



INTRODUCTION

Automotive electronics is the branch of mechatronics focused on the electrical and electronic equipment installed in cars. The importance of electronic systems in cars has been increasing year by year till reaching one of the main parts of the automobiles nowadays.

The electronic systems have replaced a lot of functions performed manually or by mechanical systems, like the fuel injection system, the control of emission gases, the safety system, the checking of the car liquids, the comfort system, the throttle control and a long etc.

The Automotive Auxiliary Components Unit, "AV-AC", has been designed by EDIBON to help the students to understand the operation of real automotive sensors and actuators and how an electronic control unit works.

GENERAL DESCRIPTION

The Automotive Auxiliary Components Unit, "AV-AC", provides a practical solution to obtain advance knowledge in the electronic and electric systems used in the automotive field nowadays.

All sensors and actuators included in the "AV-AC" unit are mounted on individual plates with the name, the standardized symbol and the 4 mm lab jack to connect the component. All sensors and actuators are real automotive components and can be connected to the electronic control unit at the same time, in order to understand the operation of each component working together, like in a real situation. The components can be mounted on the vertical frame included with the unit in order to test them alone or connected to the electronic control unit.

The sensors and actuators are focused on different automotive auxiliary systems: car lightening system, wiper washer system, power door locks system, car instrument panel, electric windows system, ultrasonic car park system, etc. All these systems components are real automotive sensors and actuators. The sensors signal measurement and the control signal of the actuators in the "AV-AC" unit are done through digital and analog signals, PWM signals and the network protocol CAN bus.

The "AV-AC" unit also includes a fault generation module, which can insert up to twelve faults in the electronic control unit (faults in different wires of the network protocol CAN bus, faults in the 12 VDC power supply, etc.).

The "AV-AC" unit is provided with a different set of practical exercises, through which the student will understand how the components used in electric and electronic systems in the automotive technology work.

SPECIFICATIONS

The "AV-AC" unit includes the following elements:

Electronic control system:

Electronic control unit.

Wiring from electronic control unit to each component.

Fuses and relays box:

Car GEM module.

Operating voltage: 12 VDC.

OBDII diagnosis connector.

Sensor and actuator circuits:

Power supply components:

12 VDC power supply to feed the system.

Car ignition switch.

Power door locks system:

Remote car key.

Front left and right electronic door locks.

Rear left and right rear electronic door locks.

Trunk electronic door lock.

Electronic door lock of the fuel tank cap.

Trunk door push-button.

Car lightning system:

Light sensor.

Front lights:

Automatic headlamp leveling system.

Left and right low beam headlights.

Left and right high beam headlights.

Daytime running lights.

Left and right front turn signals.

Left and right side turn signals.

Left and right front fog lights.

Rear lights:

Left and right rear turn signals.

Rear fog light.

Left and right rear brake lights.

Third brake light.

Reverse light.

License plate lights.



AV-AC detail

Auxiliary lights:

- Interior car light.
- Trunk light.

Rear-view mirror system:

- Rear-view mirror control switch.
- Adjustable and heated lateral rear-view mirror.
- Interior rear-view mirror with auto-dimming.

Car instrument panel with controls:

- Tachometer.
- Speedometer.
- Fuel gauge.
- Car lightning system indicators.
- Battery charge warning indicator light.
- Oil-pressure warning indicator light.

Light control switch:

- Low beam headlights.
- High beam headlights.
- Front fog lights switch.
- Rear fog light switch.

Steering wheel with controls:

- Wiper washer control.
- Horn push-button.
- Emergency lights push-button.
- Reverse switch to activate the reverse light.
- Brake switch to activate the brake lights.
- Turn signals control.

Wiper washer system:

- Rain sensor.
- Front and rear wiper washer motor.
- Washing water pump.

Car audio system:

- Car stereo radio.
- Car stereo radio control panel.
- Two 12 VDC speakers.

Car electric windows system:

- Left and right front electric windows motor.
- Electric windows control switches.
- CAN bus communication.

Ultrasonic car park system:

- Four ultrasonic emitter and receiver units.
- Ultrasonic car control unit.
- 12 VDC speaker.

Fuel level sensor.

12 VDC car socket.

Heated rear window simulator.

Test module to check the operation of each sensor and actuator working individually:

- Attached to the frame of the unit.
- 4 mm lab jack with the 12 VDC power supply.
- 4 mm lab jack with the communication terminals of the electronic control unit.

Fault generation module:

- Attached to the frame of the unit.
- Generates twelve faults in the operation of different sensors and actuators and the communication between them and the electronic control unit.
- The faults are generated through toggle switches.

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

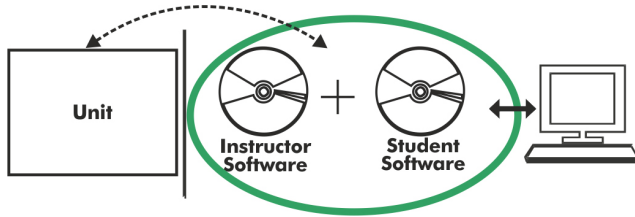
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|---|---|
| 1.- Familiarization with electronic control unit. | 11.- Instrumentation panel functions. |
| 2.- Lighting elements and light sensor. | 12.- Activation and control of the lighting system. |
| 3.- Function and activation of the central locking system control components. | 13.- Function of the adjustable rear-view mirror with auto-dimming. |
| 4.- Front wiper washer and rain sensor. | 14.- Car audio system. |
| 5.- Function of the adjustable and heated lateral rear-view mirror. | 15.- Fault insertion and diagnosis. |
| 6.- Electrical window lifters system activation. | 16.- Individual testing actuators and sensors. |
| 7.- Ultra-sonic parking system. | - Several other exercises can be done and designed by the user. |
| 8.- Reverse light and switch. | |
| 9.- Brake light and switch. | |
| 10.- Car steering wheel control functions. | |

REQUIRED SERVICES

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| - Electrical supply: single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz. |
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DIMENSIONS AND WEIGHTS

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| AV-AC: |
| - Dimensions: 1150 x 2500 x 2200 mm approx.
(35.43 x 61.02 x 70.86 inches approx.) |
| - Weight: 150 Kg approx.
(319 pounds approx.) |

AV-AC/ICAI. Interactive Computer Aided Instruction Software:

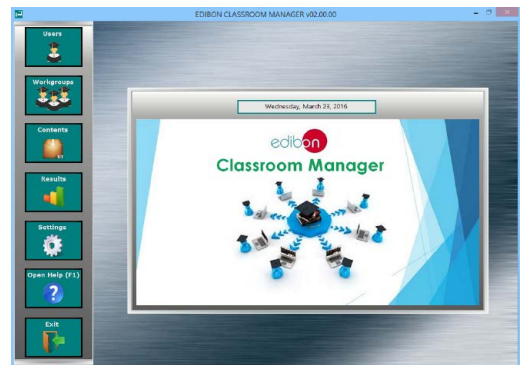
With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment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

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

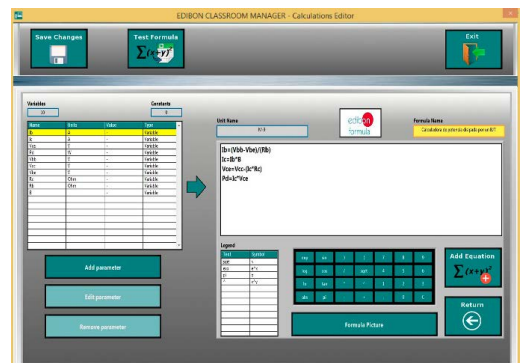
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

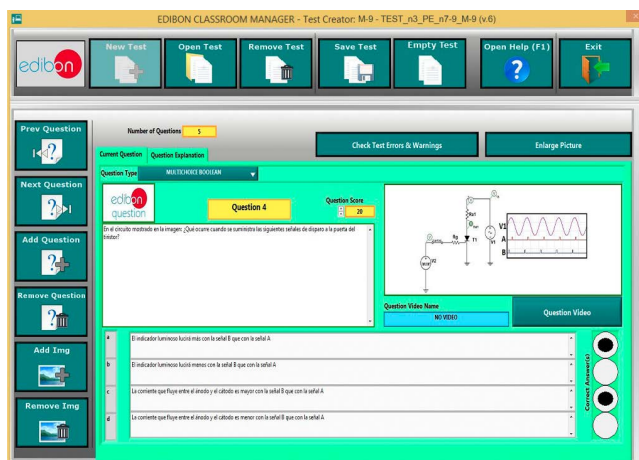
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



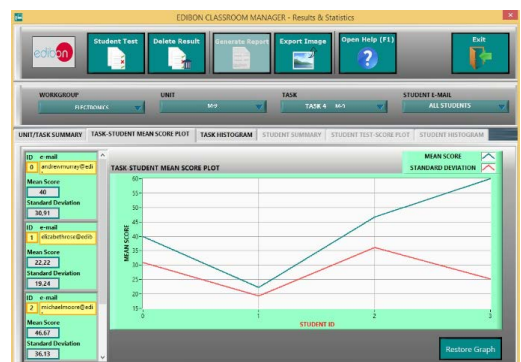
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



ECAL. EDIBON Calculations Program Package - Formula Editor Screen



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



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

Optional
Student Software

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

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

Innovative features:

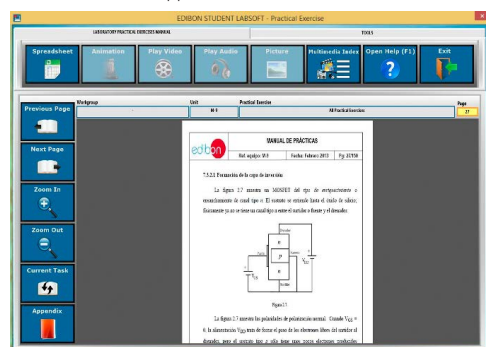
- **Student Log-In & Self-Registration.**
- **Existing Tasks checking & Monitoring.**
- **Default contents & scheduled tasks available to be used from the first session.**
- **Practical Exercises accomplishment by following the Manual provided by EDIBON.**
- **Evaluation Methods to prove your knowledge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

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

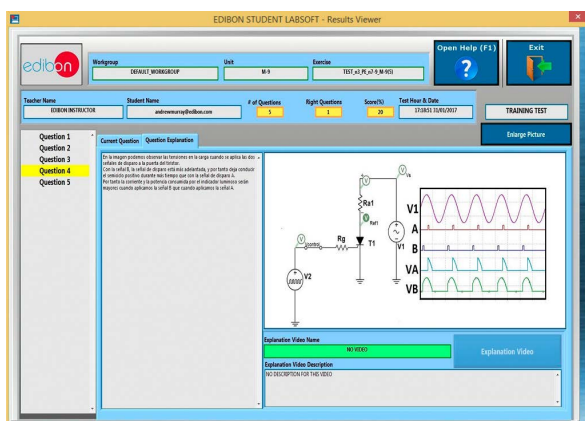
www.edibon.com/en/interactive-computer-aided-instruction-software



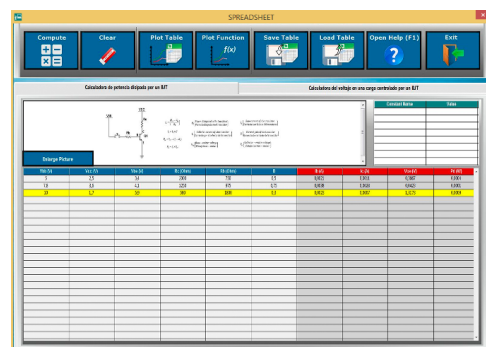
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

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



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REPRESENTATIVE:

