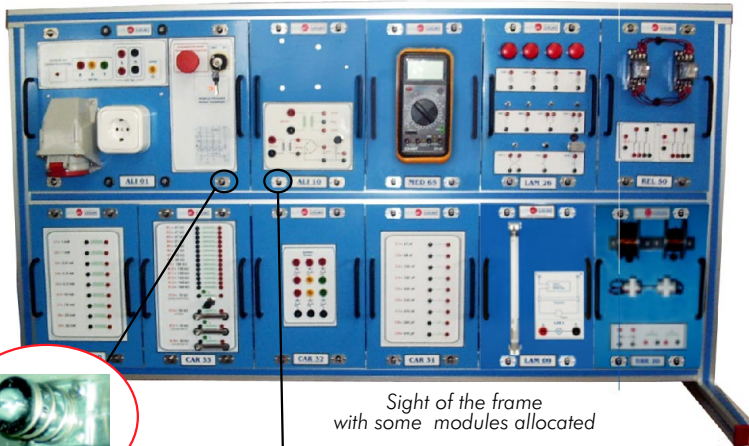


Example of some modules

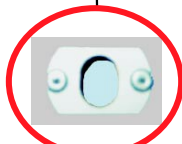
BASS. Frame



Sight of the frame with some modules allocated



Modules automatic anchorage system



High Safety
Automatic earth connection system



Main Features:

- Anodized aluminium structure and modular building.
- Possibility of housing until 12 different modules, at the same time.
- Automatic anchorage system for any module.
- Automatic earth connection system.

Main Features:

- Painted steel construction.
- All modules have handles and diagram.
- Automatic anchorage system for placing any module in the frame.
- Safety wires.
- Automatic anchorage
- Automatic earth connection.
- Safety connections.



ISO 9001:2000
Certificate of Approval



European Union Certificate



Certificates ISO 14001: 2004 and
ECO-Management and Audit Scheme
(environmental management)



Worlddidac Quality Charter
Certificate
Worlddidac Member

INCLUDED MODULES

ALI01. Industrial Main Power Supply



- Magneto-thermal protection.
- Differential protection.
- Double plug and terminals (three-phase + single-phase).
- 2 lamps.
- 8 terminals.
- Mushroom security button.
- Removable key.

ALI10. Power Supply Module



- AC and DC power supply module that allows the following output voltages:
 Alternating:
 15 + 15 Vac, 0.5 A.
 24 Vac, 2 A.
 Direct:
 24 Vdc, 2 A.
 0-20 Vdc, 2 A.

CAR30. Inductances Module



- 9 inductances from 1 mH to 45 mH for assemblies in alternating of R, L, C components, together with the CAR33 module.
- Assemblies that can be made: Filters and RL, RC, RLC circuits in series and in parallel.
- Power supply can be taken from ALI10 (24 Vac).

CAR31. Capacitors Module



- With this module we can study, among others:
 RLC circuits.
 Electric capacity.
 Charge and discharge of a capacitor.
 Type of capacitors.
 Capacitors in series and in parallel.
 Etc.
- 7 independent not polarised ones, from 47 nF to 470 nF.
- 2 polarised of 220 μ F and 470 μ F .

CAR32. Rectifier Diodes Module



- Rectifier diodes of 40 A. (6 units).
- Together with CAR30 module, filtrate of voltage of the assemblies can be made.
- Some assemblies:
 Positive/negative simple rectification.
 Single-phase and three-phase bridge rectification.
 Double rectification.

CAR33. Resistive Components Module



- Fixed resistances, with values from 47 to 150 K ohms. (14 units).
- Linear potentiometers (2 units), one of them coiled of 5 W.
- Logarithmic potentiometers. (2 units).
- It can study RLC circuits.
- Series and parallel resistences association.
- Different connection circuits.

Continue ...

LAM26. **Lighting Module**



- For electric installations of signalling and lighting at low voltage (24 V).
- Bayonette 24V lamps. (4 units).
- Switches. (2 units).
- Inverter.
- Single commutators. (2 units).
- Buzzer.
- Push-button.

We can made the following practices:
 Lamps control by switches.
 Lamps control by relays.
 Lamp control from three points.
 Lighting level control.
 Lamps ignition by button.
 Simultaneous connection of lamp and push-button.
 Acoustic alarms.
 Etc.

LAM09. **Fluorescent Lamp**



- 230 Vac fluorescent lamp.
- 5 W reactance.
- Starter.
- Study of operation principles of fluorescent lamp reactance and starter.

MED65. **Digital Multimeter**



- Digital multimeter for measurement of:
 - Voltage.
 - Current.
 - Resistance.
 - Capacitance.
 - etc.

REL50. **Relays Module**



- Relays with a coil at 24 Vac voltage and double contact. (2 units).

TRA28. **Three-phase Transformer**



- Transformer of three branches:
 - Primary ones: 220 and 380 V.
 - Secondary ones: 3x73 V by branch.
 - Power: 500 W.
- Possible practices:
 - Transformers in series and in parallel (single-phase).
 - The transformer as a booster (single-phase).
 - The transformer as a reducer (single-phase).
 - Auto-transformer (single-phase).
 - Star connection (three-phase).
 - Delta connection (three-phase).
 - Parameters determination (short-circuit and open-circuit test).

VAR17. **Dismantled Transformer Kit**



- 1000-loop coil.
- 2000-loop coil.
- A four-elements disassembled core.

Continue ...

VAR15. Single-phase Capacitor Motor (EMT16)



- V. Armature: 110/220 V.
- Power: 0.27 HP.
- Speed: 1550 rpm.
- Capacitor starting.

VAR02. Motor (EMT7) (squirrel cage)



- Three phase squirrel cage motor.
- V. Armature: 230/400 V.
- Power: 0.5 HP ≈ 0.30 KW.
- Speed: 1500 rpm at 50 Hz.
- 7 terminals.

VAR25. Open Universal Motor (EMT12)



- V. Armature: 110/240 V.
- Power: 0.3 HP.
- Speed: 750 rpm.
- Universal motor open by its sides to see inside, specially the brushes.

VAR16. Electromagnetism Kit with Group of Motor/Generator



- Set of two coils (2000 and 1000 loops).
- Cores of several materials (brass, stainless steel, iron).
- Longitudinal magnet.
- Group motor/generator with its axis united (24 Vdc).

VAR18. Electrostatic Kit



- Case containing:
- PVC bar.
 - PVC tube.
 - Nylon bar.
 - Aluminium bar.
 - Acetate sheets (2 units).
 - Electroscope (vertical base and hook, aluminium sheets, aluminium ball).
 - Rabbit skin.

Some Practical Possibilities:

Static Electricity:

- 1.- Electrostatic demonstration on several materials.
- 2.- The Electroscope.
- 3.- The Acetate.
- 4.- Sign of the charge.
- 5.- Static electricity checking, with an electroscope and an electrometer.
- 6.- Static electricity experiments.

Magnetism, Electromagnetism and Electromagnetic Induction:

- 7.- Electromagnetic induction.
- 8.- Electromagnet: Oersted's experiment.
- 9.- The electromagnetic field (Electromagnets).

Direct current (DC) and Alternating Current (AC):

- 10.- Ohm's law verification.
- 11.- Resistance measurement.
- 12.- Resistors in series association.
- 13.- Resistors in parallel association.
- 14.- Power measurement of a resistive circuit.
- 15.- Analysis of the variable resistances response curve.
- 16.- Voltage divider analysis.
- 17.- Simplification systems: Application of Kirchhoff's first law.
Application of Kirchhoff's second law. Thevenin's and Norton's Theorem.
- 18.- Application of the superposition theorem.
- 19.- Coils in series association.
- 20.- Coils in parallel association.
- 21.- Measurement and visualization of the alternating current.
- 22.- Measurement of the phase angle among voltages (AC).
- 23.- Resistive circuits in delta.
- 24.- Resistive circuits in star.
- 25.- Star/delta transformation.
- 26.- Delta/star transformation.
- 27.- Lamp with variable lighting.
- 28.- Connection of lamps in series.
- 29.- Connection of lamps in parallel.

Electric capacity:

- 30.- Capacity measurement of a capacitor.
- 31.- Capacitors series association.
- 32.- Capacitors parallel association.
- 33.- Charge analysis of a capacitor.
- 34.- Discharge analysis of a capacitor.

Dynamic Electricity:

- 35.- Identification of the components of the trainer.
- 36.- Preparation of the power supply and of the measurement instruments.

Motors:

- 37.- Electric motors.
- 38.- Generators.
- 39.- Single-phase motor.
- 40.- Universal motor.
- 41.- Squirrel-cage three-phase motor.
- 42.- Identification, coils measurement and starting-up of a single-phase motor.

- 43.- Identification, measurement and starting-up of an universal motor.
- 44.- Identification, coils measurement and starting-up of a three phase motor.
- 45.- Electric energy into mechanic energy conversion.
- 46.- Mechanic energy into electric energy conversion.
- 47.- Electric energy into magnetic energy conversion.
- 48.- Magnetic induction: Lenz's Law.

Transformers:

- 49.- Assembling the transformer.
- 50.- Back transformer.
- 51.- Boost transformer.
- 52.- Auto-transformer.
- 53.- Experiments and practices with a dismantled transformer.
- 54.- Identification of the three-phase transformer.
- 55.- Connection as single-phase transformer.
- 56.- Star/star three-phase connection.
- 57.- Reverse star/star three-phase connection.
- 58.- Direct delta/delta three-phase connection.
- 59.- Star/delta three-phase connection.
- 60.- Three-phase/six-phase connection.
- 61.- Transformer with coils in series in phase.

RL, RC and RCL Circuits:

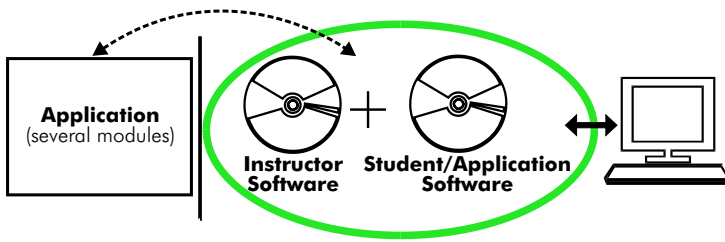
- 62.- Time constant.
- 63.- Analysis of a RL circuit in series.
- 64.- Analysis of a RL circuit in parallel.
- 65.- Analysis of a RC circuit in series.
- 66.- Analysis of a RC circuit in parallel.
- 67.- Analysis of a RCL circuit in series.
- 68.- Analysis of a RCL circuit in parallel.

Rectification and filtrate:

- 69.- Low-pass filter.
- 70.- High-pass filter.
- 71.- Analysis of the rectifier diode response curve.
- 72.- Half wave rectification.
- 73.- Full wave rectification.
- 74.- Rectification to feed the universal motor.
- 75.- Double wave rectification with two windings.
- 76.- Double wave rectification with a Graetz's bridge.
- 77.- Half wave three-phase rectification.
- 78.- Three-phase rectification in bridge.

Electric circuits of application:

- 79.- Basic electric installation with lamps.
- 80.- Lamps controlled by a switch or a push button.
- 81.- Lamps controlled from two points
- 82.- Lamps controlled from three points.
- 83.- Lamps control by a switch relay.
- 84.- Lamps control by a commutator relay.
- 85.- Acoustic circuit.
- 86.- Fluorescent tube.

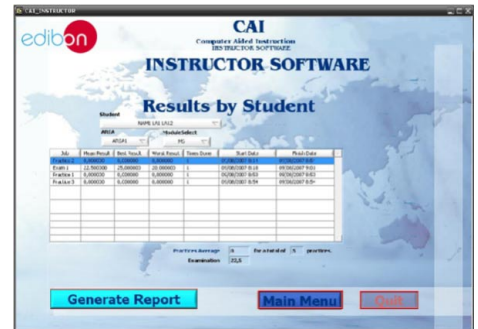


With no physical connection between application/module and computer, this complete package consists on an Instructor Software (INS/SOF) totally integrated with the Student/Application Software. Both are interconnected so that the teacher knows at any moment what is the theoretical and practical knowledge of the students. These, on the other hand, get a virtual instructor who helps them to deal with all the information on the subject of study.

With the **INS/SOF. Classroom Management Software Package (Instructor Software)**, the Teacher has a whole range of options, among them:

- Organize Students by Classes and Groups.
 - Create easily new entries or delete them.
 - Create data bases with student information.
 - Analyze results and make statistical comparisons.
 - Print reports.
 - Develop own examinations.
 - Detect student's progress and difficulties.
- ...and many other facilities.

Examples of the Software screens



The Instructor Software is the same for all the applications, and working in network configuration, allows controlling all the students in the classroom.

A.../SOF Computer Aided Instruction Software Packages (Student/Application Software).

It explains how to use the application/module, run the experiments and what to do at any moment.

Each application has its own Student Software package.

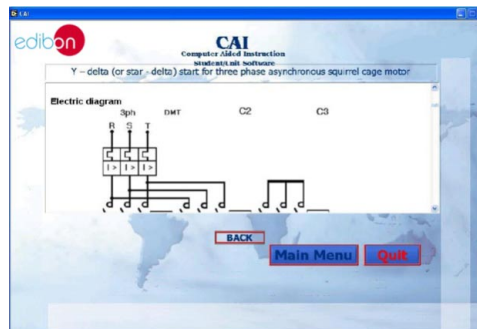
- The options are presented by pull-down menus and pop-up windows.
- Each Software Package contains:

Theory: that gives the student the theoretical background for a total understanding of the studied subject.

Exercises: divided by thematic areas and chapters to check out that the theory has been understood.

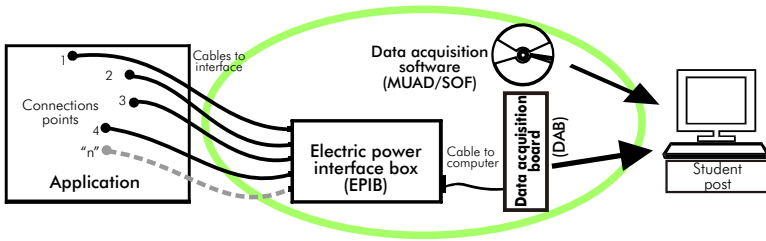
Guided Practices: presents several practices to be done, alongside the applications/modules, showing how to complete the exercises and practices.

Exams: set of questions presented to test the obtained knowledge.



* Software is available in English and Spanish. Any other language available on request.

MUAD. Power Data Acquisition System



MUAD is the perfect link between the application/module and the PC. MUAD is a continuous data acquisition system with virtual instrumentation, that measures, analyzes and represents the parameters involved in the process. MUAD allows voltage and current acquisition and measurement, data processing, frequency spectrum and all the functions of a digital oscilloscope. We easily connect the Electric Power Interface Box (EPIB) to the application/module with the supplied cables (there are several connection points placed for it). The EPIB is connected to the PC through the Data Acquisition Board (DAB), and by using the Data Acquisition with Virtual Instrumentation Software (MUAD/SOF), the student can get results from the undertaken experiment/practice, see them on the screen and work with them.

The MUAD system allows voltage and current measurement and acquisition, data processing, frequency spectrum and the functions of a digital oscilloscope.

This MUAD System includes EPIB + DAB + MUAD/SOF:

1) Hardware :

1.1) EPIB. Electric power interface box (dimensions: 300 x 120 x 180 mm. approx.):

Interface that carries out the conditioning of the diverse signals that can be acquired in a process, for their later treatment and visualisation.

In the front panel, the elements are separated in two parts: left-hand part to VOLTAGE sensors, and right-hand part corresponds with CURRENT sensors.

Analogue Input Channels:

8 analogue input channels. Sampling range: 250 KSPS (kilo samples per second).

4 Tension sensors AC/DC, 400V. 4 Current sensors.



EPIB

1.2) DAB. Data acquisition board :

PCI Data acquisition board (National Instruments) to be placed in a computer slot.

Bus PCI.

Analogue input:

Number of channels= 16 single-ended or 8 differential.

Resolution= 16 bits, 1 in 65536.

Sampling rate up to: 250 KSPS (Kilo samples per second).

Input range (V)= ± 10V.

Data transfers= DMA, interrupts, programmed I/O.

Number of DMA channels= 6.

Analogue output:

Number of channels= 2.

Resolution= 16 bits, 1 in 65536.

Maximum output rate up to: 833 KSPS.

Output range(V)= ± 10.

Data transfers= DMA, interrupts, programmed I/O.

Digital Input/Output:

Number channels= 24 inputs/outputs.

D0 or DI Sample Clock frequency: 0 to 1 MHz.

Timing:

Counter/timers= 2.

Resolution: Counter/timers: 32 bits.



DAB

2) MUAD/SOF. Data acquisition software :

Data Acquisition Software with Graphic Representation:

Friendly graphical frame.

Compatible with actual Windows operating systems.

Configurable software allowing the representation of temporal evolution of the different signals.

Visualization of a tension of the circuits on the computer screen.

Sampling velocity up to 250 KSPS (Kilo samples per second) guaranteed.



MUAD/SOF

Software Main Screen



- 1.- Voltage channels section
- 2.- Current channels section
- 3.- Power spectrum section
- 4.- General control panel section

Manuals and Accessories

Manuals:

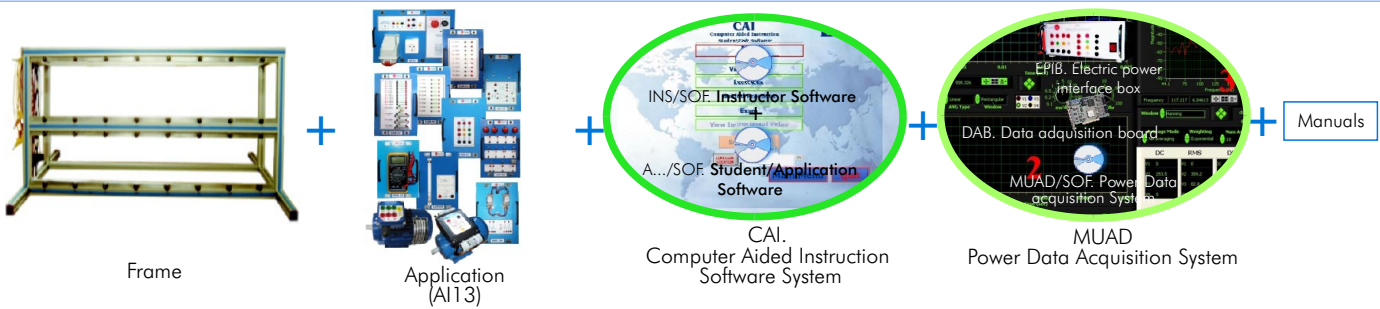
Manuals are developed following the SELF-TEACHING principle, thus facilitating to the utmost student's productivity when completing the practices/exercises. 8 Manuals are supplied with each application.

Accessories:

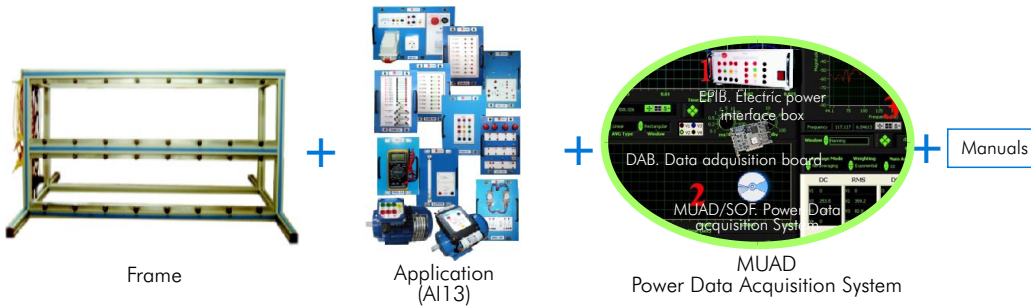
With the each application will be supplied a safety wires kit for doing the practices (CABD), net cable, adaptors, etc, for normal operation.

Working possibilities:

1) Working possibility CAI + MUAD (EDIBON complete system)



2) Working possibility MUAD



3) Working possibility CAI



4) Simplest Working possibility



OTHER AVAILABLE OPTIONS

- AI13-A. Modular Trainer for Electrotecnics (**RLC Circuits**).
- AI13-B. Modular Trainer for Electrotecnics (**Electrostatic Kit**).
- AI13-C. Modular Trainer for Electrotecnics (**Motors**).
- AI13-D. Modular Trainer for Electrotecnics (**Transformers**).
- AI13-E. Modular Trainer for Electrotecnics (**Lighting**).

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



C/ Del Agua, 14. Polígono Industrial San José de Valderas.
28918 LEGANÉS. (Madrid). SPAIN.
Phone: 34-91-6199363 FAX: 34-91-6198647
E-mail: edibon@edibon.com WEB site: www.edibon.com

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