

Unit: AE-PLC-SE. Elevator Control Application

Key features:

- **Web server with SCADA function.**
- **Software to program and configure the web server.**
- **PLC and HMI device programming software.**
- **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**
- **Suitable for applied research, real industrial simulation, training courses, etc.**
- **Totally safe, using three safety systems (mechanical, electrical and electronic).**
- **Designed and manufactured under several quality standards.**
- **Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc., apart from supervising the knowledge and progress achieved by the user.**

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 PRODUCTS
 ↳ 60.- MECHATRONICS & COMPUMECHATRONICS

INTRODUCTION

Programmable Logic Controllers (PLC) were introduced in the industry in the late 1960s to replace circuits made with relays (relay logic systems). The PLCs systems based on digital electronics improved flexibility, operation and errors debugging capacity. Among others, these improvements have allowed for keeping the PLCs technology as a viable option in modern automation systems.

One of the latest developments in communications is the Internet of Things (IoT) or the interconnection of devices, telephones, smart homes, etc. This new technology has been implemented in the latest PLCs versions, which allows for controlling the PLC from anywhere with an internet connection.

The Elevator Control Application, "AE-PLC-SE", has been designed by EDIBON to work with the "AE-PLCA" unit and, thus, allow the user to learn how to work with a PLC's practical application. The "AE-PLC-SE" is a completely automated elevator system that includes movable components and real sensors to simulate an elevator application with greater realism.

GENERAL DESCRIPTION

The "AE-PLC-SE" application is a PLC controlled automatic system that simulates an elevator. The "AE-PLC-SE" has movable elements, such as the car and the doors, light indicators and sensors used in real systems to simulate realistically an elevator control system.

The "AE-PLC-SE" is a three-floor application with movable car, floor selector and a light indicators panel that indicate the state of the system.

The "AE-PLC-SE" has been designed to work with the "AE-PLCA", allowing for displaying and controlling all the variables of the system through an SCADA system. Working with the "AE-PLCA" unit, the system allows for the SCADA control of the unit via a web application or through the large touch-screen HMI device included in the "AE-PLCA".

SPECIFICATIONS

The unit includes the following components:

Elevator system:

- Motor-driven movable car.
- Motor-driven opening and closing of doors.
- Light indicators in each floor.
- 16 input digital signals.
- 16 output digital signals.

Control panel:

- Mushroom type emergency push-button.
- Start/stop push-buttons.
- Switches for manual or automatic operation.
- Terminal block to connect the inputs and outputs of the unit with individual identification of every signal.

Electrical components:

- Four DC motors, 24Vdc with gearbox.

Sensors:

- Three IR barrier detectors.
- Three capacitive sensors.
- Six limit switch sensors.

Fault generation module:

- Generates 20 faults in different components of the station.
- Generated by lever switches.
- Plastic monoblock electric box.
- Locked by key.

AE-PLCA. Advanced PLC Trainer.

- **N-ALI02. Domestic Power Supply**
Single-phase supply: 110-240Vac, PH+N+G.
ON-OFF switch with key.
Single-phase cable and connector included.
Differential magneto-thermal switch, 2 poles, 25A, 30mA AC 6KA.
- **N-MT. Test module**
Single-phase supply: 110-240Vac, PH+N+G.
20 digital signal generators:
10 lever switches.
10 pushbuttons.
Each digital signal generator is linked to a green LED.
Output voltage levels of 0Vdc and 24Vdc.
6 analog signal generators:
6 potentiometers.
Output voltage levels from -10V to +10V.



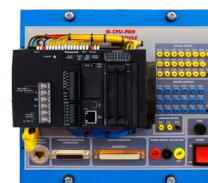
N-ALI02



N-MT

• **N-CPU-PAN. CPU module**

- Single-phase supply: 110-240Vac, PH+N+G.
- Overcurrent protection with fuse.
- PLC device: Panasonic FP7 CPS31E:
 - High processing speed: 11 ns per basic instruction (step).
 - Programming capacity: 120k basic instructions (step).
 - Data logging capacity: 256k words.
 - Independent memory for comments: 3MB.
 - Supports SDHC type generic memory cards up to 32GB.
- Expansion module for digital inputs, PANASONIC FP7 AFP7X1 6DW:
 - 16 digital inputs with allowable input range from 12V to 24V.
- Expansion module for digital outputs, PANASONIC FP7 AFP7Y16R:
 - 16 relay type digital outputs with voltage level of 24Vdc.
- Web server function:
 - Up to 16 sessions at the same time.
 - Compatible with most common search engines.
- Ethernet connector for the N-SWT-8 module.
- Connector for the output and input digital signals.



N-CPU-PAN

• **N-ESA-PAN. Analog I/O module**

- Single-phase supply: 110-240Vac, PH+N+G.
- Expansion unit for analog inputs, PANASONIC 7BH21:
 - Input voltage range from -10V to +10V.
 - 8 analog inputs.
 - Resolution of 16 bits.
- Expansion unit for analog outputs, PANASONIC 4AD01:
 - Output voltage range from -10V to +10V.
 - 4 analog outputs.
 - Resolution of 12 bits.
- Ethernet connector for the module N-SWT-8.
- Connector for the output and input analog signals.



N-ESA-PAN

• **N-HMIA-PAN. Advanced HMI module**

- Single-phase supply: 110-240Vac, PH+N+G.
- HMI device:
 - Touchscreen.
 - TFT display of 64K colors and 16:9 format.
 - Size of the display: 187x147mm (7 inches).
 - Resolution: 800x480 WVGA.
 - Backlight with high brightness of 300cd/m².
 - SD card slot.
 - Double Ethernet port.
- Ethernet connector for the module N-SWT-8.



N-HMIA-PAN

• **N N-SWT-8. 8 ports Ethernet switch module**

- Single-phase supply: 110-240Vac, PH+N+G.
- Compact switch module:
 - 8 Ethernet ports.
 - Works as Ethernet interconnection point.



N-SWT-8

• **N N-MOD. Modem communication module**

- Single-phase supply: 110-240Vac, PH+N+G.
- Internet router.
- RJ-11 connector for telephone line.
- Ethernet connector for the module N-SWT-8.



N-MOD

Specifications

• PLC programming software:

Programming software developed according to the norm IEC 61131-3.

Compatible with Windows operating systems.

Five programming languages:

Ladder diagrams (LD). Structured text (ST). Instruction list (IL). Sequential function chart (SFC). Function block diagram (FBD).

Remote programming, service and diagnosis.

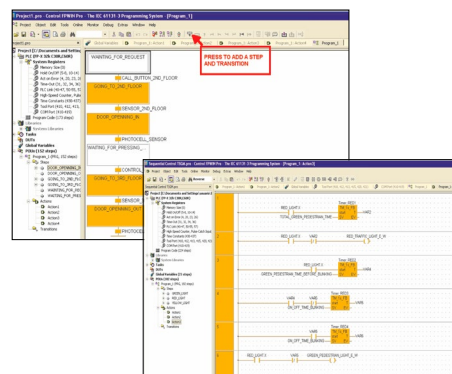
Minimum size of program.

Powerful debugging and monitoring tools.

Supports functions created by the user and function blocks.

Saves project files in the PLC.

Examples and quick tutorial included.



PLC Programming software

• Programming software of the HMI touchscreen:

Tool to create screens:

This software is a tool created to program the touchscreen. Thanks to this tool, appropriate screens and images can be designed and created. Enables the transfer of the program to the touchscreen, uploading objects created from the terminal and print screens created.

Lots of functions. Creation of screens:

Includes many programming tools.

Text, diagram or data display devices, buttons for drawings, charts and pilot lights.

Creation of functional screens adaptable to each application.

Drawing functions: creation of different programming elements through icons and bitmaps.

Easy operation (drag and drop):

A library of elements allows for programming with the mouse by just selecting and moving elements to the desired locations (drag and drop).

Easy user libraries creation:

Libraries can be registered and stored to be used in later projects.

Printing. The project screens can be printed:

Screens can be printed after previewing, selecting and configuring them.

Bitmaps editor:

This tool allows the creation, reading and modification of bitmaps to use them as programming elements in the screen. Icons (buttons) can be created from images.

Web applications programming software:

Easy programming of complete web applications to display and control all the variables of the PLC. No previous experience in web programming is required.

Library of buttons, pushbuttons, needle indicators, bar charts, etc. for a quick programming of the applications.

The web applications can take up to 14MB and allow up to 16 users to access at the same time.

Applications can be programmed to control all the digital and analog variables of the PLC.

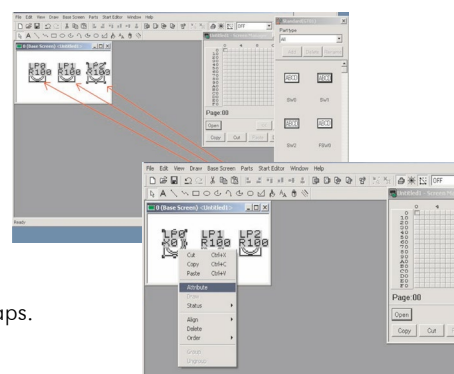
Search engines compatible with the web server:

Windows: Google Chrome, Mozilla Firefox, Opera and Internet Explorer.

OS X: Safari, Google Chrome and Mozilla Firefox.

IOS: Safari and Google Chrome.

Android: Google Chrome.



Programming software of the HMI Touchscreen

Cables and Accessories, for normal operation.

Manuals:

This unit **is supplied with 7 manuals**: Required Services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance & Practices Manuals.

EXERCISES AND PRACTICAL POSSIBILITIES

- | | |
|--|--|
| 1.- Basic concepts of a PLC. | 7.- Optimization of the operation of an automatic elevator system. |
| 2.- Digital variables reading. | 8.- Study of faults introduced by the fault generation module. |
| 3.- Digital variables control. | |
| 4.- Manual control of an elevator system. | |
| 5.- Control of an automatic elevator system. | |
| 6.- Parameters change of an automatic elevator system. | |

REQUIRED SERVICES

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| <ul style="list-style-type: none">- Supply: single-phase, 220V/50Hz or 110V/60Hz.- Computer. |
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DIMENSIONS AND WEIGHTS

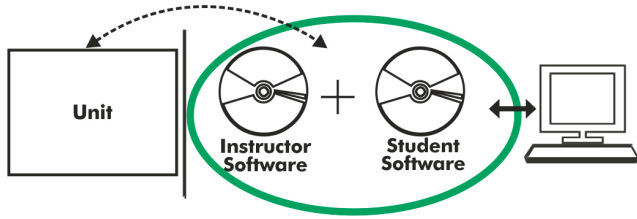
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| <p>AE-PLC-SE unit:</p> <ul style="list-style-type: none">- Dimensions: 320 x 550 x 750 mm. approx.
(12.59 x 21.65 x 29.52 inches approx.)- Weight: 30 Kg. approx.
(66 pounds approx.). <p>AE-PLCA unit:</p> <ul style="list-style-type: none">- Dimensions: 315 x 400 x 1000 mm. approx.
(12.40 x 15.74 x 39.36 inches approx.)- Weight: 40 Kg. approx.
(88 pounds approx.). |
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OPTIONAL SERVICES

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| <ul style="list-style-type: none">- Phone line or Ethernet network with internet access. |
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Optional

AE-PLC-SE/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.

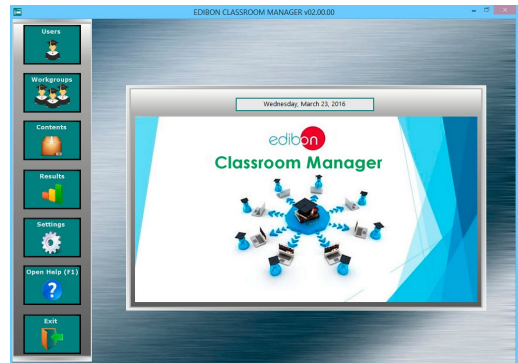
Instructor Software

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

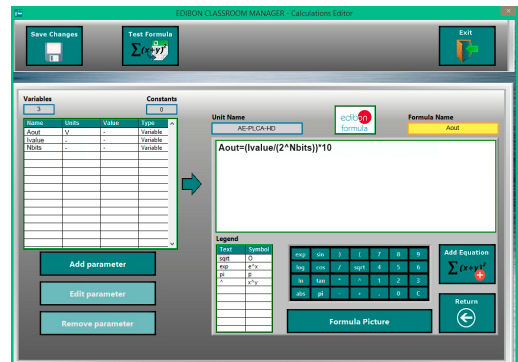
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

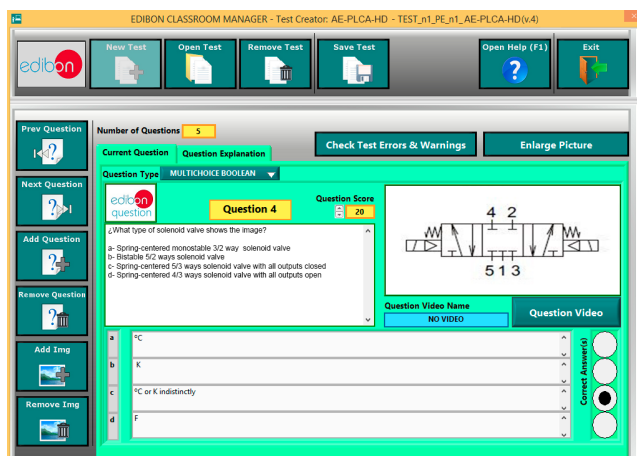
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Test Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



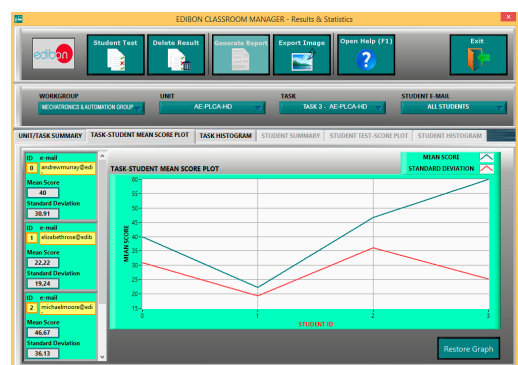
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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

Student Software

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

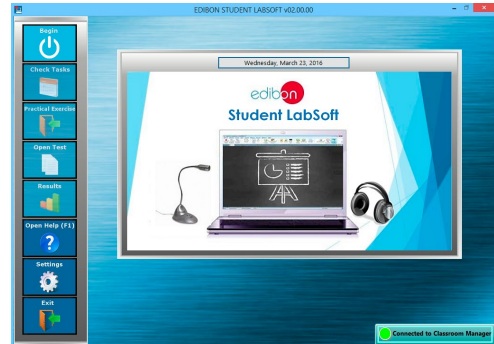
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are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

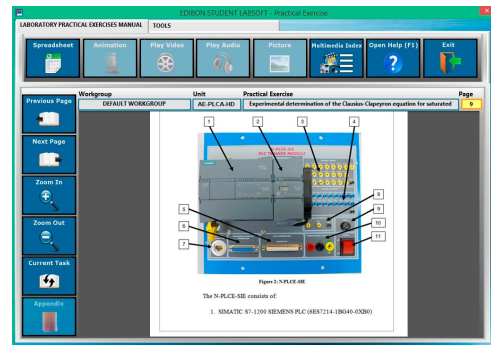
- **Student Log-In & Self-Registration.**
- **Existing Tasks checking & Monitoring.**
- **Default contents & scheduled tasks available to be used from the first session.**
- **Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- **Evaluation Methods to prove your knowledge 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:

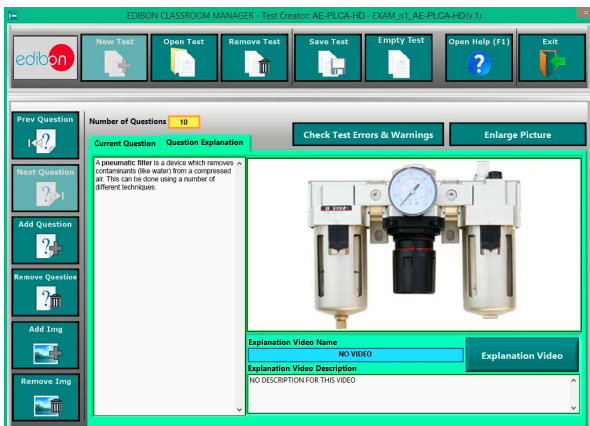
www.edibon.com/en/files/expansion/ICAI/catalog



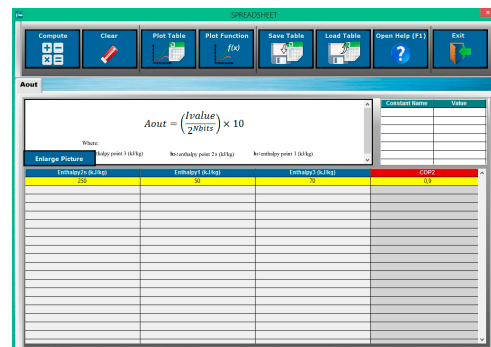
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

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



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REPRESENTATIVE:

