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### INTRODUCTION

Nowadays energy efficiency is one of the most important goals in the world. Energy efficiency improvements are necessary to combat climate change using less energy and providing the same services.

In order to get this purpose KNX technology offers a series of devices such as Peak Demand Monitoring, Current Detection, Network Monitoring, Load Shedding, Metering, Energy Pulse Counting, Data Logging, Visualization, etc. However, depending on the place where the solution is given, it will be required different types of KNX devices.



ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)



Certificate and Worlddidac Member

## GENERAL DESCRIPTION

The 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 training 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 recommended 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.
- N-KNX17. KNX/EIB Movement Sensor Module.
- 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.
- N-LAM32.1 Led Lamp.

Additional applications:

- AEL-KNX1. KNX/EIB Shutter Control Application.
- AEL-KNX2. KNX/EIB Heating Control Application.
- 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.

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

General Description

Configuration table:

REF	KNX MODULES	AEL-KNX1 KNX/EIB Shutter Control Application	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
N-KNX1	KNX/EIB Heating Actuator Module		X			
N-KNX2	KNX/EIB Additional Power Supply Module	O	O	O	O	O
N-KNX3	KNX/EIB Barrier Sensor Module			O		
N-KNX4	KNX/EIB Binary Input Module			X		O
N-KNX5	KNX/EIB Binary Output Module			X		O
N-KNX6	KNX/EIB Bolt Switch Module			O		
N-KNX7	KNX/EIB Broken Glass Module			O		
N-KNX8	KNX/EIB Dimming Actuator Module				X	X
N-KNX9	KNX/EIB Electronic Control Module					X
N-KNX10	KNX/EIB Energy Meter Module				O	X
N-KNX11	KNX/EIB Fingerprint Reader Module			O		
N-KNX12	KNX/EIB Fire/Smoke Sensor Module			O		
N-KNX13	KNX/EIB Flooding Sensor Module			O		
N-KNX14	KNX/EIB Light Sensor Module	X			X	O
N-KNX15	KNX/EIB Magnetic Card Reader Module			O		
N-KNX16	KNX/EIB Manual Switches Module				X	
N-KNX17	KNX/EIB Movement Sensor Module		O	O	O	O
N-KNX18	KNX/EIB Power Supply Module	X	X	X	X	X
N-KNX19	KNX/EIB Proximity Sensor Module			O		
N-KNX20	KNX/EIB Push-Button Module	X				
N-KNX21	KNX/EIB Room Controller Module	O				X
N-KNX22	KNX/EIB Scene Controller Module				O	
N-KNX23	KNX/EIB Shutter Motor Module	O				
N-KNX24	KNX/EIB Shutter/Blind Actuator Module	X				
N-KNX25	KNX/EIB Single Line Extending Bus Module	O	O	O	O	O
N-KNX26	KNX/EIB Siren Module			O		
N-KNX27	KNX/EIB Staircase Sensor Module				O	
N-KNX28	KNX/EIB Switch Actuator Module				X	O
N-KNX29	KNX/EIB Temperature Sensor Module		X			O
N-KNX30	KNX/EIB Touch Panel Module	O	O	O	O	O
N-KNX31	KNX/EIB Valve Actuator Module		O			
N-KNX32	KNX/EIB Weather Station Module	O	O			
N-KNX33	KNX/EIB Window/Door Contact Module			O		
N-KNX34	KNX/EIB USB Programming Interface Module	X	X	X	X	X
N-KNX35	KNX/EIB Infrared Transmitter/Receiver Module			O		
N-LAM08	2 Lamps-holders + Incandescent Lamps 40 W				X	O
N-LAM32	1 Led Lamp				X	O
ETS	KNX Engineering Tool Software	X	X	X	X	X

**X = minimum recommended modules**

**O = optional and additional modules**

## SPECIFICATIONS

The application includes the following modules:

- **N-KNX34. KNX/EIB USB Programming Interface Module.**

Power supply: KNX line, 21 ...30 VDC.

Current consumption (max.): < 5 mA.

USB connection: USB2.0 connector.

- **N-KNX18. KNX/EIB Power Supply Module.**

Power supply: 230 VAC.

Maximum load: 640 mA.

Output voltage: 24 VDC.

- **N-KNX9. KNX/EIB Electronic Control Module.**

Nominal voltage: 230 VAC.

Frequency: 50 Hz.

KNX bus voltage: 24 VDC.

Mains inputs/outputs: 4 mm safety sockets.

Bus inputs/outputs: 2 mm safety sockets.

Automatic control.

- **N-KNX8. KNX/EIB Dimming Actuator Module.**

Nominal voltage: 230 VAC.

Frequency: 50 Hz.

KNX bus voltage: 24 VDC.

Bus inputs/outputs: 2 mm safety sockets.

Mains inputs/outputs: 4 mm safety sockets.

- **N-KNX10. KNX/EIB Energy Meter Module.**

KNX bus voltage: 24 VDC.

Bus inputs/outputs: 2mm safety sockets.

This module allows measure:

Active power.

Active energies.

Current.

Voltage.

- **N-KNX21. KNX/EIB Room Controller Module.**

KNX bus voltage: 24 VDC.

Bus inputs/outputs: 2 mm safety sockets.

Additional and recommended modules:

- **N-KNX30. KNX/EIB Touch Panel Module.**

Nominal voltage: 230 VAC.

Frequency: 50 Hz.

KNX bus voltage: 24 VDC.

Mains inputs/outputs: 4 mm safety sockets.

Bus inputs/outputs: 2 mm safety sockets.

- **N-KNX25. KNX/EIB Single Line Extending Bus Module.**

Nominal voltage: 230 VAC.

Frequency: 50 Hz.

KNX bus voltage: 24 VDC.

Mains inputs/outputs: 4 mm safety sockets.

Bus inputs/outputs: 2 mm safety sockets.

Interconnection with other KNX/EIB systems.

- **N-KNX2. KNX/EIB Additional Power Supply Module.**  
 KNX bus voltage: 28 VDC.  
 Bus inputs/outputs: 2 mm safety sockets.
- **N-KNX29. KNX/EIB Temperature Sensor Module.**  
 KNX bus voltage: 24 VDC.  
 Bus inputs/outputs: 2 mm safety sockets.  
 Range measurement: 0-40 °C (approx.).
- **N-KNX17. KNX/EIB Movement Sensor Module.**  
 Movement sensor for bus system KNX.  
 Max. Transmission range frontally 7 m.  
 Number of channels 1.
- **N-KNX14. KNX/EIB Light Sensor Module.**  
 KNX bus voltage: 24 VDC.  
 Bus inputs/outputs: 2 mm safety sockets.  
 Photosensitive cell.
- **N-KNX28. KNX/EIB Switch Actuator Module.**  
 Nominal voltage: 230 VAC.  
 Frequency: 50 Hz.  
 KNX bus voltage: 24 VDC.  
 Bus inputs/outputs: 2 mm safety sockets.  
 Mains inputs/outputs: 4 mm safety sockets.
- **N-KNX5. KNX/EIB Binary Output Module.**  
 Nominal voltage: 230 VAC.  
 Frequency: 50 Hz.  
 KNX bus voltage: 24 VDC.  
 Mains inputs/outputs: 4 mm safety sockets.  
 Bus inputs/outputs: 2 mm safety sockets.
- **N-KNX4. KNX/EIB Binary Input Module.**  
 Nominal voltage: 230 VAC.  
 Frequency: 50 Hz.  
 KNX bus voltage: 24 VDC.  
 Mains inputs/outputs: 4 mm safety sockets.  
 Bus inputs/outputs: 2 mm safety sockets.
- **N-LAM08. 2 Lamps-holders + Incandescent Lamps 40 W.**  
 Nominal voltage: 230 VAC.  
 Nominal Power: 2 x 40 W.  
 Mains inputs/outputs: 4 mm safety sockets.
- **N-LAM32. 1 Led Lamp.**  
 Nominal voltage: 230 VAC.  
 Nominal Power: 4 W.
- **All necessary cables to realize the practical exercises are included.**

**Cables and Accessories**, for normal operation.

**Manuals:**

This unit is **supplied with the following manuals**: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

## EXERCISES AND PRACTICAL POSSIBILITIES

- |   |   |
|---|---|
| 1.- Study of the fundamental of a KNX/EIB installation BUS.                                       | Some practical possibilities with additional and recommended modules:<br>11.- Presence control for an efficient operation.<br>12.- Study of the brightness control.<br>13.- Visualize the brightness control with a LED or an incandescent lamp.<br>14.- Switching and dimming the brightness.<br>15.- Compare the efficient of a LED and incandescent lamp.<br>16.- Compare the efficient of modern installations with the older ones.<br>17.- Make complex logics with binary inputs and outputs.<br>18.- Programming the touch panel according to different scenes.<br>19.- Checking all parameters in the touch panel.<br>20.- Centralized control of the main charges in the touch panel.<br>21.- Extending a bus system through a single-line topology. |
| 2.- Programming of on-off smart switches to demonstrate KNX/EIB switching operations.             |   |
| 3.- Programming of switching and dimmers for complete control.                                    |   |
| 4.- 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.- Automatic regulation of consumption according to the required conditions.                     |   |
| 8.- Centralized control with an electronic control module.  |   |
| 9.- Comparison of switching and dimming control consumption according to the required conditions. |   |
| 10.- Visualize the instantaneous energy consumption.  |   |

### REQUIRED SERVICES

- Electrical supply: single phase, 230 V./50 Hz. or 115 V./60 Hz.

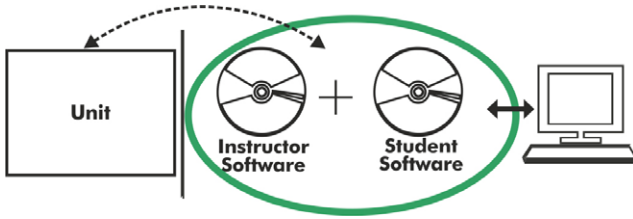
### DIMENSIONS AND WEIGHTS

#### AEL-KNX5:

- Dimensions: 640 x 320 x 920 mm approx.  
(25.19 x 12.59 x 32.22 inches approx.)
- Weight: 60 Kg approx.  
(132 pounds approx.)

## Optional

### AEL-KNX5/ICAI. Interactive Computer Aided Instruction Software System:



With no physical connection between unit and computer (PC), this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students.

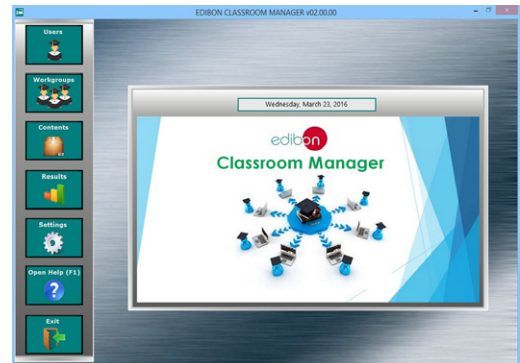
### Instructor Software

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

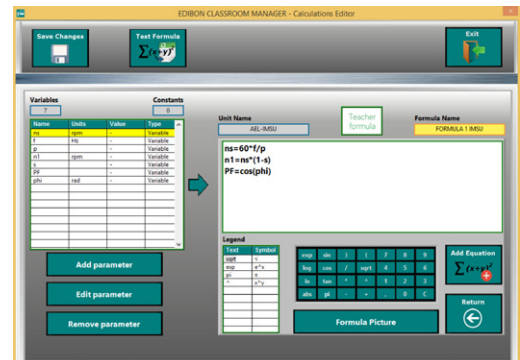
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

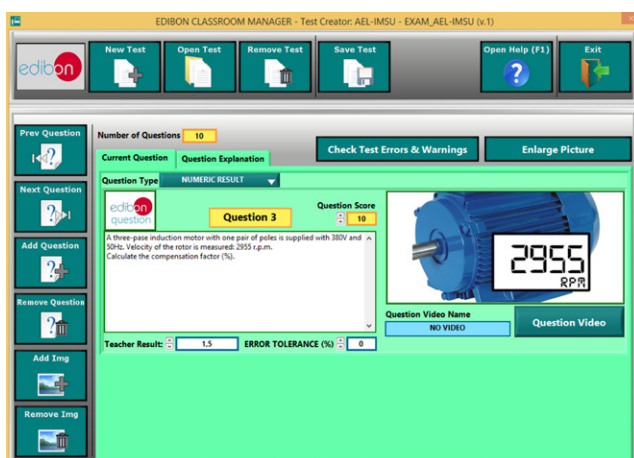
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



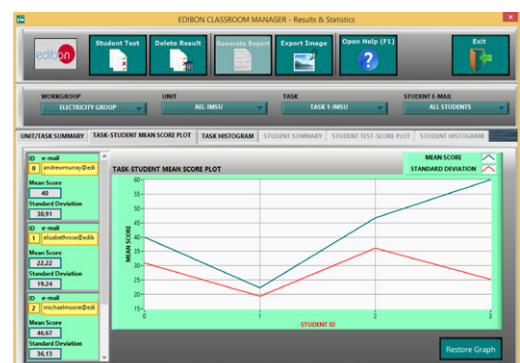
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



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



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

Optional  
**Student Software**

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

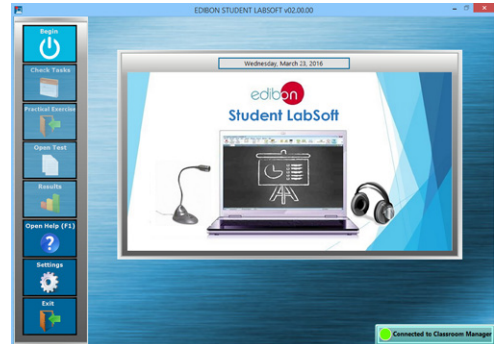
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are provided by EDIBON to allow the students start working from the first session. Reports and statistics are available to know their progression at any time, as well as explanations for every exercise to reinforce the theoretically acquired technical knowledge.

Innovative features:

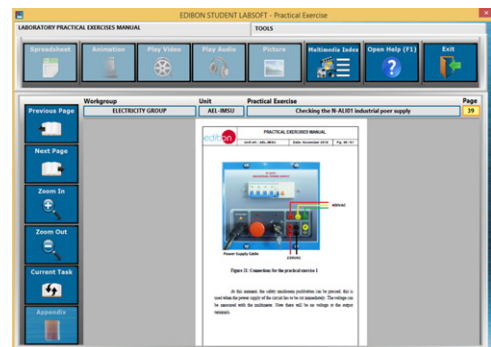
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.
- Test self-correction.
- Calculations computing and plotting.
- Equation System Solver Engine.
- User Monitoring Learning & Printable Reports.
- Multimedia-Supported auxiliary resources.

For more information see ICAI catalogue. Click on the following link:

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



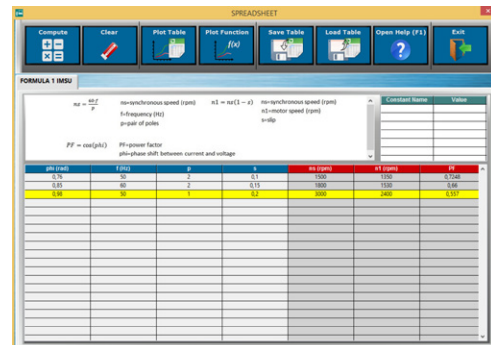
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

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



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Edition: ED01/17  
Date: October/2017

REPRESENTATIVE:

