



INTRODUCTION

Automotive electronics is the branch of mechatronics that focuses on the electrical and electronic equipment installed in cars. The weight of electronic systems in cars has increased over the years to become one of the main parts of automobiles today. Electronic systems have replaced many functions performed manually or by mechanical systems, such as the fuel injection system, emission gas control, safety system, car fluid check, comfort system, throttle control and many others. The Automotive Electric Generation Unit, "AV-GE", is composed of the car's electrical circuit that includes the generation and battery charging part of the car, as well as the instrumentation panel part that contains the most common fault indicators of the car's electrical system.

The Automotive Power Generation Unit, "AV-GE", has been designed by EDIBON to study the power generation in the automotive field by performing exercises that address the analysis and function of each component of the electrical system. It will allow to study the operation of the alternator and its voltage regulation, the ignition switch sequence, and the characteristics and behavior of the battery during the charging and discharging phases. It is also possible to study the role of the rectifier and how the system reacts to failures, such as in the alternator, the battery or the internal combustion engine. In addition, the unit allows customized, user-designed simulations to explore in detail other specific automotive electrical system scenarios.



Certificate of Approval of the
Quality Management System



European Union Certificate
(total safety)



UL and CSA Regulations
(All our products are manufactured according
to current UL and CSA regulations)



Certificate of Approval of the
Environmental Management System



Worlddidac Association
Certificate of Membership

GENERAL DESCRIPTION

The Automotive Electric Generation Unit, "AV-GE", has been designed by EDIBON to provide a practical solution to help to become familiar with the components used in today's automobile electrical circuits.

The components included in "AV-GE" focus on the generation of electrical energy and the charging of the automobile battery.

The "AV-GE" unit contains an engine and generator assembly coupled together through a belt and pulley system, such as those of an actual automobile. The generator drive motor is an electric motor that will emulate the function of the internal combustion engine of the automobile. The electrical circuit of the unit uses a 12 V automotive battery as its accumulator component.

Furthermore, the "AV-GE" unit includes an instrument panel with an electric key switch and the warning lights that illuminate when the most typical faults of automotive electrical systems occur: electrical circuit malfunction indicator (GEN-L), battery or electrical circuit malfunction indicator (BATT), and malfunction indicator or engine check light (MIL).

In addition, the system is equipped with an accessible fuse and relay block, allowing direct manipulation of the protection and distribution elements of the circuit. This feature facilitates fault diagnosis and reinforces the unit's pedagogical approach, aimed at the development of applied technical skills.

The "AV-GE" not only enables the teaching of the basic principles of automotive electricity, but also prepares students to face the technological challenges of hybrid and electric vehicles. It provides an in-depth understanding of energy management, integration between electrical and electronic systems, and component analysis in a safe, controlled and highly formative environment.

The "AV-GE" unit consists of the following elements:

- Instrument panel with warning lights.
- Electric key switch.
- Fuse and relay block.
- Variable frequency drive for electric motor control.
- Electric motor for petrol engine simulation.
- Alternator.
- 12 VDC battery with accessible terminals (battery points).

SPECIFICATIONS

The "AV-GE" unit mainly consists of:

Instrument panel with the following components:

- Electric key switch.
- MIL warning light (malfunction indicator or engine check light).
- BATT warning light (battery or electrical circuit malfunction indicator).
- GEN-L warning light (electrical circuit malfunction indicator).

Relay and fuse box:

- Automotive GEM module.
- Operating voltage: 12 VDC.

Variable frequency drive:

- Power supply: 230 VAC.
- ON / OFF switch.
- Output voltage connections PWM:
 - Three-phases: 230 VAC.

Potentiometer to adjust the frequency.

Setting and visualization display of the machine parameters.

Electric motor for petrol engine simulation (EMT7/1K):

- Nominal power: 1100 W.
- Nominal voltage: 3 x 230/400 VAC Δ/Y .
- Frequency: 50 / 60 Hz.
- Number of poles: 2.
- Speed: 2730 rpm.
- Attached to the alternator by means of a belt and pulley system.

Alternator:

- Nominal voltage: 12 VDC.
- Alternator charging current: 25 – 50 A.
- Attached to the motor by means of a belt and pulley system.

12 VDC battery with accessible terminals (battery points):

- Nominal voltage: 12 VDC.
- Capacity: 62 Ah.
- Accessible terminals.
- Terminals: positive/negative.

Cables and accessories for a correct operation.

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



AV-GE detail

EXERCISES AND PRACTICAL POSSIBILITIES

- 1.- Function of every element in the automotive electrical circuit.
 - 2.- Operation of the alternator.
 - 3.- Function of the rectifier.
 - 4.- Alternator voltage adjustment.
 - 5.- Ignition switch sequence.
 - 6.- Features and operation of the battery.
 - 7.- Operation of the electrical circuit of an automobile on battery discharge.
 - 8.- Operation of the electrical circuit of an automobile on battery charge.
 - 9.- Behavior of the system when an alternator failure occurs.
 - 10.- Behavior of the system when a battery failure occurs.
 - 11.- Behavior of the system when an internal combustion engine failure occurs.
- Several other exercises can be done and designed by the user.

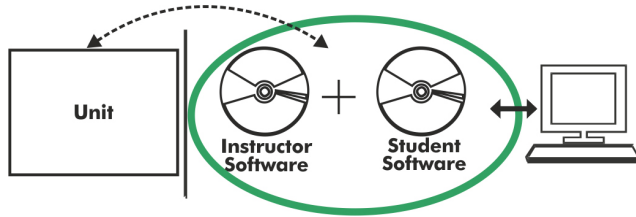
REQUIRED SERVICES

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

DIMENSIONS AND WEIGHTS

AV-GE:

- Dimensions: 1200 x 520 x 710 mm approx.
(47.24 x 20.47 x 27.95 inches approx.)
- Weight: 65 Kg approx.
(143 pounds approx.)

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

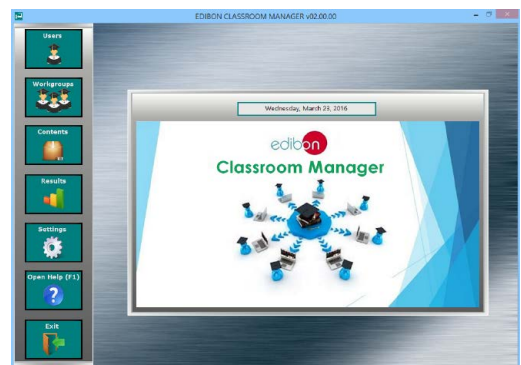
With no physical connection between unit and computer, this complete software package consists of an Instructor Software (EDIBON Classroom Manager -ECM-SOF) totally integrated with the Student Software (EDIBON Student Labsoft -ESL-SOF). Both are interconnected so that the teacher knows at any moment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

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

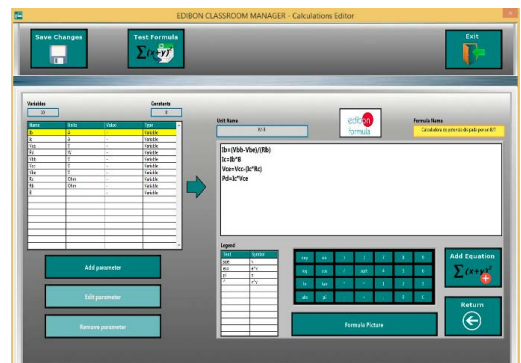
ECM-SOF is the application that allows the Instructor to register students, manage and assign tasks for workgroups, create own content to carry out Practical Exercises, choose one of the evaluation methods to check the Student knowledge and monitor the progression related to the planned tasks for individual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

Innovative features:

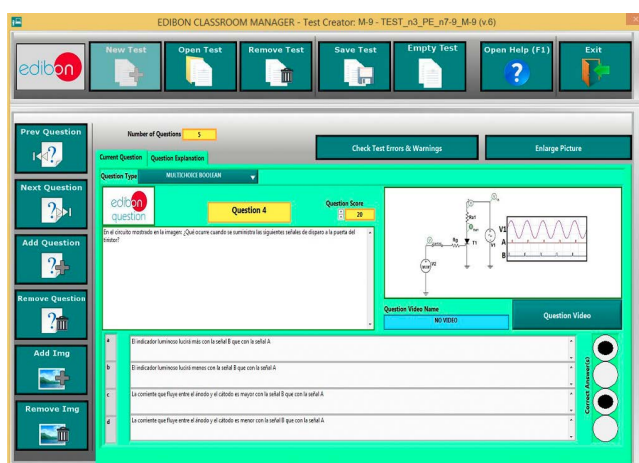
- User Data Base Management.
- Administration and assignment of Workgroup, Task and Training sessions.
- Creation and Integration of Practical Exercises and Multimedia Resources.
- Custom Design of Evaluation Methods.
- Creation and assignment of Formulas & Equations.
- Equation System Solver Engine.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



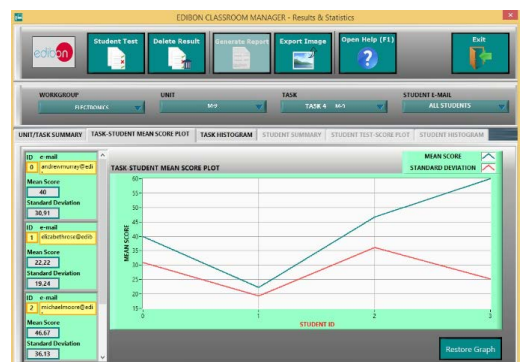
ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



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

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

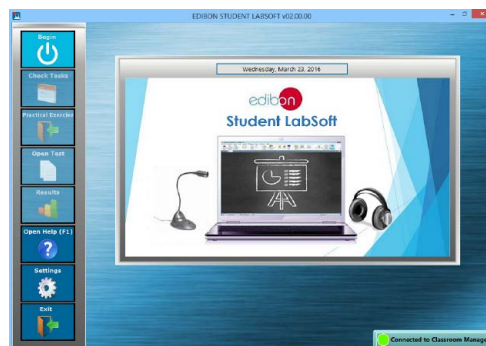
ESL-SOF is the application addressed to the Students that helps them to understand theoretical concepts by means of practical exercises and to prove their knowledge and progression by performing tests and calculations in addition to Multimedia Resources. Default planned tasks and an Open workgroup are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

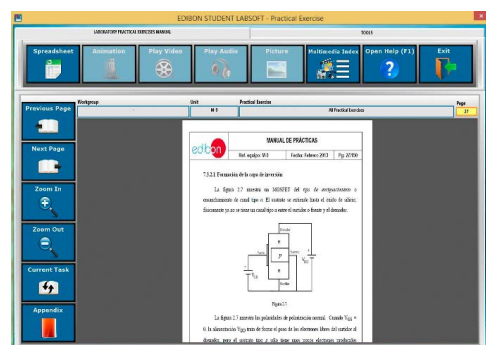
- Student Log-In & Self-Registration.
- Existing Tasks checking & Monitoring.
- Default contents & scheduled tasks available to be used from the first session.
- Practical Exercises accomplishment by following the Manual provided by EDIBON.
- Evaluation Methods to prove your knowledge and progression.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

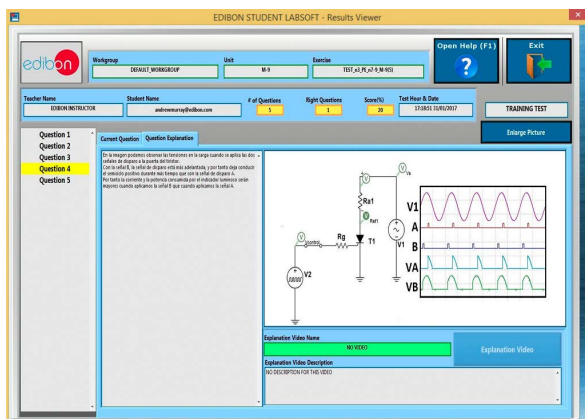
www.edibon.com/en/interactive-computer-aided-instruction-software



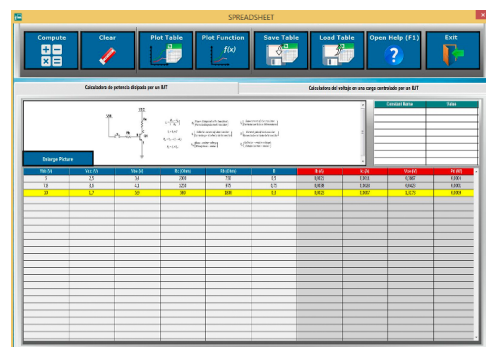
ESL-SOF. EDIBON Student LabSoft (Student Software)
Application Main Screen



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.



C/ Julio Cervera, 10. Móstoles Tecnológico.
28935 MÓSTOLES. (Madrid). ESPAÑA - SPAIN.
Tel.: 34-91-6199363 Fax: 34-91-6198647
E-mail: edibon@edibon.com Web: www.edibon.com

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REPRESENTATIVE:

