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional asynchronous single-phase motor with split phase.</li> </ul>					
<ul> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacitation.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase with short circuited brus.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase with short circuited brus.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacitor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with split phase.</li> </ul>	<ul> <li>AEL-EMT6-T. Transparent and functional AC synchronous three-phase motor alternator.</li> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacitie.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting capacitie.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase with short circuited brushe</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional three-phase reluctance motor.</li> </ul>					
<ul> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor of two independent spectration.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor with starting capacitor.</li> <li>AEL-EMT11-T. Transparent and functional universal motor.</li> <li>AEL-EMT11-T. Transparent and functional universal motor.</li> <li>AEL-EMT11-T. Transparent and functional invites motor with short circuited brus.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase with short circuited brus.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous three-phase motor with split phase.</li> </ul>	<ul> <li>AEL-EMT7-T. Transparent and functional asynchronous three-phase motor of squirrel cage.</li> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor of two independent speed</li> <li>AEL-EMT10-T. Transparent and functional asynchronous three-phase motor of two independent speed</li> <li>AEL-EMT12-T. Transparent and functional asynchronous single-phase motor with starting capaciti</li> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushe</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"AEL-EMT20-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"AEL-EMT20-T. Transparent and functional asynchronous single-phase motor of squirrel cage.</li> <li>"AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>"AEL-EMT20-T. Transparent and functional three-phase reluctance motor.</li> </ul>					
<ul> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor of two independent spectration in the spectra and functional asynchronous single-phase motor with starting capacity.</li> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT12-T. Transparent and functional one of two independent spectra and functional asynchronous single-phase motor with starting capacity.</li> <li>AEL-EMT14-T. Transparent and functional asynchronous single-phase with short circuited brust and functional asynchronous single-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel capacitor.</li> <li>AEL-EMT12-T. Transparent and functional asynchronous three-phase motor of squirrel capacitor.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous three-phase motor of squirrel capacitor.</li> </ul>	<ul> <li>AEL-EMT8-T. Transparent and functional asynchronous three-phase motor with wound rotor.</li> <li>AEL-EMT9-T. Transparent and functional Dahlander three-phase motor.</li> <li>AEL-EMT10-T. Transparent and functional asynchronous single-phase motor of two independent speed</li> <li>AEL-EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacit</li> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushe</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting capacital capacital.</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor of squirrel cage "Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional three-phase reluctance motor.</li> </ul>					
<ul> <li>AEL-EMT10-T. Transparent and functional asynchronous three-phase motor of two independent spect of the independent spectrum spectrum independent spectrum indepe</li></ul>	<ul> <li>AEL-EMT10-T. Transparent and functional asynchronous three-phase motor of two independent speed</li> <li>AEL-EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacit</li> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushe</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage "Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional three-phase motor with split phase.</li> </ul>					
<ul> <li>AEL-EMT1 1-T. Transparent and functional asynchronous single-phase motor with starting capacity of the start</li></ul>	<ul> <li>AEL-EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacit</li> <li>AEL-EMT12-T. Transparent and functional repulsion motor, single-phase with short circuited brushe</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage "Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional three-phase motor with split phase.</li> </ul>					
<ul> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brus</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel capacitor.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase</li> </ul>	<ul> <li>AEL-EMT12-T. Transparent and functional universal motor.</li> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushe</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage "Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional three-phase motor with split phase.</li> </ul>		•AEL-EMT10-T. Transparent and functional asynchronous three-phase motor of two independent speeds.			
<ul> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brus</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel car "Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase</li> </ul>	<ul> <li>AEL-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushe</li> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage "Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional three-phase reluctance motor.</li> </ul>		• AEL-EMT11-T. Transparent and functional asynchronous single-phase motor with starting capacitor.			
<ul> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with startin running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel can "Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase</li> </ul>	<ul> <li>AEL-EMT16-T. Transparent and functional asynchronous single-phase motor with starting running capacitor.</li> <li>AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage "Y" connection.</li> <li>AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.</li> <li>AEL-EMT21-T. Transparent and functional three-phase reluctance motor.</li> </ul>		• AEL-EMT12-T. Transparent and functional universal motor.			
running capacitor. •AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel ca "Y" connection. •AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase	running capacitor. •AEL-EMT17-T. Transparent and functional asynchronous three-phase motor of squirrel cage "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-EMT14-T. Transparent and functional repulsion motor, single-phase with short circuited brushes.			
"Y" connection. • AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase	"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-EMT21-T. Transparent and functional three-phase reluctance motor.					
• AEL-EMT21-T. Transparent and functional three-phase reluctance motor.			• AEL-EMT20-T. Transparent and functional asynchronous single-phase motor with split phase.			
	• AEL-EMT22-T. Transparent and functional single-phase shaded pole motor.		• AEL-EMT21-T. Transparent and functional three-phase reluctance motor.			
AEL-EMT22-T. Transparent and functional single-phase shaded pole motor.			•AEL-EMT22-T. Transparent and functional single-phase shaded pole motor.			

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AEL-5. POWER SYSTEMS AND SMART GRID TECHNOLOGY LAB					
	AEL-5.1.				
	Generation Applications				
Basic Synchronization Applications         • AEL-MOSC. Manual Operations of Synchronization Circuits.         Advanced Synchronization Applications         • AEL-EESD. Advanced Digital Synchronization Application.         Wind Energy         • AEL-WPP. Wind Power Plants with Double Feed Induction Generator.         • AEL-WPT. Wind Power Application with Permanent Magnets Synchronous Generator.         • AEL-WPPI. Wind Power Plants with Induction Generator.	Applications Photovoltaic Energy • AEL-PHVG. Photovoltaic Application with Connection to Grid. Fuel Cell Energy • AEL-FCLL. Fuel Cell Energy Application. • AEL-EPP. Energy Power Plants Application. • AEL-HPPP. Hydroelectric Power Plants Application with Pelton Turbine. • AEL-MEPD. Marine Electrical Power Distribution System. • TDEGC. Computer Controlled Diesel Engine Electricity Generator.	Basic Smart Grid Power Systems  • AEL-BSG. Basic Smart Grid Application.  • AEL-BSGC. Basic Smart Grid Application, with SCADA. Microgrid Series  • AEL-MGR. Micro-Grids Power System Series.			
	AEL-5.2. Distribution and Transmission Applications				
	Applications				
	Distribution and Transmission Applications				
• AEL-AE1A. Aerial Line Model.	AEL-SST-01. Basic Opera	tions in Switching Transmission Substation Application.			
• AEL-TI-01. Analysis of Three-phase Power Lines.	AEL-SST-02. Switching Su	bstation Protection Application.			
AEL-TI-02. Distribution Transformer with Motor Regulation.	• AEL-HVDC. High Voltage	DC Transmission Lines.			
• AEL-TI-03. Arc suppression Coil.					
• AEL-TI-04. Underground Transmission lines.					
• AEL-TI-05. Parallel and Series Transmission Lines.					
AEL-TI-06. Analysis of flow power on Transmission Lines.					
AEL-TI-07. Transmission Systems with Synchronous General	tor.				
	AEL-5.3. Loads Applications				
	Applications				
Basic Load Controller Application	ons	Advanced Loads Control			
AEL-MRPC. Manual Reactive Power Compensation.	AEL-FUSG. Final User Sm				
AEL-ARPC. Automatic Reactive Power Compensation.		Smart Grid-Smart Meter Application.			
<ul> <li>AEL-EECFP. Advanced Power Factor Compensation.</li> <li>AEL-APFC. Single-phase Automatic Power Factor Compen</li> </ul>	AEL-EECFP. Advanced Power Factor Compensation.       • AEL-FUSG-E. Final User Smart Grid-Smart Energy Application.         AEL-APFC. Single-phase Automatic Power Factor Compensation.       • AEL-FUSG-N. Final User Smart Grid-Net Metering Application.				
ALL-1 030-IN. That oser shart weighting Application.     ALL-1 030-IN. That oser shart weighting Application.					
	AEL-5.4.				
	Protection Relays Applications				
AEL-CTFP. Current Transformer Fundaments for Protections Devices.     AEL-TPT-01. Overcur     AEL-VTFP. Voltage Transformer Fundaments for Protections Devices.     AEL-TPT-02. Direction		s <b>tems for Transmission and Distribution Lines</b> Time Protection Relay for Lines. Dvercurrent Protection Relay for Transmission Lines.			
Protection Applications Relay	-	and Undervoltage Protection Relay.			
<ul> <li>ERP. Protection Relays Test Application.</li> <li>ERP-CBM. Cybersecurity Module.</li> </ul>	AEL-TPT-04. Directional P     AEL-TPT-05. Earth-Fault V	,			
Protection Systems for Generat		smission Lines Protection Relay.			
• AEL-GPRE. Generator Protection Relay Application.	• AEL-TPT-07. High Speed I	Distance Protection Relay.			
	AEL-5.5 Cybersecurity Applications				
• ERP-CBM. Cybersecurity Module.	Applications				
	AEL-5.6.				
	Available "Smart Grid Power Systems"				
<ul> <li>AEL-MPSS-02. Modular Smart Grid Power Systems Simula</li> <li>AEL-MPSS-03. Modular Smart Grid Power Systems Simula</li> <li>AEL-MPSS-04. Modular Smart Grid Power Systems Simula</li> <li>AEL-CPSS-01S. Smart Grid Power Systems Application, with</li> <li>AEL-CPSS-02S. Smart Grid Power Systems Application with</li> </ul>	or, with Automatic Control Generation, Transmission Line, Load for, with Automatic Control Generation, Transmission Line and L or, with Manual Control Generation, Transmission Line, Loads of or, with Manual Control Generation, Transmission Line and Loads h Automatic Control Generation, Transmission Line and Loads. ion, with Automatic Control Generation and Loads. Two Parallel Generators, Two Distribution Lines and Loads, with	oads, with SCADA. and Protection Relays, with SCADA. ids, with SCADA. h SCADA.			
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\*Specifications subject to change without previous notice, due to the convenience of improvements of the product.



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