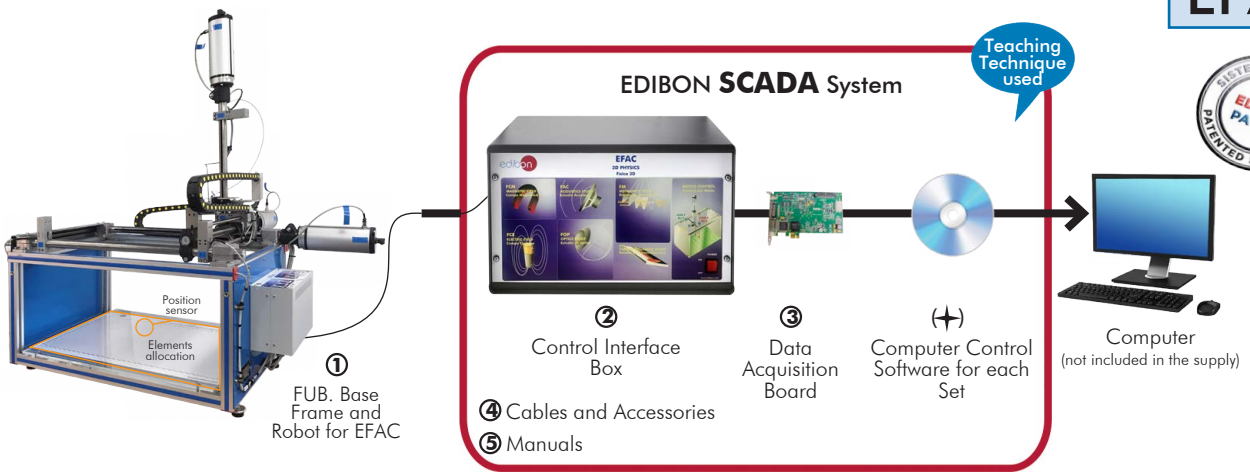
edibon

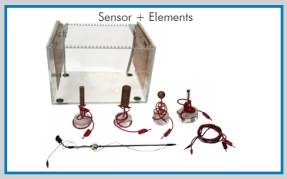
Engineering and Technical Teaching Equipment

Computer Controlled **Three Dimensions (3D) Physics,** with SCADA

EFAC

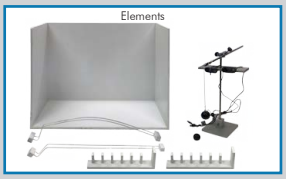


★ ***REQUIRED ELEMENTOS FOR FUB*** *(required at least one):*



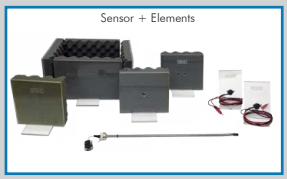
FCE. Electric Fields Study Set

FCM. Magnetic Field Study Set

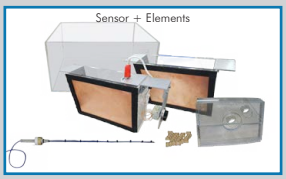


FM. Mechanics Study Set

FOP. Optics Study Set



FAC. Acoustics Study Set



FTT. Thermodynamics Study Set

The Computer Controlled Three Dimensions (3D) Physics Complete Unit, "EFAC/T", includes FUB, FCE, FCM, FM, FOP, FAC and FTT.

Key features:

- **Advanced Real-Time SCADA.**
- **Open Control + Multicontrol + Real-Time Control.**
- **Specialized EDIBON Control Software based on LabVIEW.**
- **National Instruments Data Acquisition board (250 KS/s, kilo samples per second).**
- **Calibration exercises, which are included, teach the user how to calibrate a sensor and the importance of checking the accuracy of the sensors before taking measurements.**
- **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**
- **Capable of doing applied research, real industrial simulation, training courses, etc.**
- **Remote operation and control by the user and remote control for EDIBON technical support, are always included.**
- **Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).**
- **Designed and manufactured under several quality standards.**
- **Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc. Apart from monitoring user's knowledge and progress reached.**
- **This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.**

OPEN CONTROL + MULTICONTROL + REAL TIME CONTROL

POWERED BY NATIONAL INSTRUMENTS LabVIEW

www.edibon.com
PRODUCTS
1.- PHYSICS

For more information about Key Features, click here

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

INTRODUCTION

Physics is the science responsible for explaining all the phenomena that intervene, interact and constitute the reality that surrounds us. In order to provide reinforcement in the study of physics, specifically in areas such: electromagnetism, thermodynamics, acoustics, optics, etc., the Computer Controlled Three Dimensions (3D) Physics, "EFAC", has been designed. The aim of this unit is to provide a real vision of many basic physical processes that will later help in the understanding of more complex physical processes.

So that all the concepts of physics can be understood, graphic and control tools are provided that allow the student to observe the result of their experiment "in situ" and in real time, to study the consequences of small perturbations and/or to carry out studies of complicated configurations.

GENERAL DESCRIPTION

The Computer Controlled Three Dimensional (3D) Physics, "EFAC", from EDIBON, allows to do practical exercises in the different fields of physics (electricity, magnetic fields, mechanics, acoustics, optics and thermodynamics).

The "EFAC" is an open unit has been designed so, the student/teacher himself in an easy and simple way can additionally design, carry out or create their own experiments.

Thus, we can add to the Base Frame and Robot for EFAC, "FUB", the sets we want to emphasize the study of those fields we need.

With this unit it is expected that the student can additionally design his own experiments as a complement to those proposed by EDIBON. For this reason, an open unit has been designed so, the student/teacher himself in an easy and simple way can additionally design, carry out or create their own experiments.

Required elements (at least one) (Not included):

FCE. The Electric Fields Study Set, "FCE", allows the spatial study of the electric field in all its dimensions (calculation of the intensity, lines of force and equipotential surfaces in both static and dynamic fields) giving the student a broader spatial vision not provided by other methods.

The supply of spheres, cylinders, wires and conducting planes together with charge sources allow the student to study experimentally Coulomb's law, the electric force between conducting spheres, Gauss's theorem and the superposition principle. The calculation of the electric flux allows us to experimentally determine the redistribution of charges generated in plane-parallel capacitors in series and parallel configurations. The effects of dielectrics on capacitors will be carried out using different materials: wood, glass and plastic blocks, which allow us to study series/parallel configurations.

The "FCE" consists of a robot arm to which is attached a probe capable of measuring the static and dynamic electric field strength. The control software, together with the data acquisition board, allows to perform sweeps in space storing the electric field strength point by point with a maximum resolution of 1 mm. The "FCE" is supplied with a management software specially designed for the spatial representation of the electric field strength and lines of force.

The mathematical tools of integration and derivation available in the management software allow the experimental verification of the laws, theorems and basic principles of electricity which are rooted in the theoretical plane and which, through the "FCE" set, can be transferred to the experimental plane.

FCM: The Magnetic Field Study Set, "FCM", allows the spatial study of the magnetic field in all its dimensions (calculation of magnetic field strength, lines of force, vector potential and equipotential lines both in static and dynamic fields). For this purpose, the computer-controlled robot arm sweeps a region of space measuring the magnetic field strength at equidistant points that the student can visualize in real time through the software supplied with the set.

This set has been specially designed to allow the student to study and experimentally verify laws, theorems and basic principles of magnetism such as: Biot-Savart's law, Ampère's theorem, Lenz's law, the principle of superposition, etc., as well as the magnetization effects of magnetic materials: ferromagnetic, paramagnetic and diamagnetic.

FM: The Mechanics Study Set, "FM", allows us to study movements that normally, would take hours and hours of calculations in a fast and simple way in the mechanical area, besides corroborating the theoretical results of other simpler ones. For this purpose, the latest technology is used when detecting and locating objects, based on artificial vision. This allows us to determine the position of the object to be studied within a limited enclosure, which will lead to the subsequent obtaining of magnitudes of the movement, such as velocities and accelerations.

It is typical to study different situations such as inclined planes, free falls, parabolic movements, pendulums, etc. in a simple way by applying theoretical concepts. However, it is not so easy to study movements different from these, with variable accelerations, inhomogeneous slopes, with friction effects, etc.

FAC: The Acoustics Study Set, "FAC" designed by EDIBON allows to perform all kinds of experiments related to acoustic waves (propagation, interferences, wave fronts, etc.).

The most complete way to carry out the observation would be to fill the space with tiny microphones, placing them at the nodes of a fine three-dimensional spatial network that does not disturb the behavior of the waves. By means of acoustic emitters the waves would be produced and all the microphones would take data during a certain time with this imaginary procedure we would have information of everything that happened in all the points of the net at all times, being collected all the nuances of the experience.

The set "FAC" is based on the reproducibility of a physical process. For this purpose, the computer-controlled robot arm sweeps a region of space measuring the intensity of the acoustic wave at equidistant points. The perfect synchronization between the transmitter and receiver, together with the control and management software, allows the student to visualize the propagation of the sound wave in space. The use of the control system with more than one emitter allows us to study the processes of constructive and destructive interference. The set is supplied with a set of acoustic materials (mirrors, lenses and diffraction gratings) that allow the study of reflection, refraction and dispersion processes, as well as acoustic shielding processes.

FOP: The Optics Study Set, "FOP", designed by EDIBON, has as its objective the study and understanding of simpler optical phenomena on which other much more complex phenomena are based. In this case, focusing on reflection, refraction, transmission, absorption and measurement of light intensity (irradiance).

Rainbows, mirages, the color of what we see, laser light, X-rays, etc. are all typical situations with which we live and whose explanation is based on optical theories. Sometimes they seem complicated, but they are all based on the combination of simple phenomena.

Nowadays, communications are carried out thanks to light. We convert electrical signals into light signals, which are associated with a lower loss in their path. In addition to greater storage, photosensitive elements have less frequent deterioration.

Phenomena such as total reflection have gone from being mere proven theoretical facts to being the driving force behind today's well-known "optical communications". Magnetic read heads have now given way to laser reading, and information storage has replaced the use of ferromagnetic devices over photosensitive elements.

FTT: The Thermodynamics Study Set, "FTT", allows the study of thermodynamics by means of the temperature difference between two sources.

Thermodynamics represents the study of temperature, heat and energy exchange. It has practical applications in all branches of science and technology, as well as in many aspects of daily life, from climate to cooking.

Temperature is familiar to all of us as a measure of how hot or cold bodies are. More precisely, it is a measure of the average internal molecular kinetic energy of a body, but both the definition and determination of temperature is a subtle and complex subject. For example, it is very difficult to define temperature so that different thermometers agree with each other in measuring the temperature of a substance. However, the properties of gases at low densities allow us to define a temperature scale "T" and to construct gas thermometers whose measurements agree.

The transmission of energy from one body to another in a heat exchange process consists simply in the absorption of energy at the molecular level. This energy causes its atoms to increase their degree of excitation, increasing their oscillations in frequency and amplitude. These oscillations, which occur around their equilibrium positions, can even "break" bonds between them, which then become free, causing the element to change its state of aggregation.

At the macroscopic level, temperature translates into the sensation of heat: when we touch an object that is at a higher temperature than that of our skin, we say that it is hot. The temperature difference between two substances will determine the direction of heat flow between them. It is this difference in heat flow that we can study with the set "FTT".

The Computer Controlled Three Dimensions (3D) Physics Complete Unit, "EFAC/T", includes the following elements:

1. Base Frame and Robot for EFAC, "FUB".
2. Electric Fields Study Set, "FCE".
3. Magnetic Field Study Set, "FCM".
4. Mechanics Study Set, "FM"
5. Acoustics Study Set, "FAC"
6. Optics Study Set, "FOP".
7. Thermodynamics Study Set, "FTT".

This Computer Controlled Unit is supplied with the EDIBON Computer Control System (SCADA), and includes: The unit itself + a Control Interface Box + a Data Acquisition Board + Computer Control, Data Acquisition and Data Management Software Packages, for controlling the process and all parameters involved in the process.

With this unit there are several options and possibilities:

- Main items: 1, 2, 3, 4 and 5.
- Optional items: 7, 8 and 9.

Let us describe first the main items (1 to 5):

① FUB. Base Frame and Robot for EFAC:

This unit is required for the use of all type sets "F" and can work with one or several sets.

Anodized aluminum frame and panels made of painted steel.

Cartesian robot, controlled by three motors:

Movement in the X, Y and Z axes.

Support for the different sensors.

Robot arm, computer controlled, with a sweeping area.

Electronic box for the motors multiplexing. This Electronic box is controlled by a PLC allocated into the Control Interface Box.

Cables.

FUB

The complete unit includes as well:

Advanced Real-Time SCADA.

Open Control + Multicontrol + Real-Time Control.

Specialized EDIBON Control Software based on LabVIEW.

National Instruments Data Acquisition board (250 KS/s, kilo samples per second).

Calibration exercises, which are included, teach the user how to calibrate a sensor and the importance of checking the accuracy of the sensors before taking measurements.

Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.

Capable of doing applied research, real industrial simulation, training courses, etc.

Remote operation and control by the user and remote control for EDIBON technical support, are always included.

Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).

Designed and manufactured under several quality standards.

Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc. Apart from monitoring user's knowledge and progress reached.

This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.

Required elements (at least one) (Not included):

- FCE. Electric Fields Study Set.
- FCM. Magnetic Field Study Set.
- FM. Mechanics Study Set.
- FAC. Acoustics Study Set.
- FOP. Optics Study Set.
- FTT. Thermodynamics Study Set.

② EFAC/CIB. Control Interface Box:

This control interface is common for the required elements (at least one) (Not included).

Control interface box with process diagram in the front panel and with the same distribution that the different elements located in the unit, for an easy understanding by the student.

All sensors, with their respective signals, are properly manipulated from -10V. to +10V. computer output.

Sensors connectors in the interface have different pines numbers (from 2 to 16), to avoid connection errors.

Single cable between the control interface box and computer.

The unit control elements are permanently computer controlled, without necessity of changes or connections during the whole process test procedure.

Simultaneous visualization in the computer of all parameters involved in the process.

Calibration of all sensors involved in the process.

Real time curves representation about system responses.

Storage of all the process data and results in a file.

Graphic representation, in real time, of all the process/system responses.

All the actuators' values can be changed at any time from the keyboard allowing the analysis about curves and responses of the whole process.

All the actuators and sensors values and their responses are displayed on only one screen in the computer.

Shield and filtered signals to avoid external interferences.

Real time computer control with flexibility of modifications from the computer keyboard of the parameters, at any moment during the process.

Real time computer control for pumps, compressors, heating elements, control valves, etc.

Real time computer control for parameters involved in the process simultaneously.

Open control allowing modifications, at any moment and in real time, of parameters involved in the process simultaneously.

Three safety levels, one mechanical in the unit, another electronic in the control interface and the third one in the control software.

EFAC/CIB

③ DAB. Data Acquisition Board:

Common for the required elements (at least one) (Not included).

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

Analog input:

Number of **channels= 16** single-ended or 8 differential. **Resolution=16 bits**, 1 in 65536.

Sampling rate up to: 250 KS/s (kilo samples per second).

Input range (V)=±10 V. Data transfers=DMA, interrupts, programmed I/0. DMA channels=6.

Analog output:

Number of **channels=2**. **Resolution=16 bits**, 1 in 65536.

Maximum output rate up to: 900 KS/s.

Output range (V)=±10 V. Data transfers=DMA, interrupts, programmed I/0.

Digital Input/Output:

Number of **channels=24 inputs/outputs**. D0 or DI Sample Clock frequency: 0 to 100 MHz.

Timing: Number of **Counter/timers=4**. Resolution: Counter/timers: 32 bits.

The Data Acquisition board model may change at any moment, providing the same or better features than those required for the unit.

DAB

④ Cables and Accessories, for normal operation.

⑤ Manuals:

This unit is **supplied with 8 manuals**: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

Required elements (at least one) (Not included)

FCE. Electric Fields Study Set.

- Sensor:

  Electric field sensor. Is supplied a probe capable of measuring the potential created by any charge distribution. This probe consists of a conductive cable that measures the potential difference between a reference and the point where it is located.

- Elements:

  - Two nickel-plated conductor sphere with insulating rod.
  - Two nickel-plated conductor cylinders with insulating rod.
  - Tank.
  - Red conductor cable with banana-crocodile.
  - Black conductor cable with banana-crocodile.

The teacher can use any element that creates ELECTRICAL FIELDS, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

FCE

Required elements (Not included):

- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

FCE/CCSOF. Control Software + Data Acquisition + Data Management:

The three softwares are part of the SCADA system.

Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. **Compatible with the industry standards.**

Registration and visualization of all process variables in an automatic and simultaneous way.

Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

Management, processing, comparison and storage of data.

Sampling velocity up to 250 KS/s (kilo samples per second).

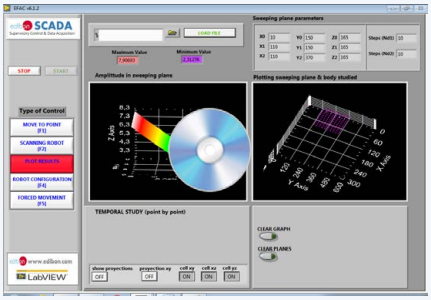
Calibration system for the sensors involved in the process.

It allows the registration of the alarms state and the graphic representation in real time.

Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

Open software, allowing the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.



FCE/CCSOF

Required elements (at least one) (Not included)

FCM. Magnetic Field Study Set

- Sensor:

  Hall probe capable of measuring the intensity of the static and dynamic magnetic fields.

- Elements:

  - Electromagnet.
  - Two magnets of AlNiCo.
  - Rectangular loop.
  - Two conductive loops of 325 turns.
  - Two conductive loops of 200 turns.
  - Solenoid with a diameter of 200 mm.
  - Solenoid with a diameter of 110 mm.
  - Two ferrite cores.
  - Stainless steel core.
  - Brass core.
  - Iron core.
  - 100 g of iron powder.

FCM

The teacher can use any element that creates MAGNETIC FIELDS, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

Required elements (Not included):

- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) **FCM/CCSOF. Control Software + Data Acquisition + Data Management:**

The three softwares are part of the SCADA system.

Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. **Compatible with the industry standards.**

Registration and visualization of all process variables in an automatic and simultaneous way.

Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

Management, processing, comparison and storage of data.

Sampling velocity up to 250 KS/s (kilo samples per second).

Calibration system for the sensors involved in the process.

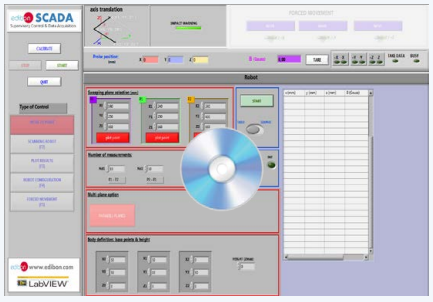
It allows the registration of the alarms state and the graphic representation in real time.

Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

Open software, allowing the teacher to modify texts, instructions.

Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.



FCM/CCSOF

Required elements (at least one) (Not included)

FM. Mechanics Study Set

- Elements:
  - Cameras (2 units).
  - Experiment drawer.
  - Linear motion rails.
  - Height rails supports.
  - Linear motions black sphere.
  - Black sphere with pendular motions rope.
  - Pendular hook for the robot.

The teacher can use any element suitable for MECHANICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

FM

Required elements (Not included):

- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) **FM/CCSOF. Control Software + Data Acquisition + Data Management:**

The three softwares are part of the SCADA system.

Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. **Compatible with the industry standards.**

Registration and visualization of all process variables in an automatic and simultaneous way.

Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

Management, processing, comparison and storage of data.

Sampling velocity up to 250 KS/s (kilo samples per second).

Calibration system for the sensors involved in the process.

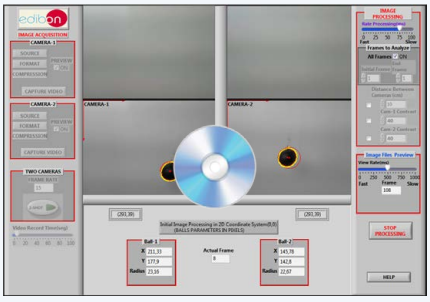
It allows the registration of the alarms state and the graphic representation in real time.

Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

Open software, allowing the teacher to modify texts, instructions.

Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.



FM/CCSOF

Required elements (at least one) (Not included)

FAC. Acoustics Study Set

- Sensor:

  Highly sensitive acoustic sensor (microphone) that allows the acoustic signal to be captured and saved at different points in the space.

- Elements:
  - High sensibility microphone.
  - Two acoustic sources (trumpets) high-frequency 3000 Hz, with 3V DC power supply.
  - Anechoic chamber. The simple chamber can be made with the panels provided with thick polyurethane supplied with the unit, and will allow isolating your experiments from external noises, allowing you to obtain the waves generated by the supplied sound source:
    - Walls covered with high-density polyurethane (4 units).
    - 170 x 200 mm flat wall with a high-density polyurethane covering and a hole of 10 mm.
    - 170 x 200 mm flat wall with a high-density polyurethane covering and two holes of 10 mm.
    - 170 x 200 mm flat wall with a high-density polyurethane covering without holes.

The teacher can use any element suitable for ACOUSTICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

FAC

Required elements (Not included):

- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

FAC/CCSOF. Control Software + Data Acquisition + Data Management:

The three softwares are part of the SCADA system.

Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. **Compatible with the industry standards.**

Registration and visualization of all process variables in an automatic and simultaneous way.

Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

Management, processing, comparison and storage of data.

Sampling velocity up to 250 KS/s (kilo samples per second).

Calibration system for the sensors involved in the process.

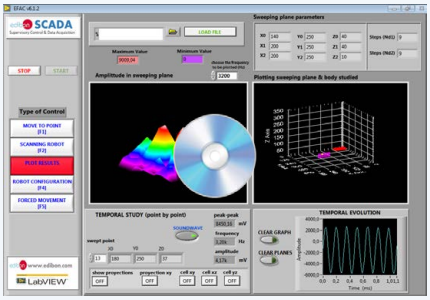
It allows the registration of the alarms state and the graphic representation in real time.

Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

Open software, allowing the teacher to modify texts, instructions.

Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.



FAC/CCSOF

Required elements (at least one) (Not included)

FOP. Optics Study Set

- Sensor:

  Sensor for the study of optics consisting of a diode capable of measuring light.

- Elements:

  - Magnifying glass with stand.
  - Torch with focusing head.
  - Base for the torch.
  - Two methacrylate plates.
  - LED panel.
  - Light diffuser for the panel.
  - Two methacrylate tanks.
  - Plane mirror.

The teacher can use any element suitable for OPTICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

FOP

Required elements (Not included):

- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) **FOP/CCSOF. Control Software + Data Acquisition + Data Management:**

The three softwares are part of the SCADA system.

Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. **Compatible with the industry standards.**

Registration and visualization of all process variables in an automatic and simultaneous way.

Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

Management, processing, comparison and storage of data.

Sampling velocity up to 250 KS/s (kilo samples per second).

Calibration system for the sensors involved in the process.

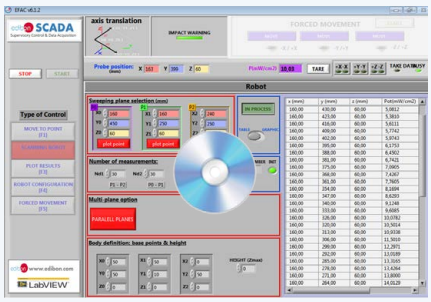
It allows the registration of the alarms state and the graphic representation in real time.

Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

Open software, allowing the teacher to modify texts, instructions.

Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.



FOP/CCSOF

Required elements (at least one) (Not included)

FTT. Thermodynamics Study Set.

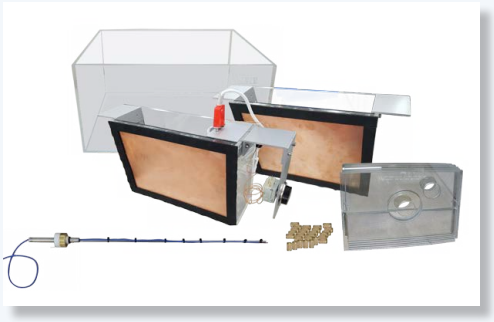
- Sensor:

  Temperature sensor: without the thermowell in a metal rod-shaped holder.

- Elements:

  - Experiment tank.
  - Cu tank with resistance inside (hot spot). The resistor will be directly connected to the mains (230 V).
  - Cu tank (cold focus).
  - Insulating plates: six vertical (250 x 110) and six horizontal (343 x 73).
  - Plate fixing nuts.

The teacher can use any element suitable for THERMODYNAMICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.



FTT

Required elements (Not included):

- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) **FTT/CCSOF. Control Software + Data Acquisition + Data Management:**

The three softwares are part of the SCADA system.

Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. **Compatible with the industry standards.**

Registration and visualization of all process variables in an automatic and simultaneous way.

Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

Management, processing, comparison and storage of data.

Sampling velocity up to 250 KS/s (kilo samples per second).

Calibration system for the sensors involved in the process.

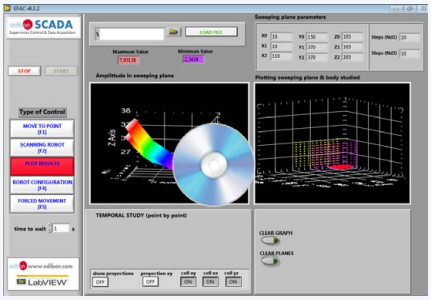
It allows the registration of the alarms state and the graphic representation in real time.

Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

Open software, allowing the teacher to modify texts, instructions.

Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.



FTT/CCSOF

Practical exercises to be done with the Electric Fields Study Set (FCE):

Level 1:

1.- Electric field created by two parallel flat sheets.

2.- Visualisation of the field lines created by a point charge.

3.- Spatial representation of the equipotential lines and the intensity of the electric field created by a point charge.

4.- Visualisation of the field lines generated by two point charges.

5.- Spatial representation of the equipotential curves created by two spherical charges.

Level 2:

6.- All those of level 1.

7.- Calculation of the charge enclosed by a plane-parallel capacitor. Gauss's theorem (I).

8.- Experimental demonstration of Gauss' law for a sphere and two conducting planes.

9.- Study of the charge stored in a plane-parallel capacitor as a function of the distance between the plates. Concept of capacitance.

10.- Experimental study of edge effects.

11.- Spatial representation of the equipotential lines created by a cylinder and a conductive plane. Principle of superposition (II).

12.- Spatial study of the electric field created by a non-regular body. Edge effects.

13.- Visualisation and calculations of the intensity of the electric field generated by a plane-parallel capacitor with a dielectric sphere inside it. Dielectric (I).

14.- Spatial representation of the electric field and equipotential lines generated by introducing a conducting sphere into a plane-parallel capacitor. Superposition principle (III).

15.- Electric field lines and equipotential surfaces generated by two conducting spheres equidistant from a conducting plane. Image effect.

16.- Experimental calculation of the redistribution of charge and potential energy of a series and parallel configuration of two plane-parallel capacitors.

IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Other possibilities to be done with this Unit:

17.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

18.- Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

19.- The Computer Control System with SCADA allows a real industrial simulation.

20.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

21.- This unit can be used for doing applied research.

22.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

23.- Control of the FCE unit process through the control interface box without the computer.

24.- Visualization of all the sensors values used in the FCE unit process.

- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Magnetic Field Study Set (FCM):

Level 1:

25.- Visualisation of the magnetic field lines generated by a magnet.

26.- Decay of the magnetic field.

27.- Three-dimensional representation of the magnetic field generated by a magnet.

28.- Magnetic field generated by two magnets. Spatial representation of the field lines and intensity.

29.- Magnetic field generated by parallel rectilinear conductors. Visualisation of field lines and calculation of magnetic intensity. Principle of superposition (I).

30.- Magnetic field generated by a loop. Three-dimensional representation of the intensity and visualisation of the field lines.

31.- Magnetic field generated by rectangular coils. Visualisation of field lines and calculation of the magnetic intensity. Superposition principle (I).

32.- Magnetic field generated by two loops crossed by currents in the same direction and in the opposite direction. Principle of Superposition (III).

33.- Magnetic field generated by a solenoid of N turns. Ampère's Law (II).

Level 2:

34.- All those of level 1.

35.- Sources of the magnetic field.

36.- Experimental demonstration of the existence of sources and sinks. Gauss's theorem.

37.- Helzmholtz coils. Three-dimensional study of the magnetic field.

38.- Magnetic field generated by a real coil.

39.- Magnetic field in matter.

IMPORTANT: **The teacher can use his own elements, therefore the practical possibilities are NEARLY UNLIMITED.**

Other possibilities to be done with this Unit:

40.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

41.- Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

42.- The Computer Control System with SCADA allows a real industrial simulation.

43.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

44.- This unit can be used for doing applied research.

45.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

46.- Control of the FCM unit process through the control interface box without the computer.

47.- Visualization of all the sensors values used in the FCM unit process.

- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Mechanics Study Set (FM):

Level 1:

48.- Calibration of the cameras.

49.- Guided horizontal movement analysis.

50.- Inclined plane movement analysis.

51.- Simple damped pendulum analysis.

52.- Circular damped pendulum movement analysis.

Level 2:

53.- All those of level 1.

54.- Calibration of the chambers.

IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Other possibilities to be done with this Unit:

55.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

56.- Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

57.- The Computer Control System with SCADA allows a real industrial simulation.

58.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

59.- This unit can be used for doing applied research.

60.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

61.- Control of the FM unit process through the control interface box without the computer.

62.- Visualization of all the sensors values used in the FM unit process.

- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Acoustics Study Set (FAC):

Level 1:

63.- Temporal visualisation of an acoustic wave.

64.- Three-dimensional study of an acoustic wave.

65.- Signal generated by two identical sources (Interference I).

66.- Acoustic attenuation produced by an obstacle.

67.- Wave fronts generator (Diffraction I).

68.- Spatial representation of an acoustic attenuation.

Level 2:

69.- All those of level 1.

70.- Experimental determination of the power of an acoustic emitter.

71.- Spatio-temporal study of the signal generated by two acoustic sources (Interference II).

72.- Acoustic media.

73.- Effects on the acoustic shielding of the wave frequency.

74.- Effects on the acoustic shielding of the amplitude of the wave.

75.- Effects of the wavelength on the diffraction phenomenon (Diffraction II).

76.- Diffraction-Interference.

IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Other possibilities to be done with this Unit:

77.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

78.- Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

79.- The Computer Control System with SCADA allows a real industrial simulation.

80.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

81.- This unit can be used for doing applied research.

82.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

83.- Control of the FAC unit process through the control interface box without the computer.

84.- Visualization of all the sensors values used in the FAC unit process.

- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Optics Study Set (FOP):

Level 1:

85.- Determination of beam divergence.

86.- Focusing point of the torch beam.

87.- Analysis of intensity loss with distance.

88.- Phenomenon of reflection.

89.- Transmission.

90.- Variation of the luminosity with methacrylate without inclination.

91.- Variation of the luminosity on having fallen with an angle on the methacrylate.

92.- Refraction.

93.- Influence of the medium in the refraction.

94.- Calculation of the focal length of a lens (magnifying glass).

Level 2:

95.- All those of level 1.

96.- Luminosity analysis.

IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Other possibilities to be done with this Unit:

97.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

98.- Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

99.- The Computer Control System with SCADA allows a real industrial simulation.

100.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

101.- This unit can be used for doing applied research.

102.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

103.- Control of the FOP unit process through the control interface box without the computer.

104.- Visualization of all the sensors values used in the FOP unit process.

- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Thermodynamics Study Set (FTT):

Level 2:

105.- Determination of temperature distribution in a water tank.

106.- Temperature distribution in the presence of hot and cold focus. Dependence on the temperature difference.

107.- Temperature distribution in the presence of a hot and a cold source. Dependence with the distance between them.

108.- Temperature distribution in the presence of hot and cold sources. Dependence on their position and geometry.

IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED**.

Other possibilities to be done with this Unit:

109.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

110.- Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

111.- The Computer Control System with SCADA allows a real industrial simulation.

112.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

113.- This unit can be used for doing applied research.

114.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

115.- Control of the FTT unit process through the control interface box without the computer.

116.- Visualization of all the sensors values used in the FTT unit process.

- 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.
- Workbench with a minimum of 1 m^2 of free surface.
- Computer.

DIMENSIONS AND WEIGHTS

EFAC:

FUB:
- Dimensions: 1020 x 1250 x 890 mm approx. (40.15 x 49.21 x 35.03 inches approx.)
- Weight: 80 Kg approx. (110.2 pounds approx.)

FCE:
- Dimensions: 500 x 300 x 300 mm approx. (19.68 x 11.81 x 11.81 inches approx.)
- Weight: 8 Kg approx. (17 pounds approx.)

FCM:
- Dimensions: 500 x 300 x 300 mm approx. (19.68 x 11.81 x 11.81 inches approx.)
- Weight: 8 Kg approx. (17 pounds approx.)

FM:
- Dimensions: 500 x 300 x 300 mm approx. (19.68 x 11.81 x 11.81 inches approx.)
- Weight: 8 Kg approx. (17 pounds approx.)

FAC:
- Dimensions: 500 x 300 x 300 mm approx. (19.68 x 11.81 x 11.81 inches approx.)
- Weight: 8 Kg approx. (17 pounds approx.)

FOP:
- Dimensions: 500 x 300 x 300 mm approx. (19.68 x 11.81 x 11.81 inches approx.)
- Weight: 8 Kg approx. (17 pounds approx.)

FTT:
- Dimensions: 500 x 300 x 300 mm approx. (19.68 x 11.81 x 11.81 inches approx.)
- Weight: 8 Kg approx. (17 pounds approx.)

Control Interface Box:
- Dimensions: 490 x 330 x 310 mm approx. (19.29 x 17.71 x 18.50 inches approx.)
- Weight: 10 Kg approx. (22 pounds approx.)

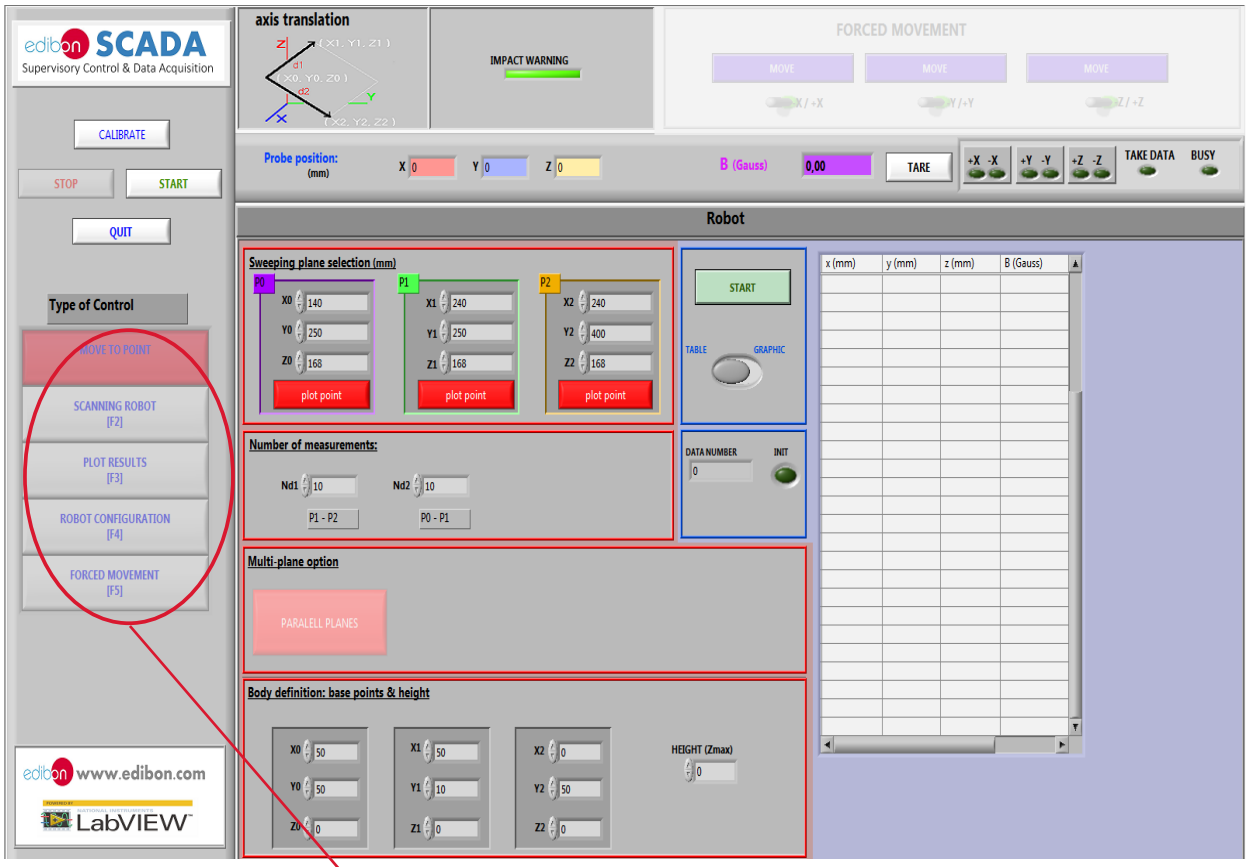
REQUIRED ELEMENTS (Not included)

Required (at least one):

- FCE. Electric Fields Study Set.
- FCM. Magnetic Field Study Set.
- FM. Mechanics Study Set
- FAC. Acoustics Study Set.
- FOP. Optics Study Set.
- FTT. Thermodynamics Study Set.

SCADA
Main screens

Example: FCM. Magnetic Fields Set

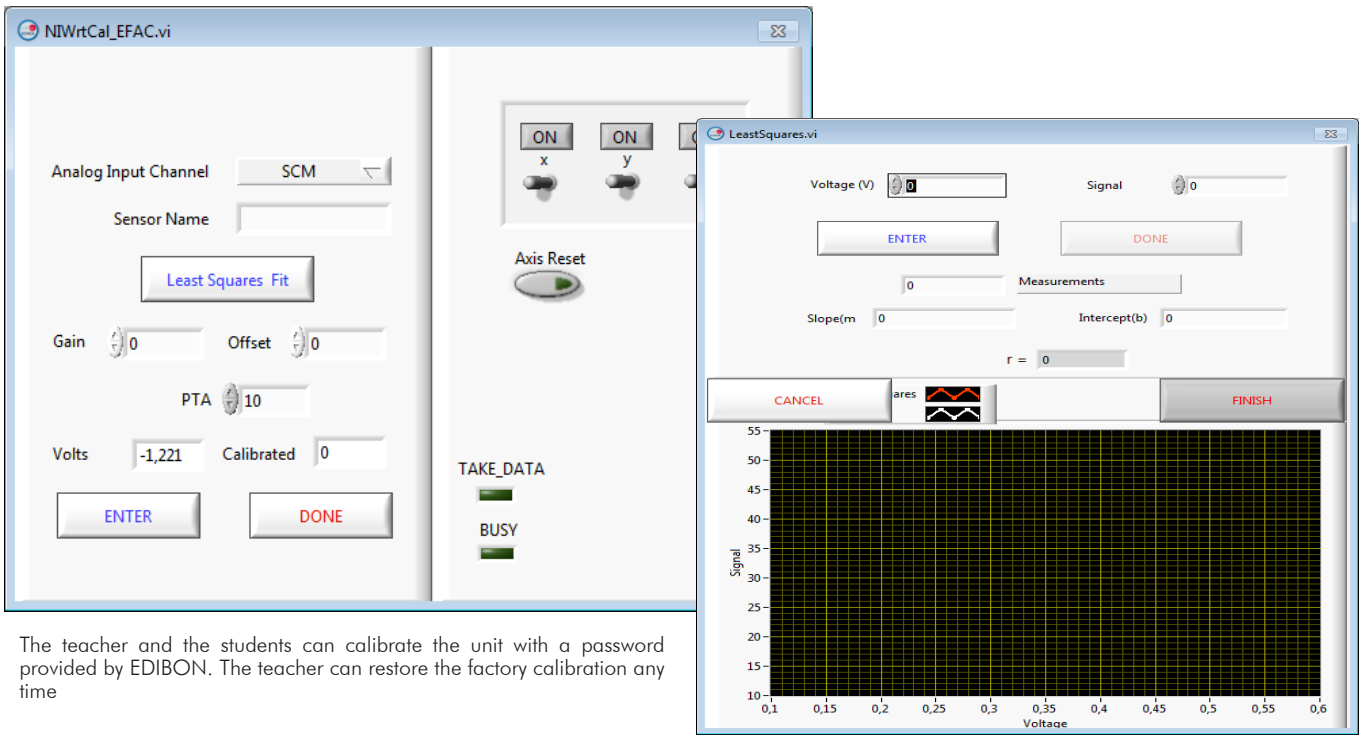


Control type menu.

It this menu we can see several selectionable parts, that are shown in the following screens:

Software for Sensors Calibration

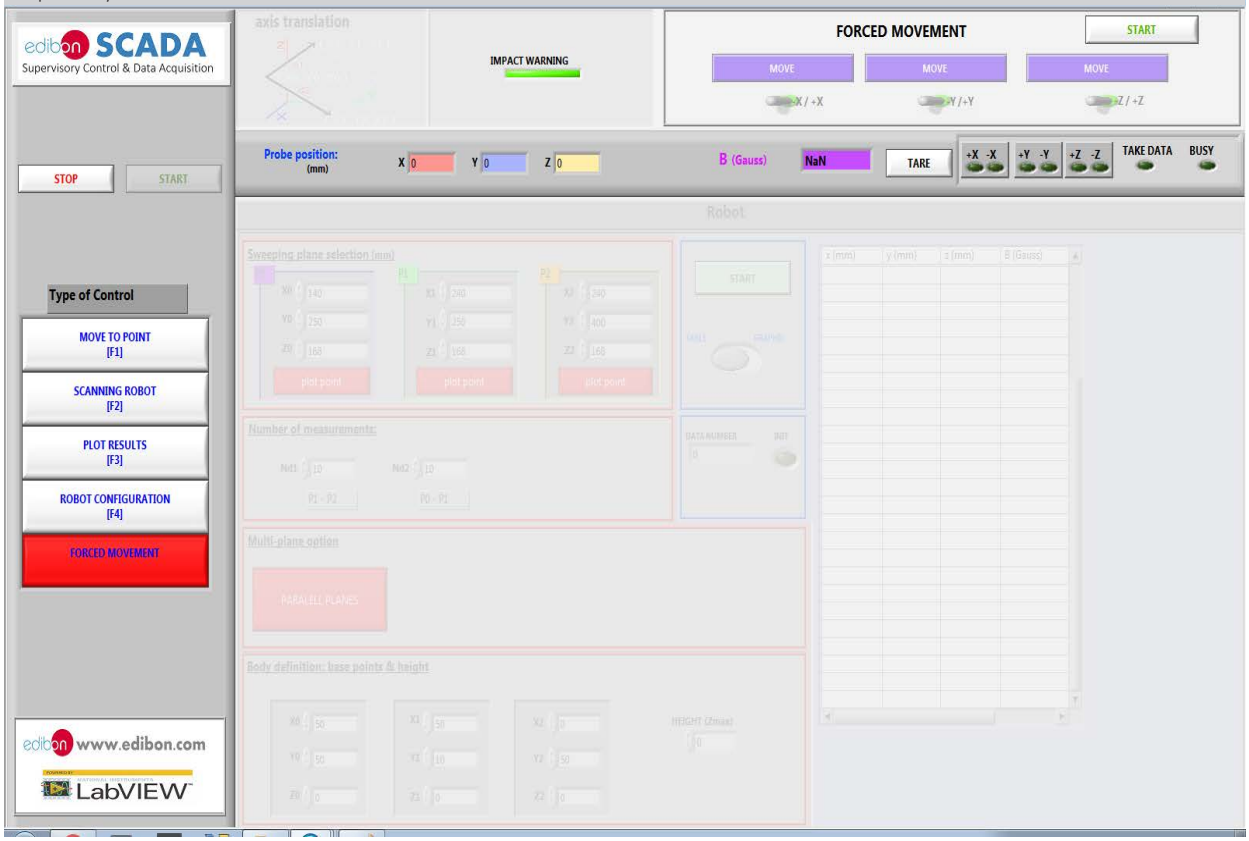
Example of screen



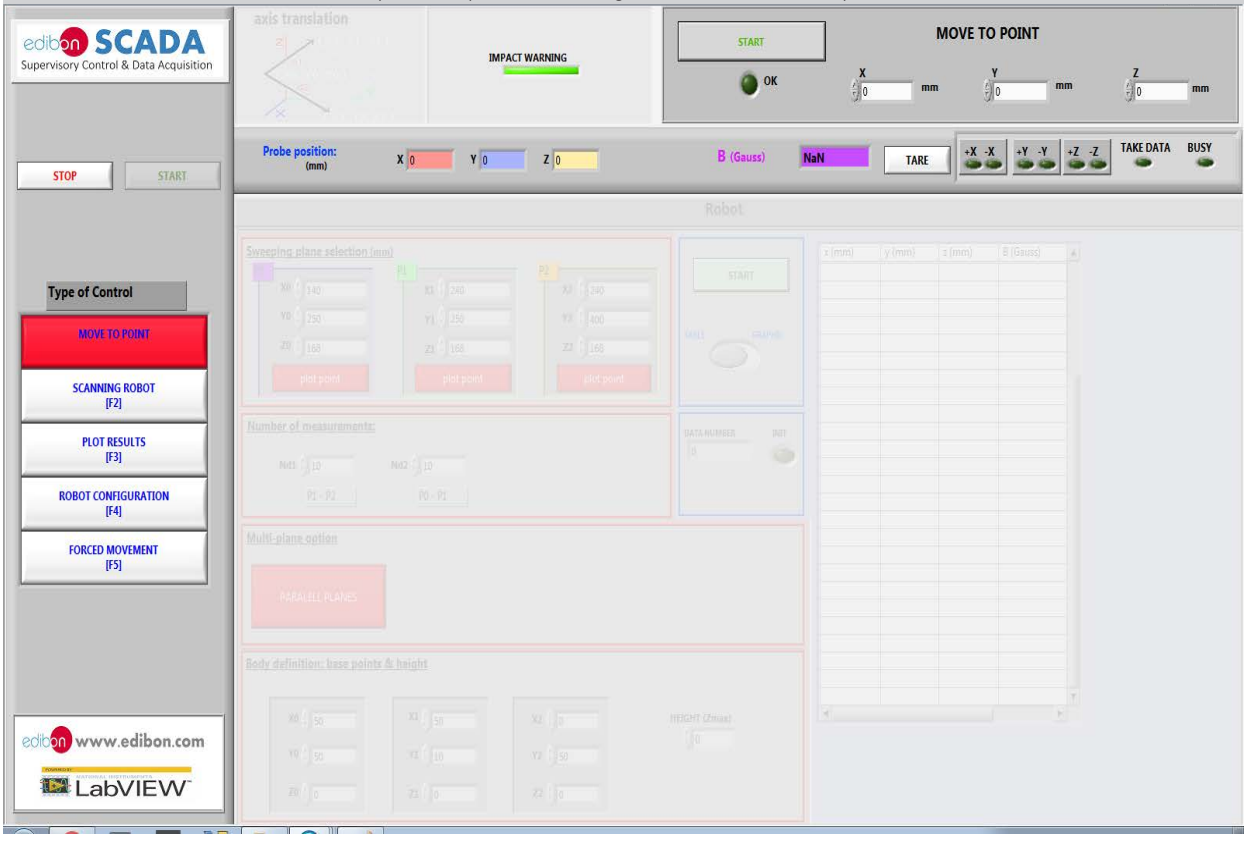
The teacher and the students can calibrate the unit with a password provided by EDIBON. The teacher can restore the factory calibration any time

Example: FCM. Magnetic Fields Set

Screen "Force mode".
We click on "Start" to start the force movement of any axis. We can activate each axis and indicate the movement direction of each axis respectively.

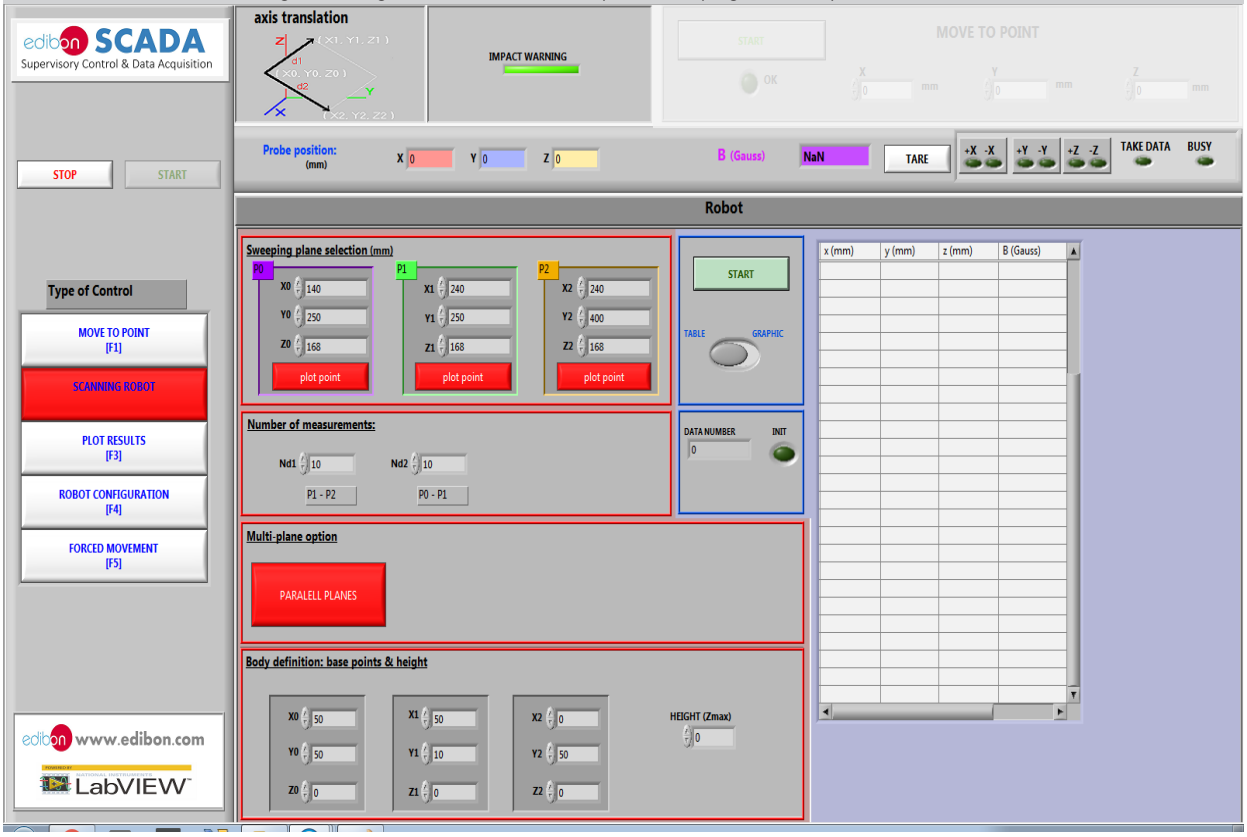


Screen "Move to a point".
In this mode we can move the robot to a particular point, introducing the coordinate in the x, y, z controls.

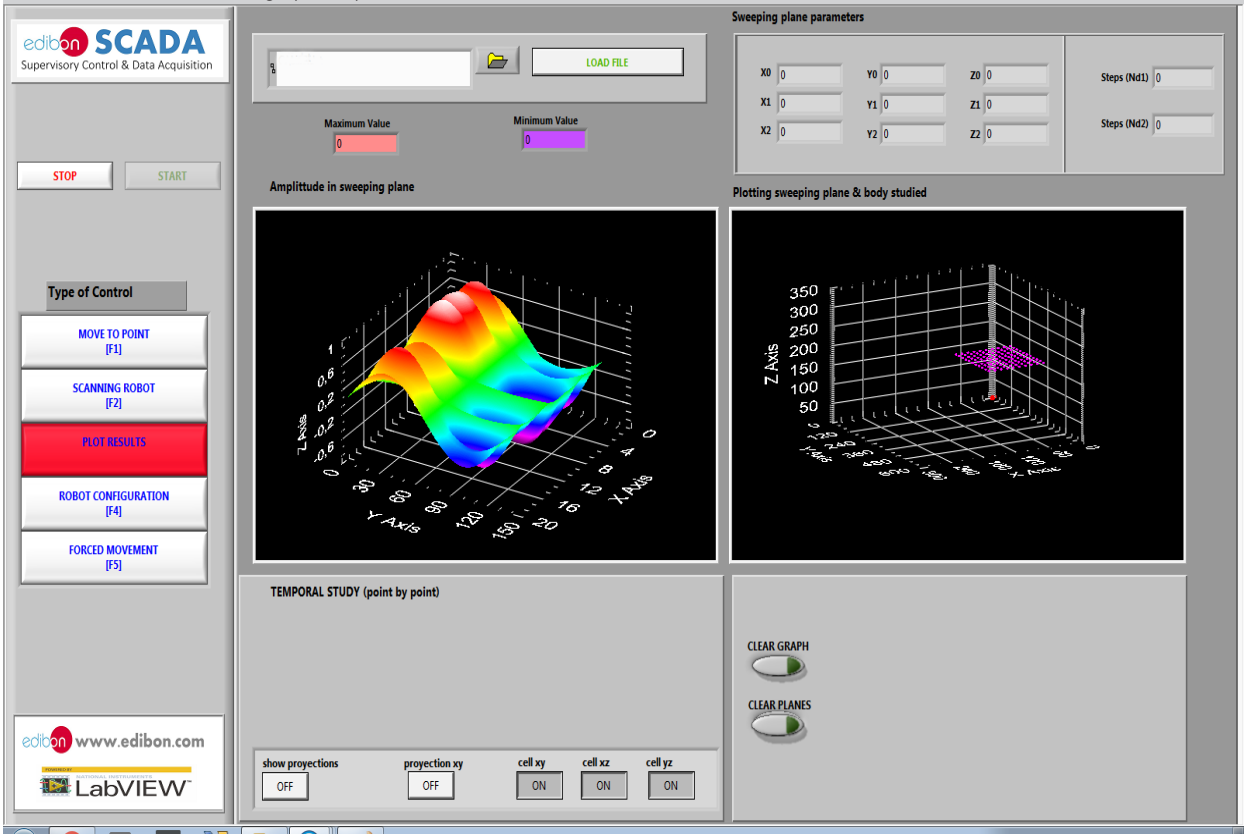


Example: FCM. Magnetic Fields Set

Screen "Sweep mode".
We activate this mode selecting "Scanning robot". In this mode, a plane sweeping defined by 3 coordinates will be executed.

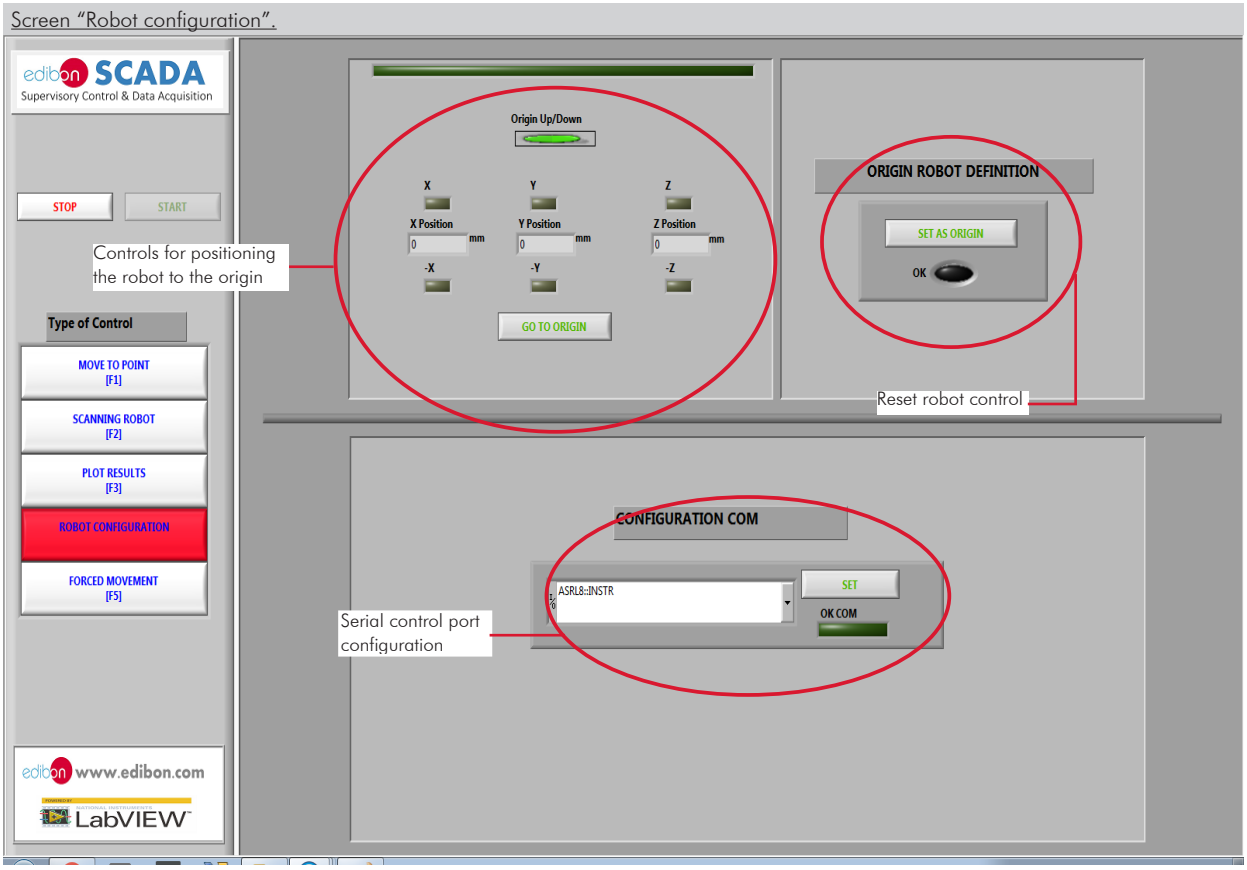


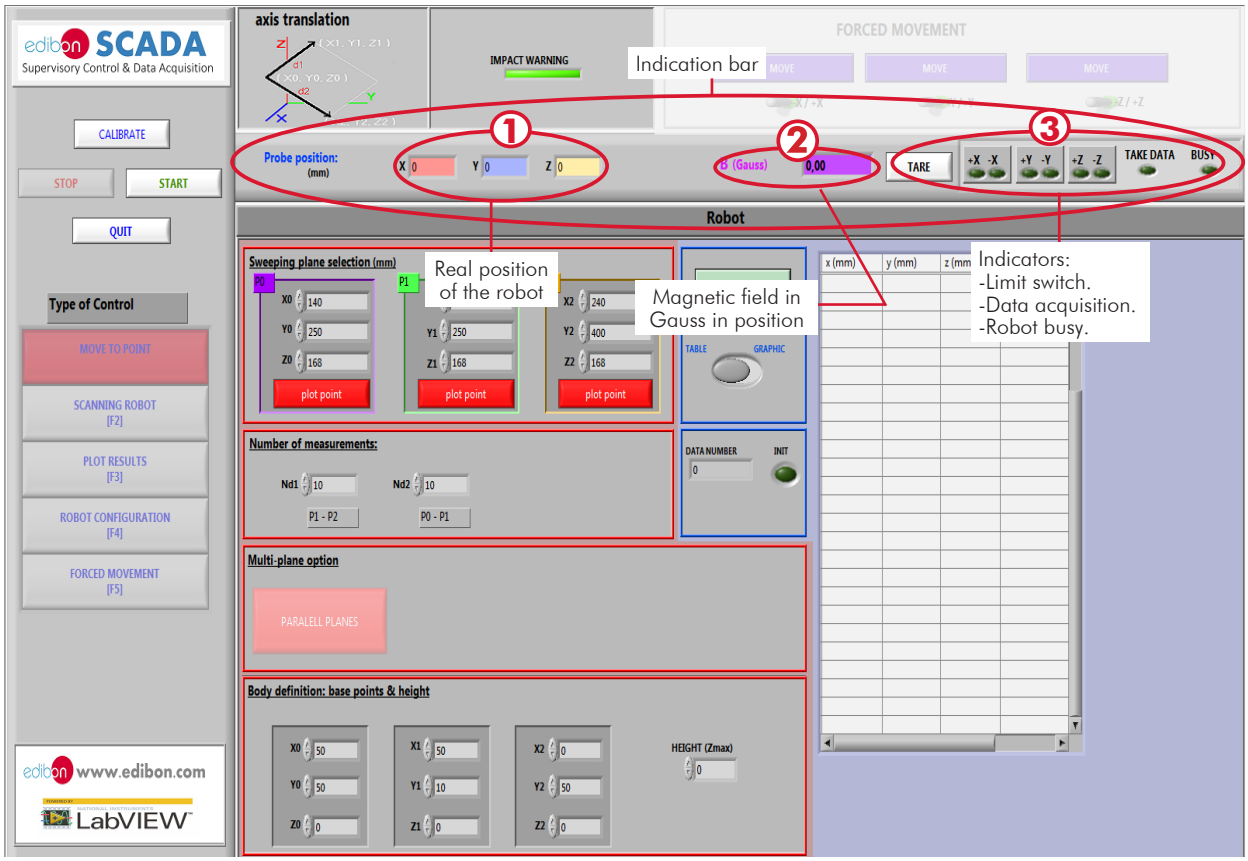
Screen "Graphical result".
In this mode we can see the graphic representation in 3D of obtained data.



Example: FCM. Magnetic Fields Set

Screen "Robot configuration".



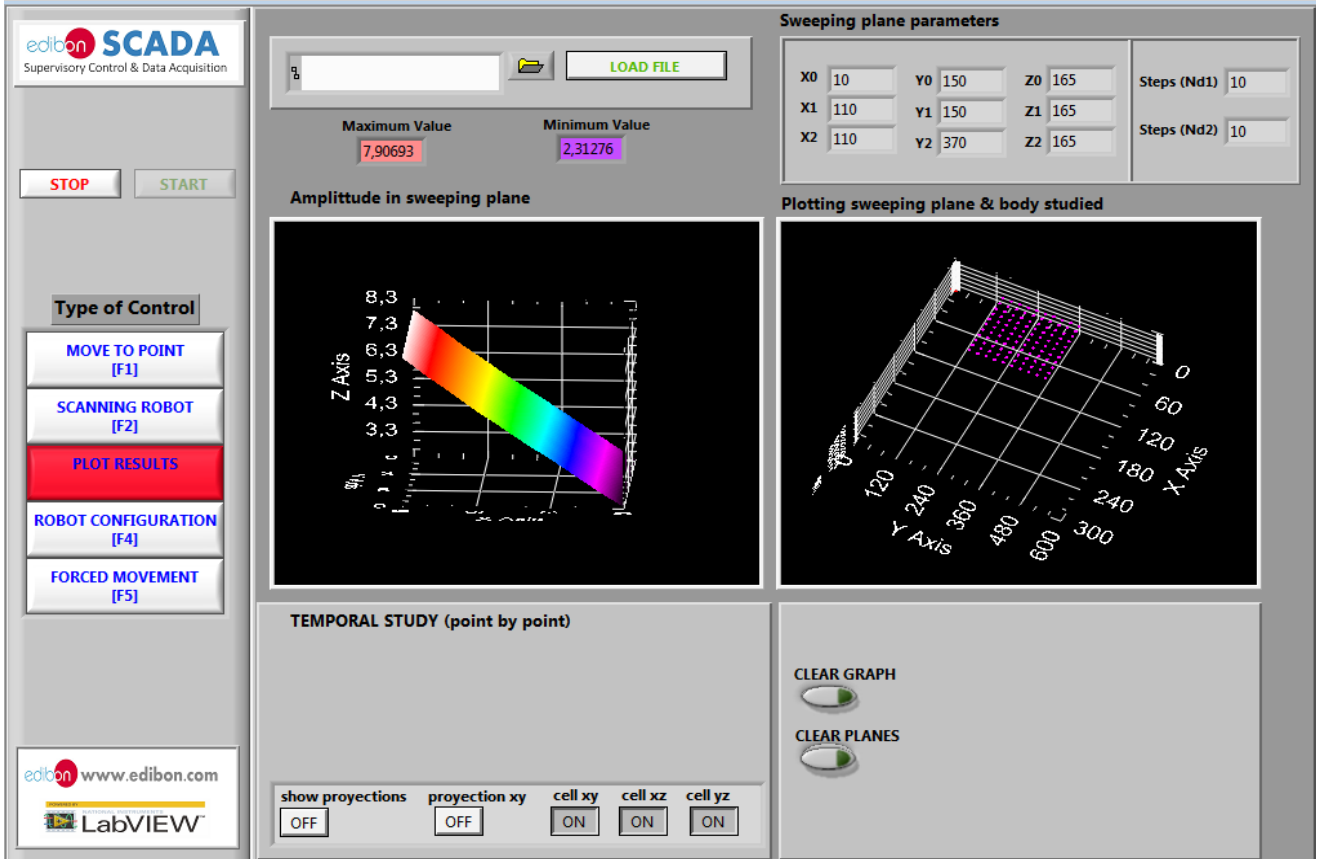


In several modes, we can see a indication bar in the middle of the screen. This bar has several indicators:

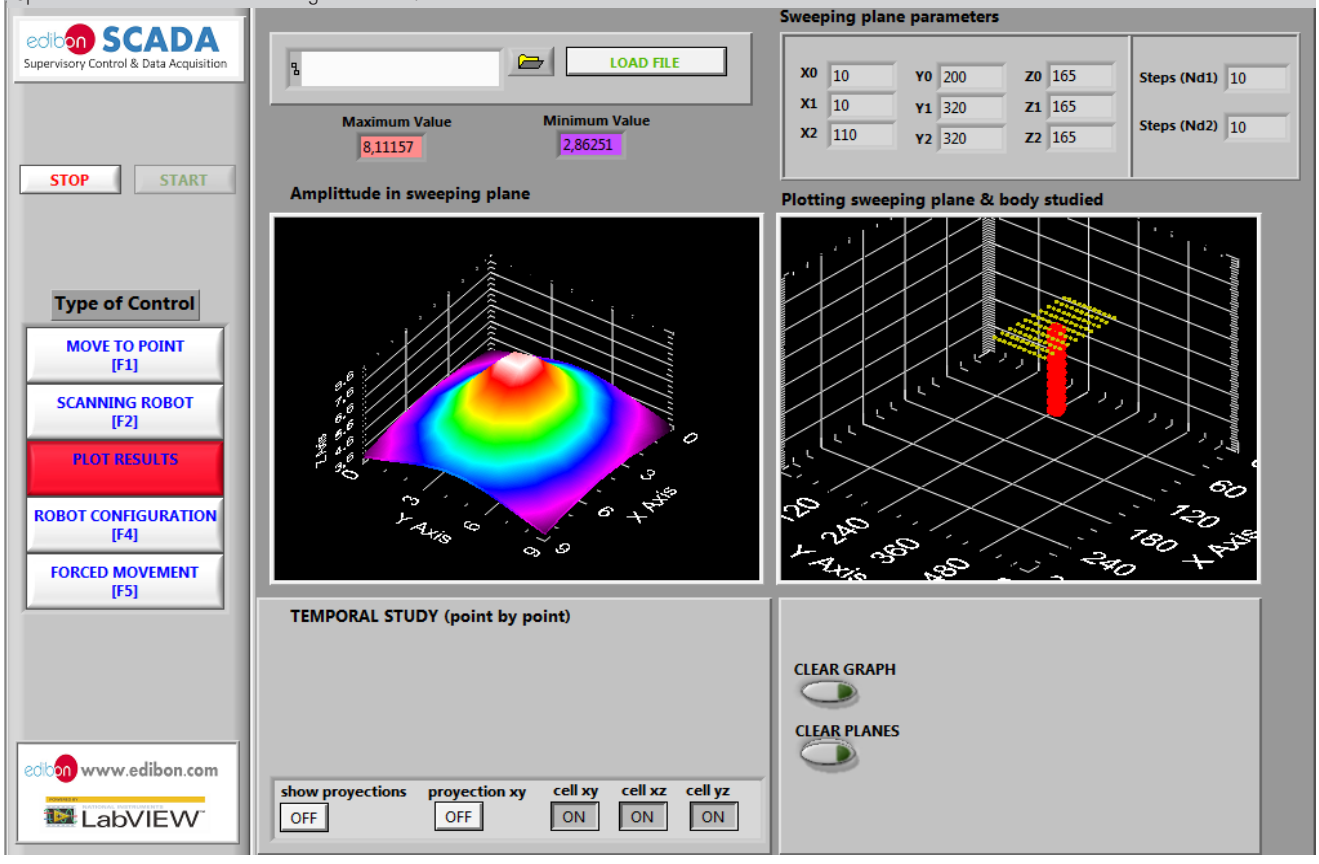
1) Actual robot position indicator, shown in millimeters.
2) Magnetic field indicator in actual robot position
3) Led indicator for limit switch of the corresponding axis. LED indicator for data taking (the robot indicates to the software when it has to take a right data). LED indicator for busy robot.

FCE. Electric Fields Study Set

Planes at the end of the tank, one of them ground and the other 10 V.

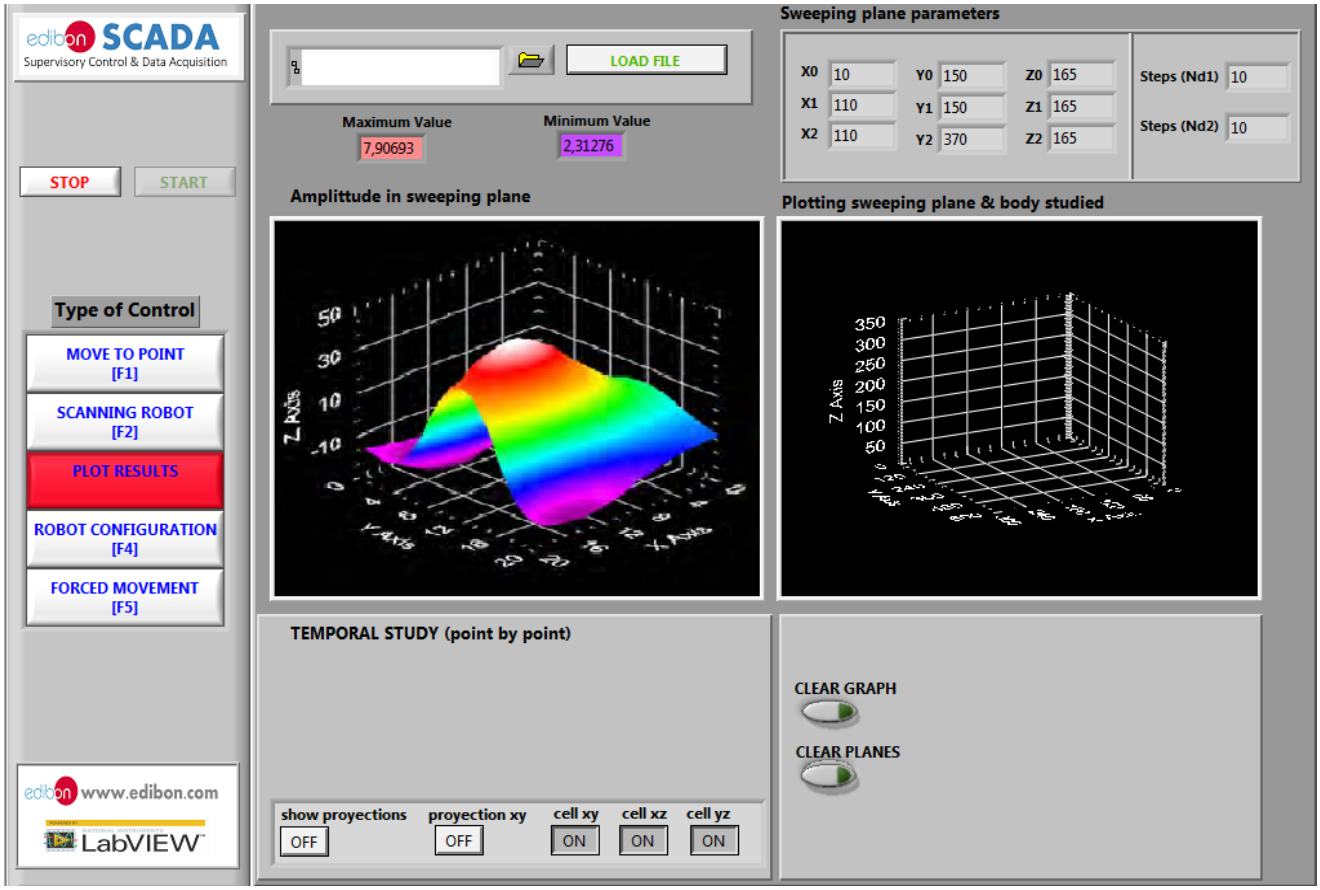


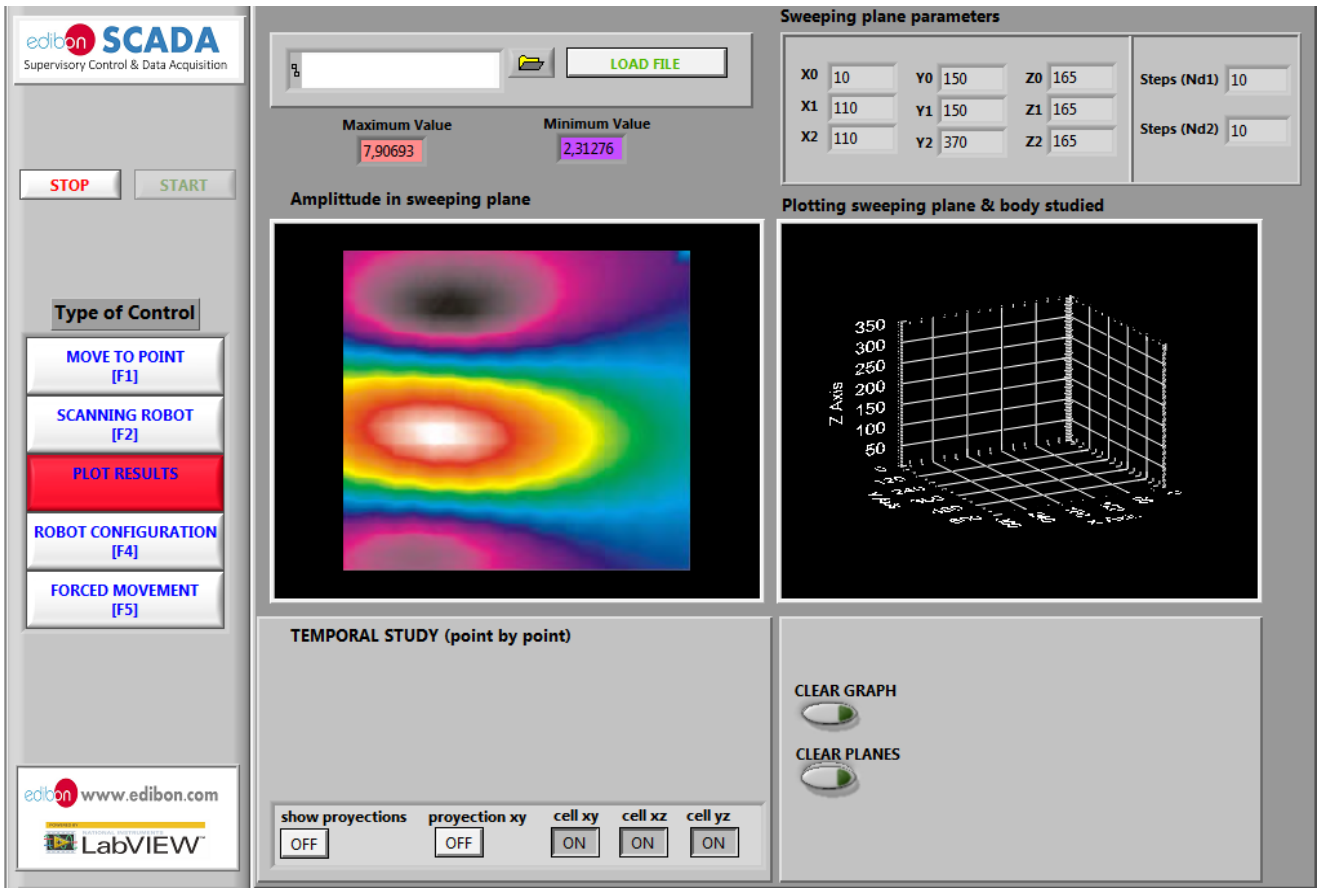
Planes at the end of the tank and charged ground.
Sphere at x60 and 260 and charged to 10 V.



Some **real** results obtained from this unit

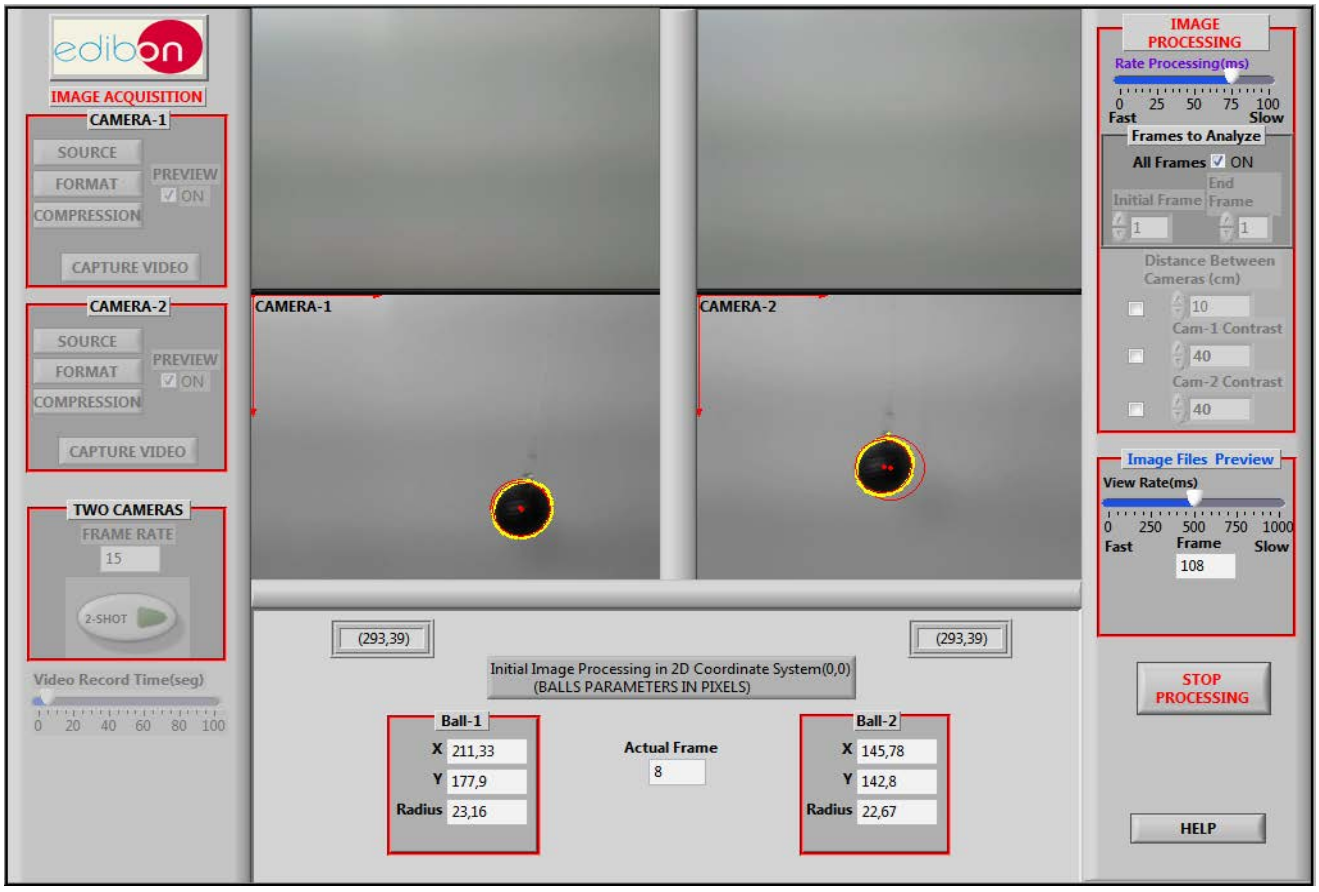
FCM. Magnetic Field Study Set

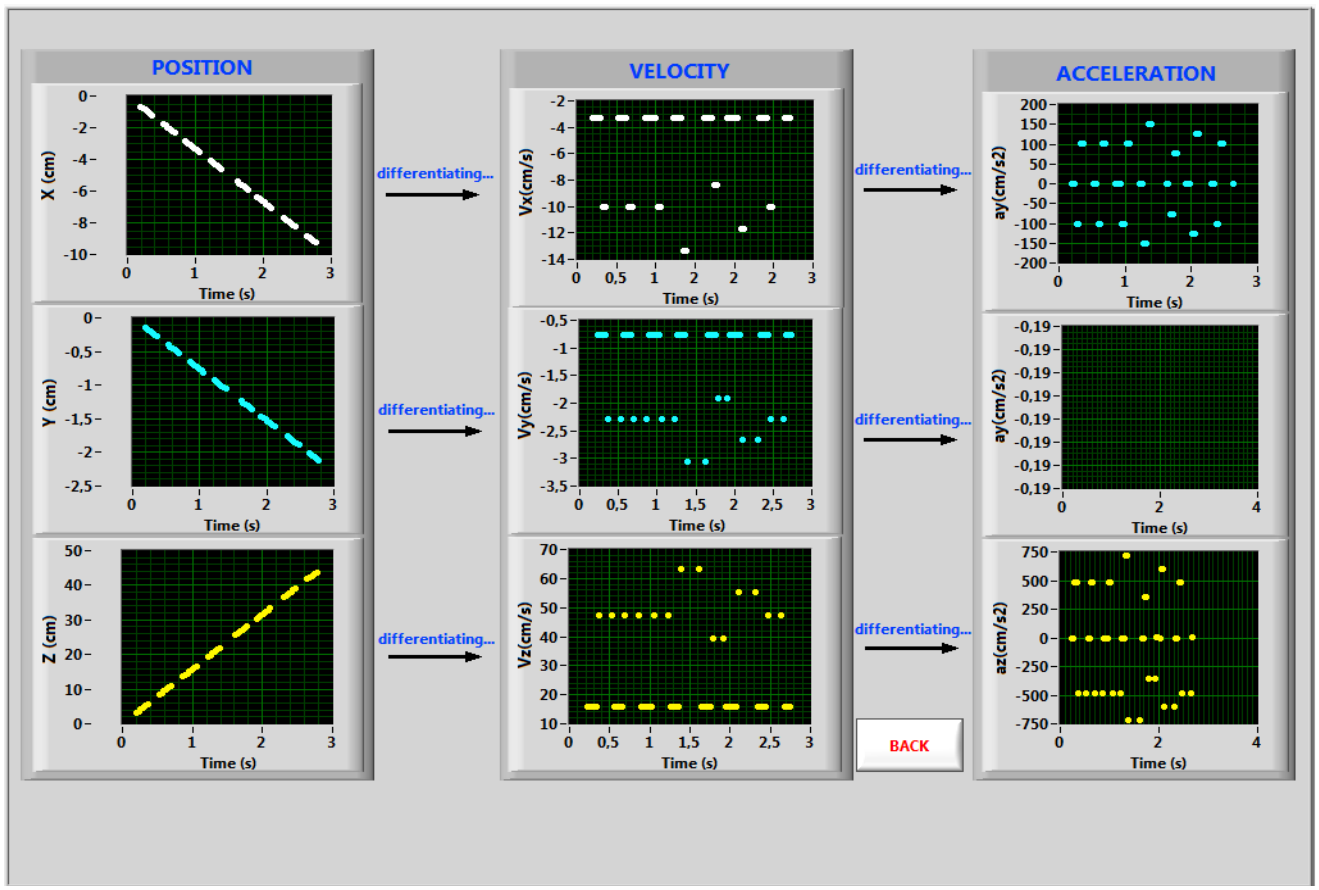




Some **real** results obtained from this unit

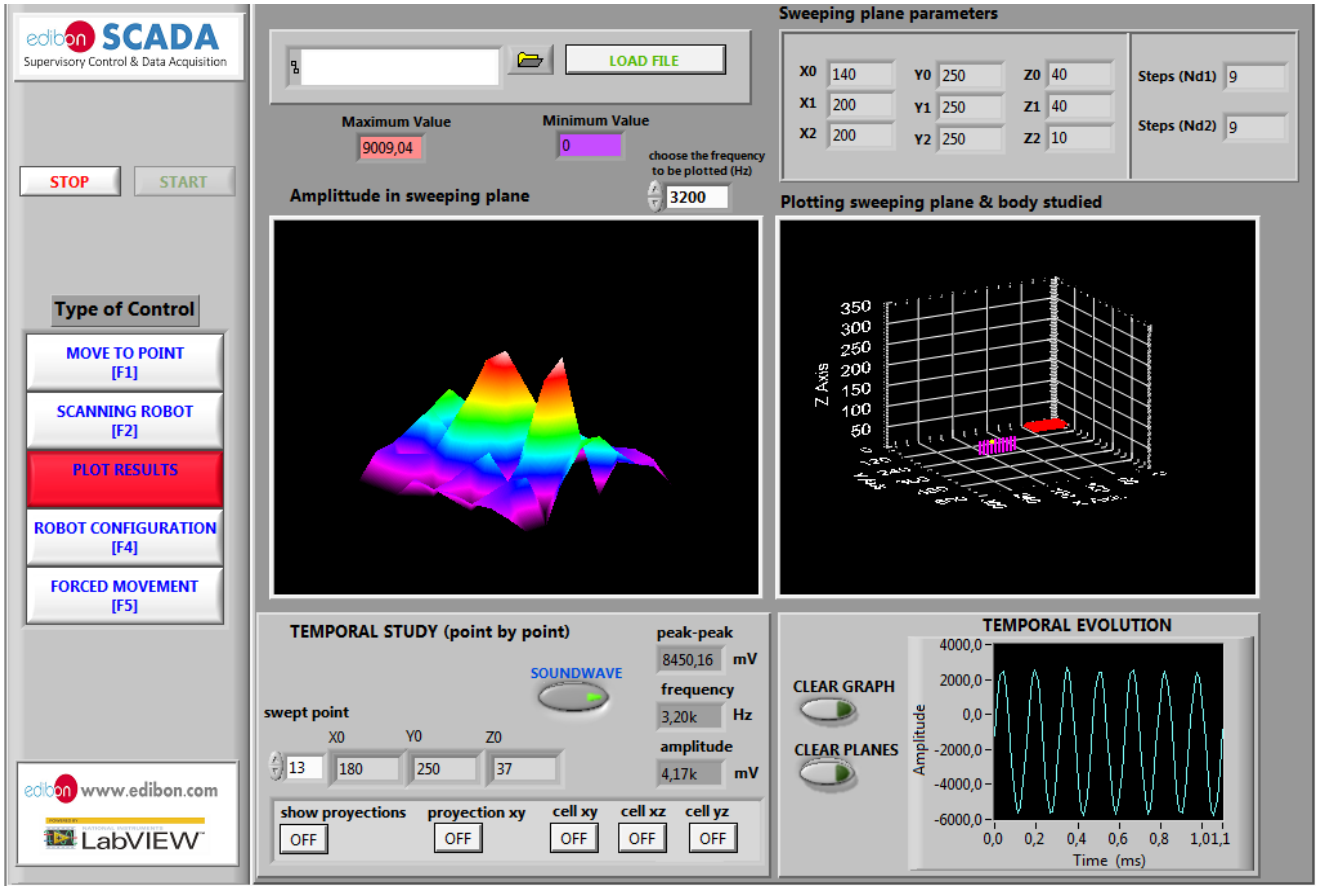
FM. Mechanics Study Set



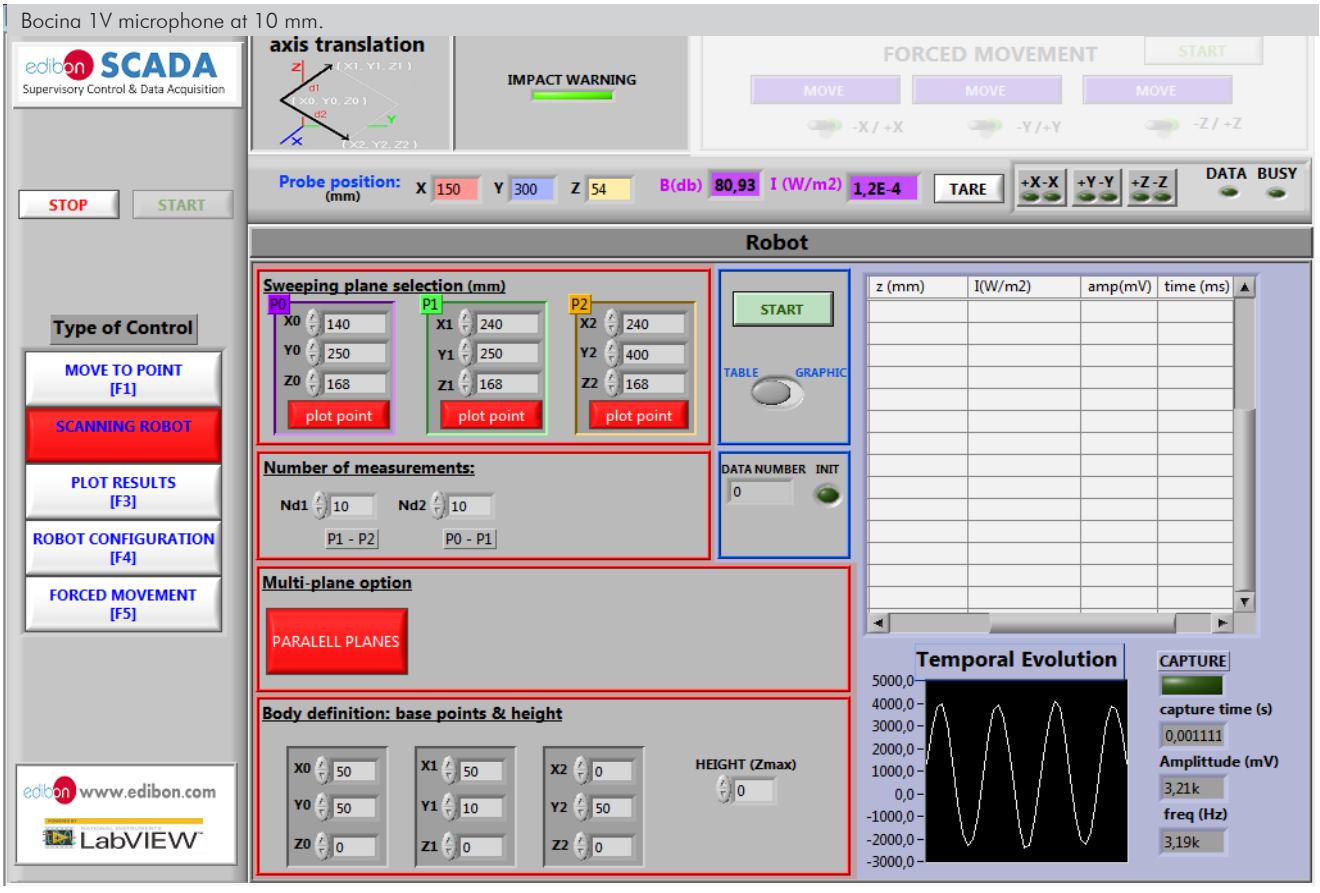


Some **real** results obtained from this unit

FAC. Acoustics Study Set

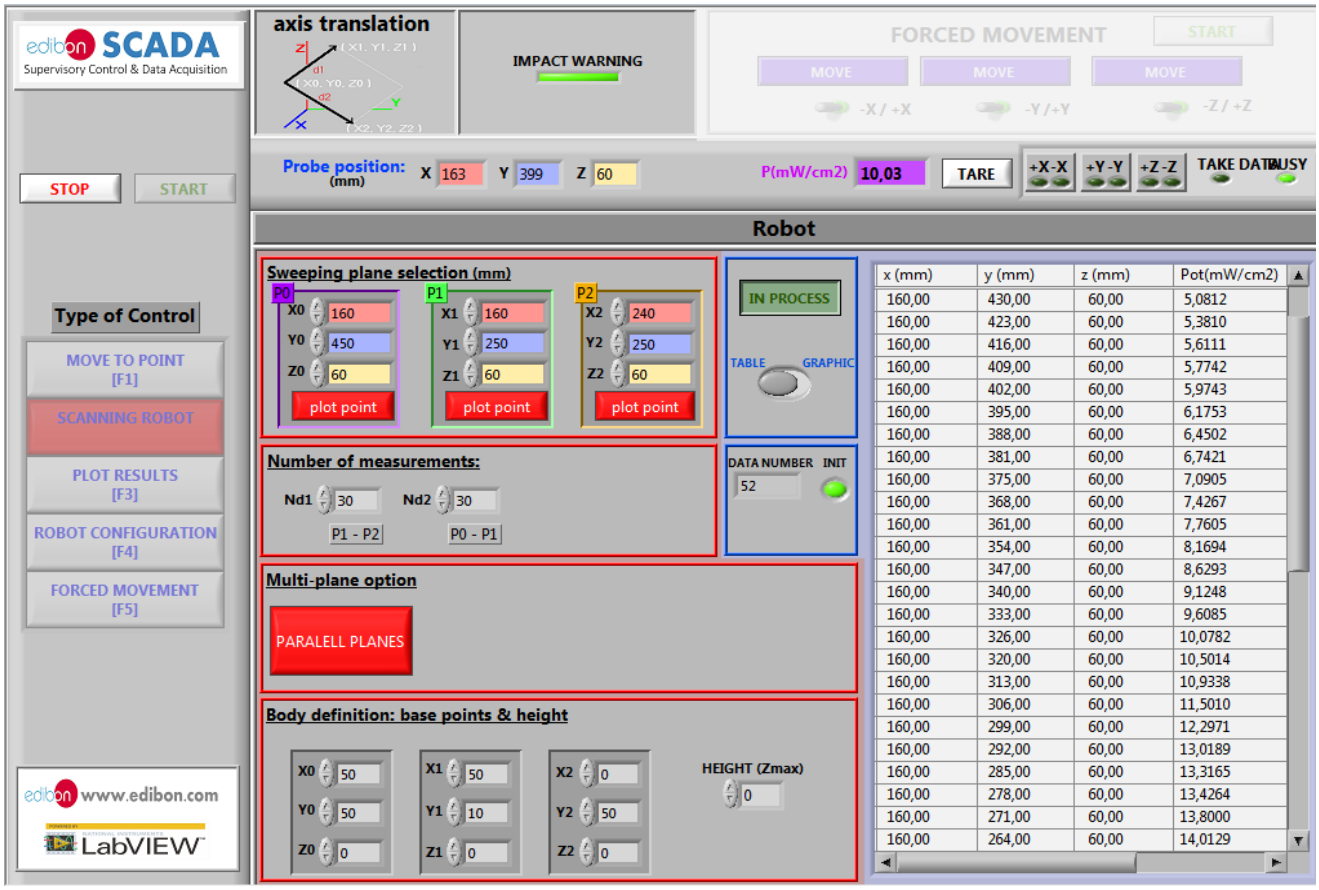


Bocina 1V microphone at 10 mm.

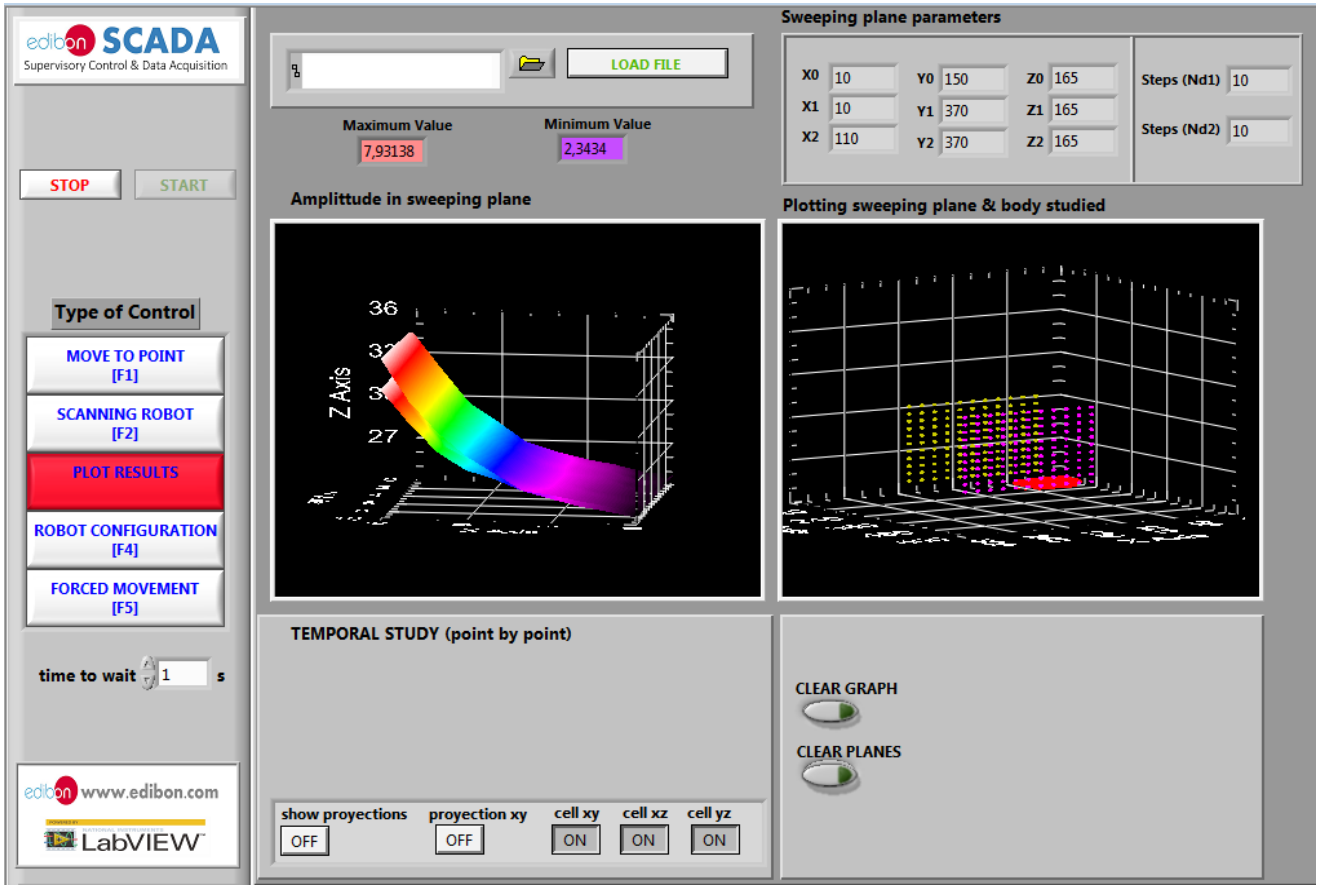


Some **real** results obtained from this unit

FOP. Optics Study Set

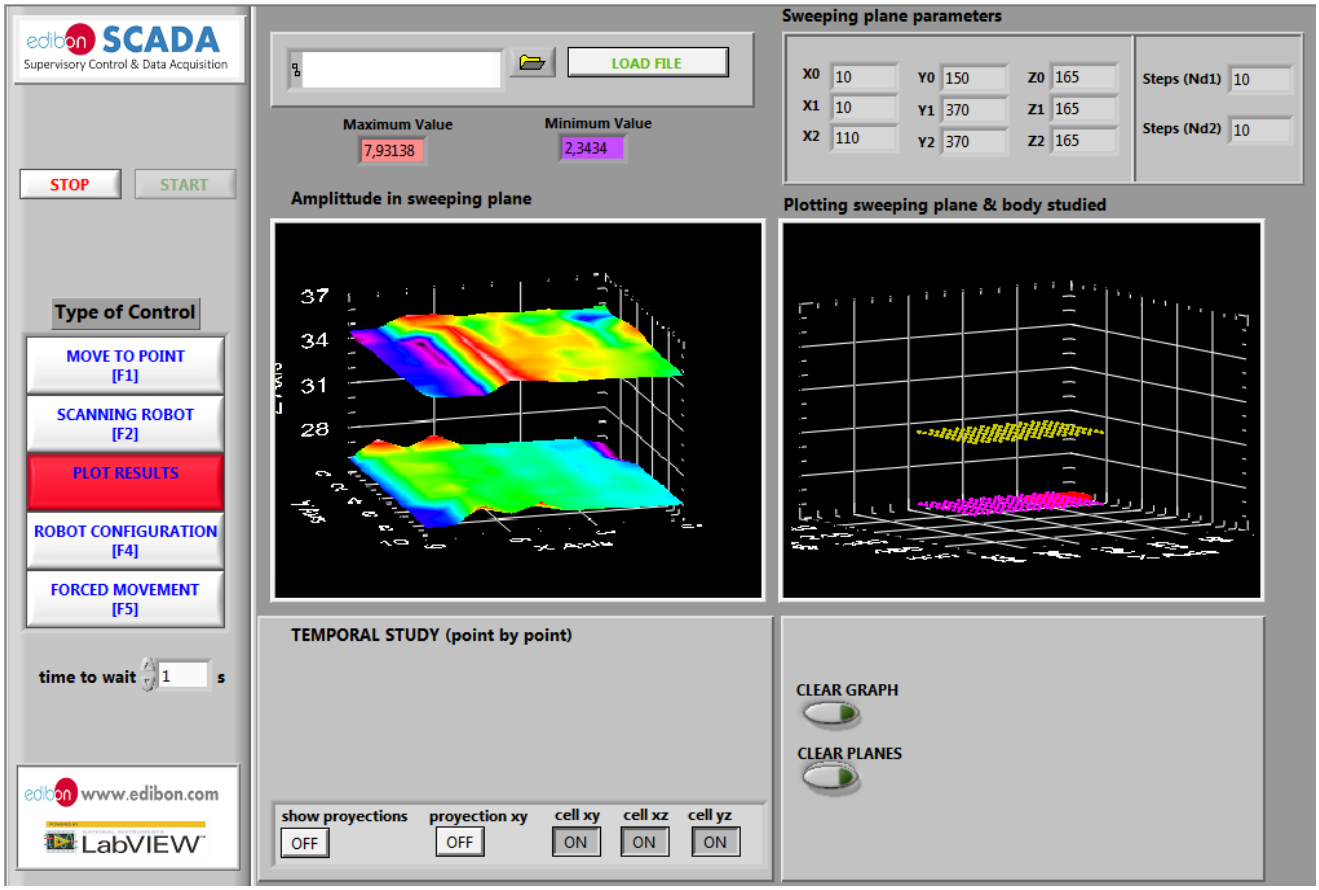


FTT. Thermodynamics Study Set



Some **real** results obtained from this unit

FTT. Thermodynamics Study Set



Additionally to the main items (1 to 5) described, we can offer, as optional, other items from 6 to 9.
All these items try to give more possibilities for:

a) Technical and Vocational Education configuration. (ICAI and FSS)
b) Multipost Expansions options. (MINI ESN and ESN)

a) Technical and Vocational Education configuration

⑥ EFAC/ICAI. Interactive Computer Aided Instruction Software.

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.

This software is optional and can be used additionally to items (1 to 5).

- 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.**

- 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.

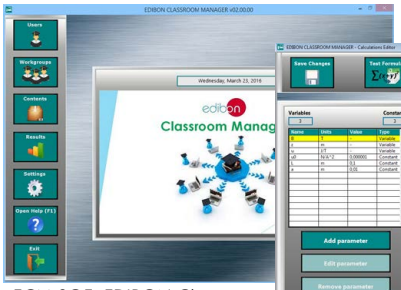
Innovative features:

- **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.**

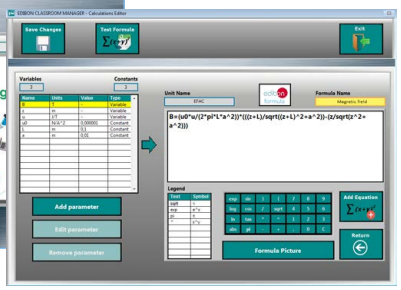
For more information see **ICAI** catalogue. Click on the following link:

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

Instructor Software

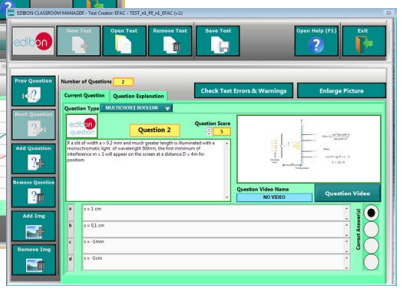


ECM-SOF. EDIBON Classroom Manager (Instructor Software) Application Main Screen



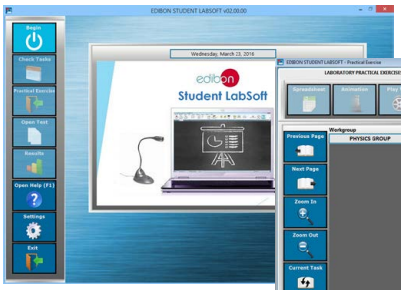
ECAL. EDIBON Calculations Program Package - Formula Editor Screen

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

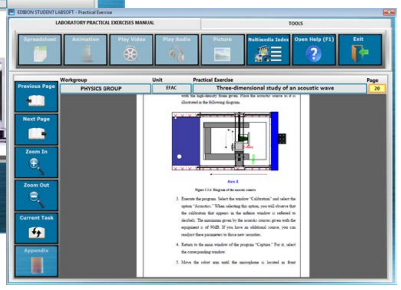


ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

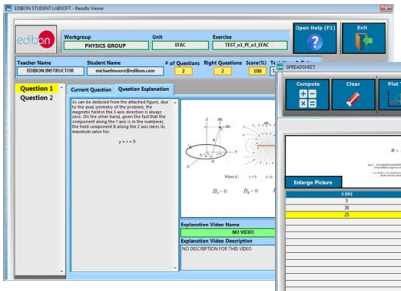
Student Software



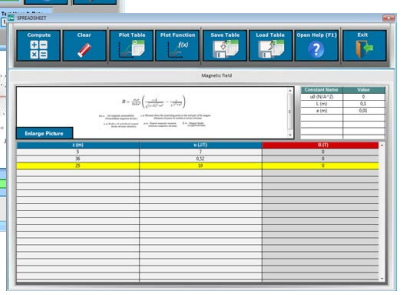
ESL-SOF. EDIBON Student LabSoft (Student Software) Application Main Screen



EPE. EDIBON Practical Exercise Program Package Main Screen



ERS. EDIBON Results & Statistics Program Package - Question Explanation



ECAL. EDIBON Calculations Program Package Main Screen

⑦ EFAC/FSS. Faults Simulation System.

Faults Simulation System (FSS) is a Software package that simulates several faults in any EDIBON Computer Controlled Unit. It is useful for Technical and Vocational level.

The "FAULTS" mode consists in causing several faults in the unit normal operation. The student must find them and solve them. There are several kinds of faults that can be grouped in the following sections:

Faults affecting the sensors measurement:

- **An incorrect calibration is applied to them.**
- **Non-linearity.**

Faults affecting the actuators:

- **Actuators channels interchange at any time during the program execution.**
- **Response reduction of an actuator.**

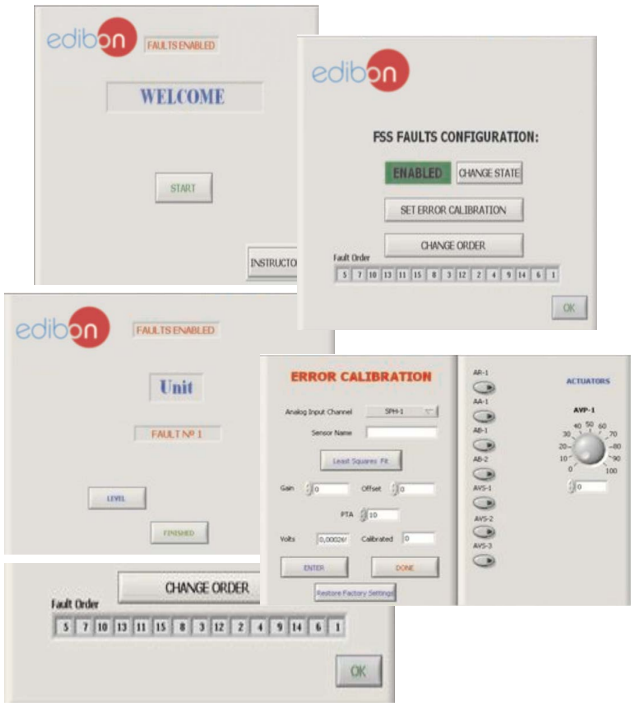
Faults in the controls execution:

- **Inversion of the performance in ON/OFF controls.**
- **Reduction or increase of the calculated total response.**
- **The action of some controls is annulled.**

On/off faults:

- **Several on/off faults can be included.**

Example of some screens



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

www.edibon.com/en/fault-simulation-system

b) Multipost Expansions options

⑧ MINI ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.

MINI ESN. EDIBON Mini Scada-Net System allows up to 30 students to work with a Teaching Unit in any laboratory, simultaneously. It is useful for both, Higher Education and/or Technical and Vocational Education.

The MINI ESN system consists of the adaptation of any EDIBON Computer Controlled Unit with SCADA integrated in a local network.

This system allows to view/control the unit remotely, from any computer integrated in the local net (in the classroom), through the main computer connected to the unit. Then, the number of possible users who can work with the same unit is higher than in an usual way of working (usually only one).

Main characteristics:

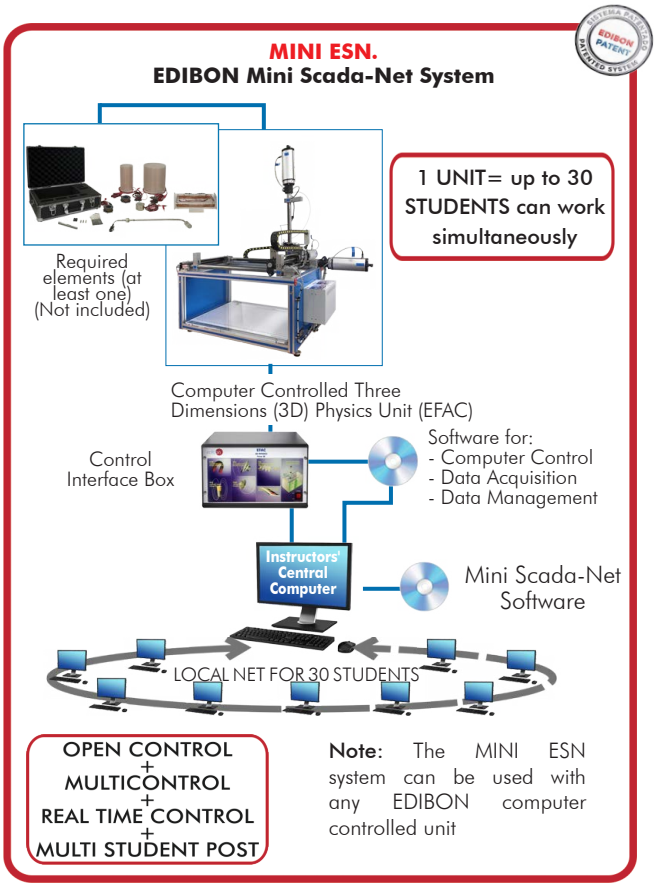
- **It allows up to 30 students to work simultaneously with the EDIBON Computer Controlled Unit with SCADA, connected in a local net.**
- **Open Control + Multicontrol + Real Time Control + Multi Student Post.**
- **Instructor controls and explains to all students at the same time.**
- **Any user/student can work doing "real time" control/multicontrol and visualisation.**
- **Instructor can see in the computer what any user/student is doing in the unit.**
- **Continuous communication between the instructor and all the users/students connected.**

Main advantages:

- **It allows an easier and quicker understanding.**
- **This system allows you can save time and cost.**
- **Future expansions with more EDIBON Units.**

For more information see **MINI ESN** catalogue. Click on the following link:

www.edibon.com/en/edibon-scada-net



⑨ ESN. EDIBON Scada-Net Systems.

This unit can be integrated, in the future, into a Complete Laboratory with many Units and many Students.

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

www.edibon.com/en/edibon-scada-net

Main items (always included in the supply)

Minimum supply always includes:

①**FUB. Base Frame and Robot for EFAC.**

②**EFAC/CIB. Control Interface Box.** (Can work with the required elements (at least one) (Not included).

③**DAB. Data Acquisition Board.** (Common for the required elements (at least one) (Not included).

④**Cables and Accessories**, for normal operation.

⑤**Manuals.**

Required elements (at least one) to be used with the Base Frame and Robot for EFAC "FUB":

FCE. Electric Fields Study Set. (+)
FCM. Magnetic Field Study Set. (+)
FM. Mechanics Study Set. (+)
FAC. Acoustics Study Set. (+)
FOP. Optics Study Set. (+)
FTT. Thermodynamics Study Set. (+)

*IMPORTANT: Under FUB we always supply all the elements for immediate running as 1, 2, 3, 4 and 5.

**IMPORTANT: Under EFAC/T we always supply all the elements for immediate running as 1, 2, 3, 4, 5 and all required elements.

Optional items (supplied under specific order)

a) Technical and Vocational Education configuration

⑥ EFAC/ICAI. Interactive Computer Aided Instruction Software.

⑦ EFAC/FSS. Faults Simulation System.

b) Multipost Expansions options

⑧ MINI ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.

⑨ ESN. EDIBON Scada-Net Systems.

①FUB. Base Frame and Robot for EFAC:

This unit is required for the use of all type sets "F" and can work with one or several sets.
Anodized aluminum frame and panels made of painted steel.
Cartesian robot, controlled by three motors:
Movement in the X, Y and Z axes.
Support for the different sensors.
Robot arm, computer controlled, with a sweeping area.
Electronic box for the motors multiplexing. This Electronic box is controlled by a PLC allocated into the Control Interface Box.
Cables.
The complete unit includes as well:

Advanced Real-Time SCADA.
Open Control + Multicontrol + Real-Time Control.
Specialized EDIBON Control Software based on LabVIEW.
National Instruments Data Acquisition board (250 KS/s, kilo samples per second).
Calibration exercises, which are included, teach the user how to calibrate a sensor and the importance of checking the accuracy of the sensors before taking measurements.
Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.
Capable of doing applied research, real industrial simulation, training courses, etc.
Remote operation and control by the user and remote control for EDIBON technical support, are always included.
Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).
Designed and manufactured under several quality standards.
Optional ICAI software to create, edit and carry out practical exercises, tests, exams, calculations, etc. Apart from monitoring user's knowledge and progress reached.
This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.

Required elements (at least one) (Not included):

FCE. Electric Fields Study Set.

- Sensor:
  Electric field sensor. Is supplied a probe capable of measuring the potential created by any charge distribution. This probe consists of a conductive cable that measures the potential difference between a reference and the point where it is located.
- Elements:
  - Two nickel-plated conductor sphere with insulating rod.
  - Two nickel-plated conductor cylinders with insulating rod.
  - Tank.
  - Red conductor cable with banana-crocodile.
  - Black conductor cable with banana-crocodile.

The teacher can use any element that creates ELECTRICAL FIELDS, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.
Required elements (Not included):
- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) FCE/CCSOF. Control Software + Data Acquisition + Data Management:
The three softwares are part of the SCADA system.
Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.
Registration and visualization of all process variables in an automatic and simultaneous way.
Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 250 KS/s (kilo samples per second).
Calibration system for the sensors involved in the process.
It allows the registration of the alarms state and the graphic representation in real time.
Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
Open software, allowing the teacher to modify texts, instructions.
Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.
This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

FCM. Magnetic Field Study Set.

- Sensor:
  Hall probe capable of measuring the intensity of the static and dynamic magnetic fields.
- Elements:
  - Electromagnet.
  - Two magnets of AlNiCo.
  - Rectangular loop.
  - Two conductive loops of 325 turns.
  - Two conductive loops of 200 turns.
  - Solenoid with a diameter of 200 mm.
  - Solenoid with a diameter of 110 mm.
  - Two ferrite cores.
  - Stainless steel core.
  - Brass core.
  - Iron core.
  - 100 g of iron powder.

The teacher can use any element that creates MAGNETIC FIELDS, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.
Required elements (Not included):
- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) FCM/CCSOF. Control Software + Data Acquisition + Data Management:
The three softwares are part of the SCADA system.
Compatible with actual Windows operating systems. Graphic and intuitive

simulation of the process in screen. Compatible with the industry standards.
Registration and visualization of all process variables in an automatic and simultaneous way.
Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 250 KS/s (kilo samples per second).
Calibration system for the sensors involved in the process.
It allows the registration of the alarms state and the graphic representation in real time.
Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
Open software, allowing the teacher to modify texts, instructions.
Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.
This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

FM. Mechanics Study Set.

- Elements:
  - Cameras (2 units).
  - Experiment drawer.
  - Linear motion rails.
  - Height rails supports.
  - Linear motions black sphere.
  - Black sphere with pendular motions rope.
  - Pendular hook for the robot.

The teacher can use any element suitable for MECHANICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.
Required elements (Not included):
- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) FM/CCSOF. Control Software + Data Acquisition + Data Management:
The three softwares are part of the SCADA system.
Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.
Registration and visualization of all process variables in an automatic and simultaneous way.
Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 250 KS/s (kilo samples per second).
Calibration system for the sensors involved in the process.
It allows the registration of the alarms state and the graphic representation in real time.
Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
Open software, allowing the teacher to modify texts, instructions.
Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.
This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

FAC. Acoustics Study Set.

- Sensor:
  Highly sensitive acoustic sensor (microphone) that allows the acoustic signal to be captured and saved at different points in the space.
- Elements:
  - High sensibility microphone.
  - Two acoustic sources (trumpets) high-frequency 3000 Hz, with 3V DC power supply.
  - Anechoic chamber. The simple chamber can be made with the panels provided with thick polyurethane supplied with the unit, and will allow isolating your experiments from external noises, allowing you to obtain the waves generated by the supplied sound source:
    - Walls covered with high-density polyurethane (4 units).
    - 170 x 200 mm flat wall with a high-density polyurethane covering and a hole of 10 mm.
    - 170 x 200 mm flat wall with a high-density polyurethane covering and two holes of 10 mm.
    - 170 x 200 mm flat wall with a high-density polyurethane covering without holes.

The teacher can use any element suitable for ACOUSTICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS
Required elements (Not included):
- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) FAC/CCSOF. Control Software + Data Acquisition + Data Management:
The three softwares are part of the SCADA system.
Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.
Registration and visualization of all process variables in an automatic and simultaneous way.
Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 250 KS/s (kilo samples per second).
Calibration system for the sensors involved in the process.
It allows the registration of the alarms state and the graphic representation in real time.
Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
Open software, allowing the teacher to modify texts, instructions.
Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.
This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

FOP. Optics Study Set.

- Sensor:
  Sensor for the study of optics consisting of a diode capable of measuring light.
- Elements:
  - Magnifying glass with stand.
  - Torch with focusing head.
  - Base for the torch.
  - Two methacrylate plates.

- LED panel.
- Light diffuser for the panel.
- Two methacrylate tanks.
- Plane mirror.

The teacher can use any element suitable for OPTICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

Required elements (Not included):

- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) FOP/CCSOF. Control Software + Data Acquisition + Data Management:

The three softwares are part of the SCADA system.
Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.
Registration and visualization of all process variables in an automatic and simultaneous way.
Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 250 KS/s (kilo samples per second).
Calibration system for the sensors involved in the process.
It allows the registration of the alarms state and the graphic representation in real time.
Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
Open software, allowing the teacher to modify texts, instructions.
Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.
This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

FTT. Thermodynamics Study Set.

- Sensor:
  Temperature sensor: without the thermowell in a metal rod-shaped holder.
- Elements:
  - Experiment tank.
  - Cu tank with resistance inside (hot spot). The resistor will be directly connected to the mains (230 V).
  - Cu tank (cold focus).
  - Insulating plates: six vertical (250 x 110) and six horizontal (343 x 73).
  - Plate fixing nuts.

The teacher can use any element suitable for THERMODYNAMICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

Required elements (Not included):

- FUB. Base Frame and Robot for EFAC.

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

(+) FTT/CCSOF. Control Software + Data Acquisition + Data Management:

The three softwares are part of the SCADA system.
Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.
Registration and visualization of all process variables in an automatic and simultaneous way.
Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 250 KS/s (kilo samples per second).
Calibration system for the sensors involved in the process.
It allows the registration of the alarms state and the graphic representation in real time.
Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
Open software, allowing the teacher to modify texts, instructions.
Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.
This unit allows the 30 students of the classroom to visualize simultaneously all the results and the manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

② EFAC/CIB. Control Interface Box:

The Control Interface Box is part of the SCADA system.
Control interface box with process diagram in the front panel.
The unit control elements are permanently computer controlled.
Simultaneous visualization in the computer of all parameters involved in the process.
Calibration of all sensors involved in the process.
Real time curves representation about system responses.
All the actuators' values can be changed at any time from the keyboard allowing the analysis about curves and responses of the whole process.
Shield and filtered signals to avoid external interferences.
Real time computer control with flexibility of modifications from the computer keyboard of the parameters, at any moment during the process.
Real time computer control for parameters involved in the process simultaneously.
Open control allowing modifications, at any moment and in real time, of parameters involved in the process simultaneously.
Three safety levels, one mechanical in the unit, another electronic in the control interface and the third one in the control software.

③ DAB. Data Acquisition Board:

The Data Acquisition board is part of the SCADA system.
PCI Express Data acquisition board (National Instruments) to be placed in a computer slot.
Analog input: Channels= 16 single-ended or 8 differential. Resolution=16 bits, 1 in 65536. Sampling rate up to: 250 KS/s (kilo samples per second).
Analog output: Channels=2. Resolution=16 bits, 1 in 65536.
Digital Input/Output: Channels=24 inputs/outputs.
The Data Acquisition board model may change at any moment, providing the same or better features than those required for the unit.

④ **Cables and Accessories**, for normal operation.

⑤ Manuals:

This unit is supplied with 8 manuals: Required services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices manuals.

Exercises and Practical Possibilities to be done with the Main Items

Practical exercises to be done with the Electric Fields Study Set (FCE):

Level 1:

1.- Electric field created by two parallel flat sheets.

2.- Visualisation of the field lines created by a point charge.

3.- Spatial representation of the equipotential lines and the intensity of the electric field created by a point charge.

4.- Visualisation of the field lines generated by two point charges.

5.- Spatial representation of the equipotential curves created by two spherical charges.

Level 2:

6.- All those of level 1.

7.- Calculation of the charge enclosed by a plane-parallel capacitor. Gauss's theorem (I).

8.- Experimental demonstration of Gauss' law for a sphere and two conducting planes.

9.- Study of the charge stored in a plane-parallel capacitor as a function of the distance between the plates. Concept of capacitance.

10.- Experimental study of edge effects.

11.- Spatial representation of the equipotential lines created by a cylinder and a conductive plane. Principle of superposition (II).

12.- Spatial study of the electric field created by a non-regular body. Edge effects.

13.- Visualisation and calculations of the intensity of the electric field generated by a plane-parallel capacitor with a dielectric sphere inside it. Dielectric (I).

14.- Spatial representation of the electric field and equipotential lines generated by introducing a conducting sphere into a plane-parallel capacitor. Superposition principle (III).

15.- Electric field lines and equipotential surfaces generated by two conducting spheres equidistant from a conducting plane. Image effect.

16.- Experimental calculation of the redistribution of charge and potential energy of a series and parallel configuration of two plane-parallel capacitors.

IMPORTANT: The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.

Other possibilities to be done with this Unit:

17.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

18.- Open Control, Multicontrol and Real Time Control.

This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.

19.- The Computer Control System with SCADA allows a real industrial simulation.

20.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

21.- This unit can be used for doing applied research.

22.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.

23.- Control of the FCE unit process through the control interface box without the computer.

24.- Visualization of all the sensors values used in the FCE unit process.

- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Magnetic Field Study Set (FCM):

Level 1:

25.- Visualisation of the magnetic field lines generated by a magnet.

26.- Decay of the magnetic field.

27.- Three-dimensional representation of the magnetic field generated by a magnet.

28.- Magnetic field generated by two magnets. Spatial representation of the field lines and intensity.

29.- Magnetic field generated by parallel rectilinear conductors. Visualisation of field lines and calculation of magnetic intensity. Principle of superposition (I).

30.- Magnetic field generated by a loop. Three-dimensional representation of the intensity and visualisation of the field lines.

31.- Magnetic field generated by rectangular coils. Visualisation of field lines and calculation of the magnetic intensity. Superposition principle (I).

32.- Magnetic field generated by two loops crossed by currents in the same direction and in the opposite direction. Principle of Superposition (III).

33.- Magnetic field generated by a solenoid of N turns. Ampère's Law (II).

Level 2:

34.- All those of level 1.

35.- Sources of the magnetic field.

36.- Experimental demonstration of the existence of sources and sinks. Gauss's theorem.

37.- Helzmholtz coils. Three-dimensional study of the magnetic field.

38.- Magnetic field generated by a real coil.

39.- Magnetic field in matter.

IMPORTANT: The teacher can use his own elements, therefore the practical possibilities are NEARLY UNLIMITED.

Other possibilities to be done with this Unit:

40.- Many students view results simultaneously.
To view all results in real time in the classroom by means of a projector or an electronic whiteboard.
41.- Open Control, Multicontrol and Real Time Control.
This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.
42.- The Computer Control System with SCADA allows a real industrial simulation.
43.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.
44.- This unit can be used for doing applied research.
45.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.
46.- Control of the FCM unit process through the control interface box without the computer.
47.- Visualization of all the sensors values used in the FCM unit process.
- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Mechanics Study Set (FM):

Level 1:

48.- Calibration of the cameras.
49.- Guided horizontal movement analysis.
50.- Inclined plane movement analysis.
51.- Simple damped pendulum analysis.
52.- Circular damped pendulum movement analysis.

Level 2:

53.- All those of level 1.
54.- Calibration of the chambers.

IMPORTANT: The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.

Other possibilities to be done with this Unit:

55.- Many students view results simultaneously.
To view all results in real time in the classroom by means of a projector or an electronic whiteboard.
56.- Open Control, Multicontrol and Real Time Control.
This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.
57.- The Computer Control System with SCADA allows a real industrial simulation.
58.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.
59.- This unit can be used for doing applied research.
60.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.
61.- Control of the FM unit process through the control interface box without the computer.
62.- Visualization of all the sensors values used in the FM unit process.
- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Acoustics Study Set (FAC):

Level 1:

63.- Temporal visualisation of an acoustic wave.
64.- Three-dimensional study of an acoustic wave.
65.- Signal generated by two identical sources (Interference I).
66.- Acoustic attenuation produced by an obstacle.
67.- Wave fronts generator (Diffraction I).
68.- Spatial representation of an acoustic attenuation.

Level 2:

69.- All those of level 1.
70.- Experimental determination of the power of an acoustic emitter.
71.- Spatio-temporal study of the signal generated by two acoustic sources (Interference II).
72.- Acoustic media.
73.- Effects on the acoustic shielding of the wave frequency.
74.- Effects on the acoustic shielding of the amplitude of the wave.
75.- Effects of the wavelength on the diffraction phenomenon (Diffraction II).
76.- Diffraction-Interference.

IMPORTANT: The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.

Other possibilities to be done with this Unit:

77.- Many students view results simultaneously.
To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

78.- Open Control, Multicontrol and Real Time Control.
This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.
79.- The Computer Control System with SCADA allows a real industrial simulation.
80.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.
81.- This unit can be used for doing applied research.
82.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.
83.- Control of the FAC unit process through the control interface box without the computer.
84.- Visualization of all the sensors values used in the FAC unit process.
- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Optics Study Set (FOP):

Level 1:

85.- Determination of beam divergence.
86.- Focusing point of the torch beam.
87.- Analysis of intensity loss with distance.
88.- Phenomenon of reflection.
89.- Transmission.
90.- Variation of the luminosity with methacrylate without inclination.
91.- Variation of the luminosity on having fallen with an angle on the methacrylate.
92.- Refraction.
93.- Influence of the medium in the refraction.
94.- Calculation of the focal length of a lens (magnifying glass).

Level 2:

95.- All those of level 1.
96.- Luminosity analysis.

IMPORTANT: The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.

Other possibilities to be done with this Unit:

97.- Many students view results simultaneously.
To view all results in real time in the classroom by means of a projector or an electronic whiteboard.
98.- Open Control, Multicontrol and Real Time Control.
This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.
99.- The Computer Control System with SCADA allows a real industrial simulation.
100.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.
101.- This unit can be used for doing applied research.
102.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.
103.- Control of the FOP unit process through the control interface box without the computer.
104.- Visualization of all the sensors values used in the FOP unit process.
- Several other exercises can be done and designed by the user.

Practical exercises to be done with the Thermodynamics Study Set (FTT):

Level 2:

105.- Determination of temperature distribution in a water tank.
106.- Temperature distribution in the presence of hot and cold focus. Dependence on the temperature difference.
107.- Temperature distribution in the presence of a hot and a cold source. Dependence with the distance between them.
108.- Temperature distribution in the presence of hot and cold sources. Dependence on their position and geometry.

IMPORTANT: The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.

Other possibilities to be done with this Unit:

109.- Many students view results simultaneously.
To view all results in real time in the classroom by means of a projector or an electronic whiteboard.
110.- Open Control, Multicontrol and Real Time Control.
This unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters; etc, in real time.
111.- The Computer Control System with SCADA allows a real industrial simulation.
112.- This unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.
113.- This unit can be used for doing applied research.
114.- This unit can be used for giving training courses to Industries even to other Technical Education Institutions.
115.- Control of the FTT unit process through the control interface box without the computer.
116.- Visualization of all the sensors values used in the FTT unit process.
- Several other exercises can be done and designed by the user.

a) Technical and Vocational Education configuration

⑥ EFAC/ICAI. Interactive Computer Aided Instruction Software.

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.

- 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.

- 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.

⑦ EFAC/FSS. Faults Simulation System.

Faults Simulation System (FSS) is a Software package that simulates several faults in any EDIBON Computer Controlled Unit.

The "FAULTS" mode consists in causing several faults in the unit normal operation. The student must find them and solve them.

There are several kinds of faults that can be grouped in the following sections:

Faults affecting the sensors measurement:

- An incorrect calibration is applied to them.

- Non-linearity.

Faults affecting the actuators:

- Actuators channels interchange at any time during the program execution.

- Response reduction of an actuator.

Faults in the controls execution:

- Inversion of the performance in ON/OFF controls.

- Reduction or increase of the calculated total response.

- The action of some controls is annulled.

On/off faults:

- Several on/off faults can be included.

b) Multipost Expansions options

⑧ MINI ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.

MINI ESN. EDIBON Mini Scada-Net System allows up to 30 students to work with a Teaching Unit in any laboratory, simultaneously.

The MINI ESN system consists of the adaptation of any EDIBON Computer Controlled Unit with SCADA integrated in a local network.

This system allows to view/control the unit remotely, from any computer integrated in the local net (in the classroom), through the main computer connected to the unit.

Main characteristics:

- It allows up to 30 students to work simultaneously with the EDIBON Computer Controlled Unit with SCADA, connected in a local net.
- Open Control + Multicontrol + Real Time Control + Multi Student Post.
- Instructor controls and explains to all students at the same time.
- Any user/student can work doing "real time" control/multicontrol and visualisation.
- Instructor can see in the computer what any user/student is doing in the unit.
- Continuous communication between the instructor and all the users/students connected.

Main advantages:

- It allows an easier and quicker understanding.
- This system allows you can save time and cost.
- Future expansions with more EDIBON Units.

The system basically will consist of:

This system is used with a Computer Controlled Unit.

- Instructor's computer.
- Students' computers.
- Local Network.
- Unit-Control Interface adaptation.
- Unit Software adaptation.
- Webcam.
- MINI ESN Software to control the whole system.
- Cables and accessories required for a normal operation.

✱ 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**

Edition: ED01/23
Date: November/2023

REPRESENTATIVE: