Computer Controlled **Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (2x1 m)**, with SCADA

ESHC(2x1m)

EDIBON PATENT

EDIBON **SCADA** System

Teaching Technique used

② Control Interface Box

③ Data Acquisition Board

④ Software for:
- Computer Control
- Data Acquisition
- Data Management

Computer
(not included in the supply)

⑤ Cables and Accessories

⑥ Manuals
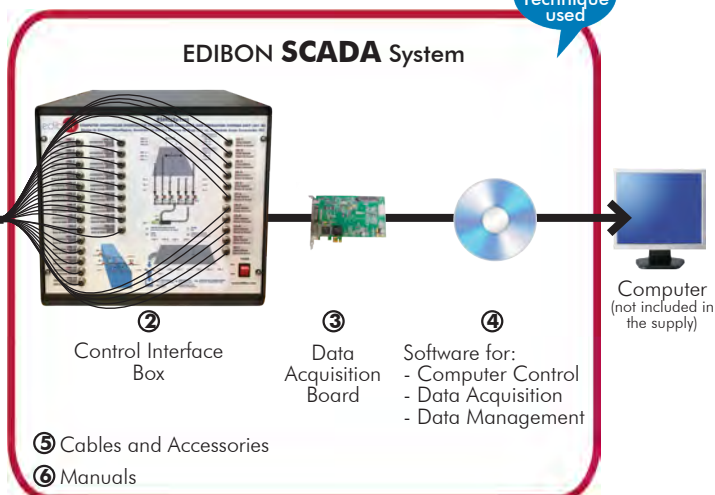
* Minimum supply always includes: 1 + 2 + 3 + 4 + 5 + 6
(Computer not included in the supply)

① Unit: ESHC(2x1m). Computer Controlled Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (2x1 m)

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
⤷8.- FLUID MECHANICS AND
13.-ENVIRONMENT

For more information about Key Features, click here

PDF Adobe

You Tube

INTRODUCTION

Fluvial geomorphology is the branch of geomorphology whose main objective is to explain the relationships between the physical processes of the flow in movable bed channels, the mechanics of the sediment transport forced by the flow and the shapes of alluvial channels created by the sediment transport.

This subfield is usually overlapped with the hydrography field. It studies river formations and shape - including the transverse and longitudinal configuration of the riverbed, the geometry of the cross sections and the shape of the bed - and analyzes the dynamic processes that transform the main features of watercourses over time.

In general, fluvial geomorphology can be divided into two branches: one studies the patterns that characterize the different river systems, called fluvial morphology, and the other studies the different dynamic processes that modify those patterns over time, called fluvial dynamics.

GENERAL DESCRIPTION

The Computer Controlled Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (2x1 m), "ESHC(2x1m)", is a self-contained unit designed to demonstrate some physical processes found in hydrology and fluvial geomorphology, including: rainfall hydrographs for catchment areas of varying permeability, the formation of rivers and their features and effects of sediment transport, the abstraction of ground water by drains, both with and without surface recharge from rainfall, etc. This unit allows demonstrating, on a small scale, the hydrological principles of ground water flow and the applications of these principles to some engineering constructions. Moreover, it allows to study the use of drains for water abstraction, de-watering and drainage of lakes, and demonstration of flood risks linked to land drainage works.

The main element of the unit is a test tank, which can be filled with sand and its tilt regulated by a lifting system. Water is supplied to the test tank through different systems: from two flexible separate hoses (simulating water inlets), from an inlet tank (simulating a river), from spray and showers nozzles located above the tank (simulating rain), or from french drains. Water is output from a river outlet tank, from the drainages located on two test tank corners, from the french drains, which have independent outlets; or from the overflows.

Two large plastic storage tanks are located under the test tank to store water.

A computer controlled pump with speed regulation impels water from the storage tanks to the test tank.

Two flexible separate hoses, placed at the test tank front side, allow adding great inlet flows.

In order to be able to simulate a river, the test tank has a tank attached to the inlet and other tank attached to the outlet. Gravel can be put inside the river inlet tank to deaden the flow and avoid turbulence. The use of a suitable channel section provides appropriate flow conditions in the test tank. The river outlet tank is located at the other end of the test tank and is used for hydrographs, run-off and river formation demonstrations.

The river tanks are communicated with the test tank through a floodgate that has two trap doors, a hermetic one and a meshed one.

Eight spray nozzles are mounted at a double line mobile bridge placed on the test tank and are arranged in a longitudinally equidistant way to provide an even water distribution along the test tank. These nozzles are also adjustable in height and width and can be easily fixed. Each nozzle has an associated ball valve, allowing a wide variety of moving rain precipitation patterns to be simulated.

ESHC(2x1m) detail

Two shower nozzles with multiple flows are placed on the test tank and allow storms and local inputs simulation. These nozzles are also adjustable in height and length, and they can be separated from the support to move them manually.

The subsurface flow inputs are via two french drains, located in the middle of the test tank. These french drains extend the full width of the tank. Each french drain can be configured as an inlet or an outlet to permit a wide variety of hydrological demonstrations.

The outlet tank consists of a sediment collection basket.

So, it is possible to measure with a sensor the quantity of collected sediment over a period of time. There are three tanks at the rear part of the unit, each of them connected to one french drain and the other one connected to the drainages. Each one of these tanks has a spillway, which allows to calculate the outlet flow of each tank. The water flow in each tank is measured by a sensor. The outlet system (from french drains or drainages to tanks) includes three diaphragm valves to regulate the flow.

The test tank includes two overflows that are communicated with the storage tanks. The water table can be kept constant by means of these overflows, with adjustable height.

The flow of all the inlet systems can be regulated by a group of diaphragm valves located at the front side of the unit. There are five orifice plates and one flow sensor that allow measuring and control the water flow in each pipe of the inlet system. Other flow sensor is located at the outlet of the pump. Filters are included in the water supply lines, minimizing system disturbances.
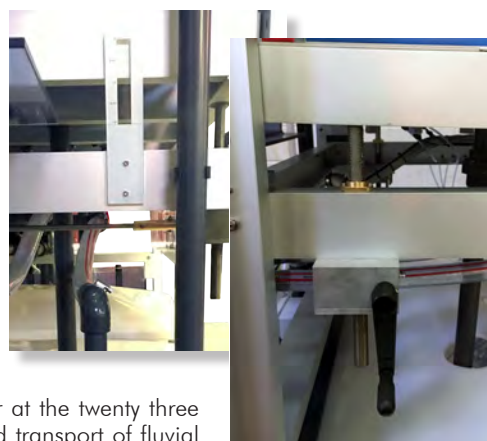
The test tank includes 23 tapping points configured in a cruciform pattern. These 23 tapping points have two functions, depending on the position of the valves included. On the one hand, they are used to taking samples to chemically analyze the water at the twenty three points, a feature that allows to broaden the use of the unit to the study of drag and transport of fluvial polluting agents. On the other hand they are used with differential pressure sensors to measure and display the phreatic surface (or ground water table levels).

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.
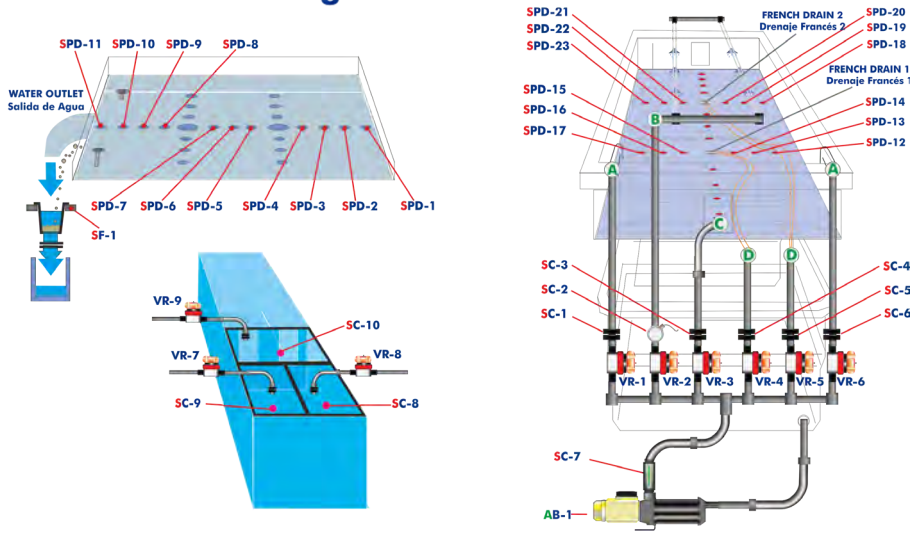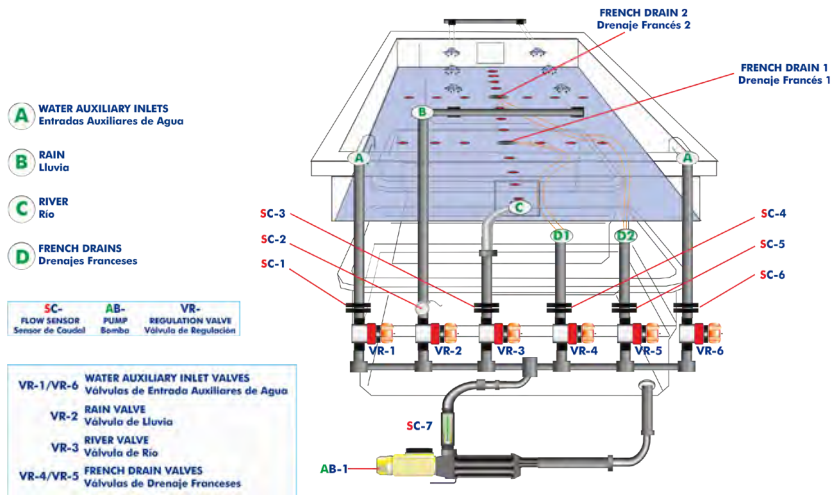
OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL

SENSORS DIAGRAM
Diagrama de Sensores

SPD-11 SPD-10 SPD-9 SPD-8

WATER OUTLET
Salida de Agua

SPD-7 SPD-6 SPD-5 SPD-4 SPD-3 SPD-2 SPD-1

SF-1

SPD-21
SPD-22
SPD-23

FRENCH DRAIN 2
Drenaje Francés 2

SPD-20
SPD-19
SPD-18

SPD-15
SPD-16
SPD-17

FRENCH DRAIN 1
Drenaje Francés 1

SPD-14
SPD-13
SPD-12

B

A

A

VR-9

SC-10

VR-7

VR-8

SC-9

SC-8

SC-3
SC-2
SC-1

C

D

D

SC-4
SC-5
SC-6

VR-1 VR-2 VR-3 VR-4 VR-5 VR-6

SC-7

AB-1

SC-	SF-	SPD-	AB-	VR-
FLOW SENSOR	FORCE SENSOR	DIFFERENTIAL PRESSURE SENSOR	PUMP	REGULATION VALVE
Sensor de Caudal	Sensor de Fuerza	Sensor de Presión Diferencial	Bomba	Válvula de Regulación

A WATER AUXILIARY INLETS
Entradas Auxiliares de Agua

B RAIN
Lluvia

C RIVER
Río

D FRENCH DRAINS
Drenajes Franceses

INLET VALVES DIAGRAM
Diagrama de Entrada de Válvulas

FRENCH DRAIN 2
Drenaje Francés 2

FRENCH DRAIN 1
Drenaje Francés 1

A WATER AUXILIARY INLETS
Entradas Auxiliares de Agua

B RAIN
Lluvia

C RIVER
Río

D FRENCH DRAINS
Drenajes Franceses

B

A

A

C

D1

D2

SC-3
SC-2
SC-1

SC-4
SC-5
SC-6

VR-1 VR-2 VR-3 VR-4 VR-5 VR-6

SC-7

AB-1

SC-	AB-	VR-
FLOW SENSOR	PUMP	REGULATION VALVE
Sensor de Caudal	Bomba	Válvula de Regulación

VR-1/VR-6 WATER AUXILIARY INLET VALVES
Válvulas de Entrada Auxiliares de Agua

VR-2 RAIN VALVE
Válvula de Lluvia

VR-3 RIVER VALVE
Válvula de Río

VR-4/VR-5 FRENCH DRAIN VALVES
Válvulas de Drenaje Franceses
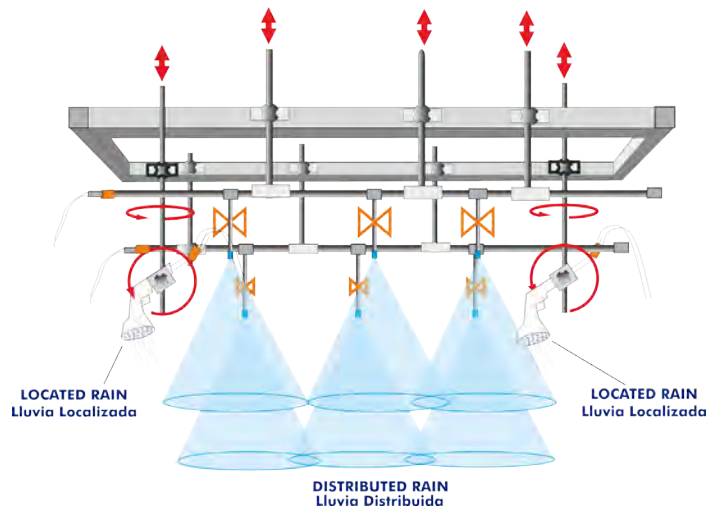
WATER OUTLET DIAGRAM
Diagrama de Salida de Agua

⑦ ⑥

④

WATER OUTLET
Salida de Agua

⑤

SF-1

FRENCH
DRAIN 2
Drenaje
Francés 2

FRENCH
DRAIN 1
Drenaje
Francés 1

VR-7 VR-9

VR-8

SC-9 SC-10

SC-8

⑧
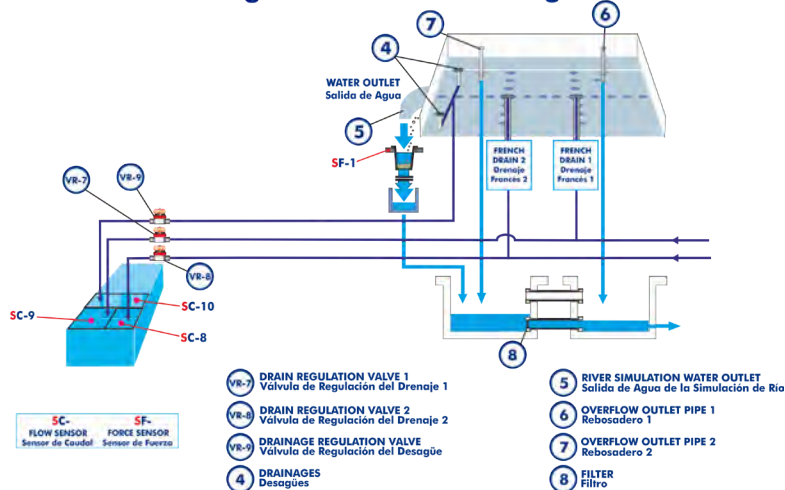
5C-	SF-
FLOW SENSOR	FORCE SENSOR
Sensor de Caudal	Sensor de Fuerza

VR-7 DRAIN REGULATION VALVE 1
Válvula de Regulación del Drenaje 1

VR-8 DRAIN REGULATION VALVE 2
Válvula de Regulación del Drenaje 2

VR-9 DRAINAGE REGULATION VALVE
Válvula de Regulación del Desagüe

④ DRAINAGES
Desagües

⑤ RIVER SIMULATION WATER OUTLET
Salida de Agua de la Simulación de Río

⑥ OVERFLOW OUTLET PIPE 1
Rebosadero 1

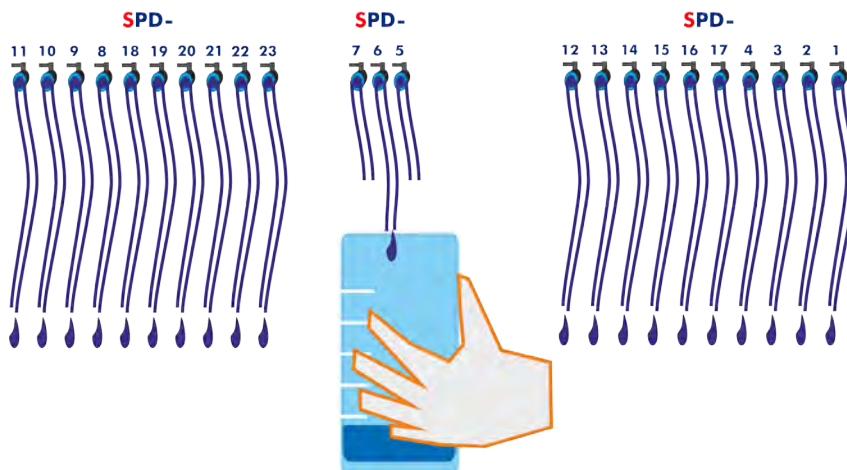⑦ OVERFLOW OUTLET PIPE 2
Rebosadero 2

⑧ FILTER
Filtro

www.edibon.com

RAIN INLET DIAGRAM
Diagrama de Entrada de Lluvia

LOCATED RAIN
Lluvia Localizada

LOCATED RAIN
Lluvia Localizada

DISTRIBUTED RAIN
Lluvia Distribuida

SENSORS PRESSURE DIAGRAM
Diagrama de Sensores de Presión

SPD-18   SPD-12
SPD-19   SPD-13
SPD-20   SPD-14

D1   D2

SPD-11 SPD-10 SPD-9 SPD-8   SPD-7 SPD-6 SPD-5   SPD-4 SPD-3 SPD-2 SPD-1

WATER INLET
Entrada de Agua

WATER OUTLET
Salida de Agua

SPD-21   SPD-15
SPD-22   SPD-16
SPD-23   SPD-17

**AB-1
PUMP**
Bomba

SAMPLES DIAGRAM
Diagrama de Muestras

SPD-

11 10 9 8 18 19 20 21 22 23

SPD-

7 6 5

SPD-

12 13 14 15 16 17 4 3 2 1

With this unit there are several options and possibilities:

- Main items: 1, 2, 3, 4, 5 and 6.
- Optional items: 7, 8, 9, 10 and 11.

Let us describe first the main items (1 to 6):

① ESHC(2x1m). Unit:

Anodized aluminum frame and panels made of painted steel.

Main metallic elements made of stainless steel.

Diagram in the front panel with distribution of the elements similar to the real one.

This unit includes wheels for its mobility and steps for a correct visualization of the practical exercises performed in the test tank.

Test tank, made of fiberglass with four windows made of polycarbonate, to be filled with sand. It provides a large working surface, dimensions: 2 m long, 1 m wide and 0.40 m deep.

Lifting system to regulate the tilt.

Two storage tanks of 400 l, that supply the water required to the test tank.

These tanks are interconnected with a butterfly valve and overflows and they include a drain device and a filter to stop any possible solid particle.

Two flexible separate hoses, placed at the test tank front side, allow to add great inlet flows.

A tank attached to the inlet of the test tank and other tank attached to the outlet of the test tank to simulate a river:

Both tanks include a valve to drain them.

The river outlet tank allows to measure the amount of sediment collected over a certain period of time.

The communication of the river tanks with the test tank is done through a floodgate that includes two trap doors. The unit includes two hermetic trap doors and two meshed trap doors.

Unit: ESHC(2x1m)

Spray and shower nozzles located above the test tank to simulate rain:

It has a metallic frame located at the upper side of the test tank. It includes a curtain to reduce possible spillages.

Eight spray nozzles are mounted at a double line mobile bridge to give an even distribution across the test tank. These nozzles are also adjustable in height and width. Each nozzle has an associated ball valve, allowing a wide variety of moving rainfall patterns to be simulated.

Two shower nozzles with multiple flows allow to simulate storms and local inputs. These nozzles are also adjustable in height and length and can be separated from the holder to move them manually.

Two french drains: they include a metallic filter to avoid sand transport to the storage tanks.

Two drainages: they include a metallic filter to avoid sand transport to the storage tanks.

Two overflows: they allow to keep water table (or phreatic surface) constant in the test tank.

Three outlet tanks (made of PVC glass) for the flow measurement in the drainages and french drains:

Each outlet tank includes: one spillway and one differential pressure sensor that allow to determine the flow removed in the drainages and french drains. They include a valve to drain them.

Computer controlled centrifugal pump (max. pressure: 7 bar, max. flow: 106 l/min) that impels water from the storage tank to the test tank through six different inlets. A cylindrical filter at the inlet of the pump stops any possible solid particle.

The test tank includes 23 tapping points, configured in a cruciform pattern. These tapping points have two functions: to take water samples and to use with 23 differential pressure sensors (range: 0 – 1 PSI).

Five orifice plates that, together with differential pressure sensors, and two flow sensors (ranges: 2 – 150 l/min and 1.5 – 30 l/min), allow to determine the flow through every inlet that connect the outlet of the pump to the test tank.

Load cell (force sensor) to measure the quantity of sediment collected over a certain period of time in the river outlet tank, range: 0 – 5 Kg.

Nine diaphragm valves: six of them are located in each inlet that connect the outlet of the pump to the test tank, and three of them are located in each outlet that connect the drainages and french drains to the outlet tanks.

Recommended elements: (Not included)

- ESH-1. Surface models for use with ESH.

    The optional accessory "ESH-1" contains a set of models with different shapes to investigate surface flow effects and run-off effects when using those models.

ESH-1

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.

② **ESHC(2x1m)/CIB. Control Interface Box:**

The Control Interface Box is part of the SCADA system.

<u>Control interface box with process diagram in the front panel</u> 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.

ESHC(2x1m)/CIB

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.

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. 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 **ESHC(2x1m)/CCSOF. Computer Control + Data Acquisition + Data Management Software:**

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.

ESHC(2x1m)/CCSOF

⑤ **Cables and Accessories**, for normal operation.

⑥ **Manuals:**

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

∗ References 1 to 6 are the main items: ESHC(2x1m) + ESHC(2x1m)/CIB + DAB + ESHC(2x1m)/CCSOF + Cables and Accessories + Manuals are included in the minimum supply for enabling normal and full operation.

EXERCISES AND PRACTICAL POSSIBILITIES TO BE DONE WITH THE MAIN ITEMS

1.-Determination of the surface drag.

2.-Determination of a hydrograph.

3.-Study of the hydrograph of one or several storms.

4.-Calculation of concentration time for a short storm.

5.-Determination of the compactness index.

6.-Determination of the drainage density.

7.-Obtaining of the pressure profile in a dike.

8.-Determination of the water obtained thanks to the gravity force and the field capacity.

9.-Study of fluvial-mechanical experiments.

10.-Formation and development of rivers over time.

11.-Study of sediment transport in models of rivers.

12.-Study of a meandering river.

13.-Study of the erosion on river beds and the speed of the flow.

14.-Study of groundwater catchment.

15.-Study of the cone of depression of a well.

16.-Study of the interaction of cones of depression by two adjoining wells.

17.-Study of a well in the center of a round island (it requires the ESH-1 accessory).

18.-Influence of a rainfall water catchment reservoir (it requires the ESH-1 accessory).

19.-Obstacle in a riverbed (it requires the ESH-1 accessory).

20.-Extracting water from an isolated well in a confined aquifer (it requires the ESH-1 accessory).

21.-Draining an excavation area (it requires the ESH-1 accessory).

22.-Draining a polder or lake (requiere el accesorio ESH-1).

23.-Well at the center of a round island (it requires the ESH-1 accessory).

Additional practical possibilities:

24.-Study of the storm hydrograph of a previously saturated catchment.

25.-Study of the storm hydrograph of an impermeable catchment.

26.-Study of the effect of a moving storm on a flood hydrograph.

27.-Study of the effect of reservoir storage on a flood hydrograph.

28.-Study of the effect of drain pipes on a flood hydrograph.

29.-Investigation of stream flows modeled in alluvial material.

30.-Study of sediment transport, bedload motion, scour and erosion.

31.-Construction of drawdown curves for one well and two wells systems.

Other possibilities to be done with this Unit:

32.-Many students view results simultaneously.

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

33.-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.

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

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

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

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

38.-Control of the ESHC(2x1m) unit process through the control interface box without the computer.

39.-Visualization of all the sensors values used in the ESHC(2x1m) unit process.

- By using PLC-PI additional 19 more exercises can be done.

- 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.
- Water supply and drain.
- Computer.

DIMENSIONS AND WEIGHTS

ESHC(2x1m):
  Unit:
    -Dimensions: 2700 x 1500 x 2000 mm approx.
                 (106.30 x 59.05 x 78.74 inches approx.)
    -Weight: 950 Kg approx.
                (2094 pounds approx.)
  Control Interface Box:
    -Dimensions: 490 x 450 x 470 mm approx.
                 (19.29 x 17.71 x 18.50 inches approx.)
    -Weight: 20 Kg approx.
                (44 pounds approx.)

REQUIRED ELEMENTS (Not included)

- Sand, with a grain diameter between 1 mm and 2.5 mm.

RECOMMENDED ELEMENTS (Not included)

- ESH-1. Surface models for use with ESH.

AVAILABLE VERSIONS

Offered in this catalogue:
- ESHC(2x1m). Computer Controlled Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (2x1 m).
Offered in other catalogues:
- ESHC(4x2m). Computer Controlled Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (4x2 m).
- ESH(2x1m). Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (2x1 m).

SCADA
Main screen
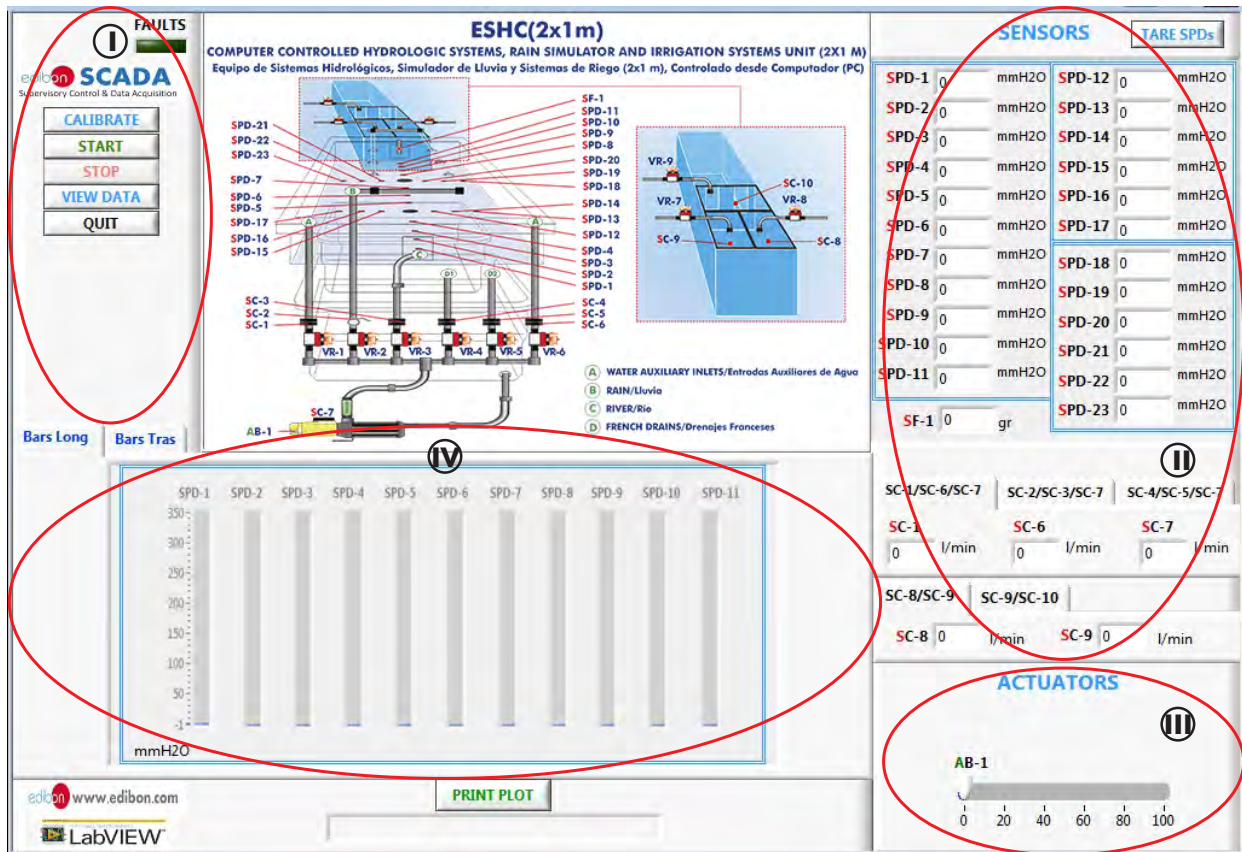
Ⓘ Main software operation possibilities.

ⒾⒾ Sensors displays, real time values, and extra output parameters. Sensors: SC=Flow sensor. SF=Force sensor. SPD=Differential pressure sensor.

ⓘⓘⓘ Actuators controls. Actuators: AB=Pump.

Ⓘⓥ Real time graphics displays.

Software for Sensors Calibration
Example of screen
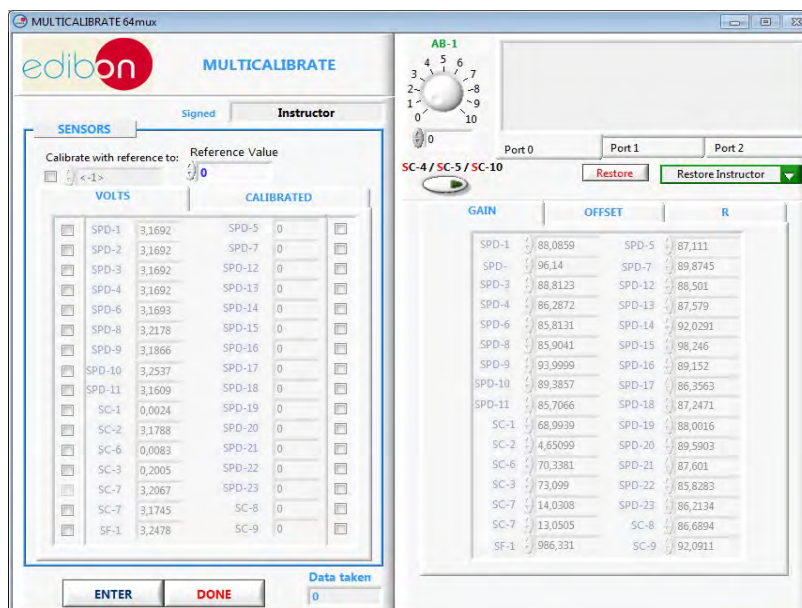
The teacher and the students can calibrate the unit with a password provided by EDIBON.
The teacher can restore the factory calibration any time.

Additionally to the main items (1 to 6) described, we can offer, as optional, other items from 7 to 11.

All these items try to give more possibilities for:

   a) Industrial configuration. (PLC)

   b) Technical and Vocational Education configuration. (ICAI and FSS)

   c) Multipost Expansions options. (MINI ESN and ESN)

<u>a) Industrial configuration</u>

⑦ **PLC. Industrial Control using PLC** (it includes PLC-PI Module plus PLC-SOF Control Software):

-PLC-PI. PLC Module:

Metallic box.

Circuit diagram in the module front panel.

Front panel:

   Digital inputs (X) and Digital outputs (Y) block:

      16 Digital inputs, activated by switches and 16 LEDs for confirmation (red).

      14 Digital outputs (through SCSI connector) with 14 LEDs for message (green).

   Analog inputs block:

      16 Analog inputs (-10 V. to + 10 V.) (through SCSI connector).

   Analog outputs block:

      4 Analog outputs (-10 V. to + 10 V.) (through SCSI connector).

   Touch screen:

      High visibility and multiple functions. Display of a highly visible status. Recipe function. Bar graph function. Flow display function. Alarm list. Multi language function. True type fonts.

Back panel:

   Power supply connector. Fuse 2A. RS-232 connector to PC. USB 2.0 connector to PC.

Inside:

   Power supply outputs: 24 Vdc, 12 Vdc, -12 Vdc, 12 Vdc variable.

   Panasonic PLC:

      High-speed scan of 0.32 μsec. for a basic instruction.

      Program capacity of 32 Ksteps, with a sufficient comment area.

      Power supply input (100 to 240 V AC).

      DC input: 16 (24 V DC).

      Relay output: 14.

      High-speed counter.

      Multi-point PID control.

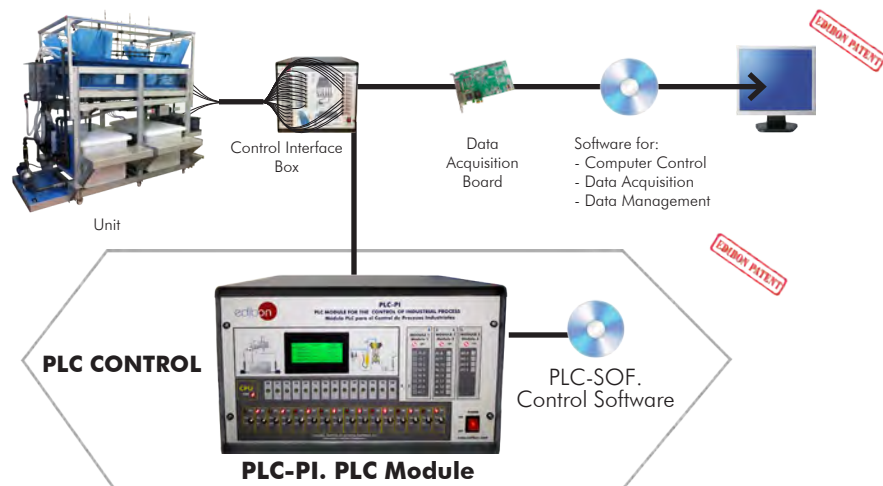   **Digital inputs/outputs and analog inputs/outputs Panasonic modules.**

Communication RS232 wire to computer (PC).

Dimensions: 490 x 330 x 310 mm. approx. (19.29 x 12.99 x 12.20 inches approx.). Weight: 30 Kg. approx. (66 pounds approx.).

-ESHC(2x1m)/PLC-SOF. PLC Control Software:

For this particular unit, always included with PLC supply.

The software has been designed using Labview and it follows the unit operation procedure and linked with the Control Interface Box used in the Computer Controlled Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (2x1 m) (ESHC(2x1m)).

Control Interface Box

Data Acquisition Board

Software for:
- Computer Control
- Data Acquisition
- Data Management

Unit

PLC CONTROL

PLC-SOF. Control Software

PLC-PI. PLC Module

Practices to be done with PLC-PI:

1.- Control of the particular unit process through the control interface box without the computer.
2.- Visualization of all the sensors values used in the particular unit process.
3.- Calibration of all sensors included in the particular unit process.
4.- Hand on of all the actuators involved in the particular unit process.
5.- Realization of different experiments, in automatic way, without having in front the particular unit. (These experiments can be decided previously).
6.- Simulation of outside actions, in the cases do not exist hardware elements. (Example: test of complementary tanks, complementary industrialenvironment to the process to be studied, etc).
7.- PLC hardware general use.
8.- PLC process application for the particular unit.
9.- PLC structure.
10.-PLC inputs and outputs configuration.
11.-PLC configuration possibilities.
12.-PLC program languages.

13.- PLC different programming standard languages (ladder diagram (LD), structured text (ST), instructions list (IL), sequential function chart (SFC), function block diagram (FBD)).
14.- New configuration and development of new process.
15.- Hand on an established process.
16.- To visualize and see the results and to make comparisons with the particular unit process.
17.- Possibility of creating new process in relation with the particular unit.
18.- PLC Programming Exercises.
19.- Own PLC applications in accordance with teacher and student requirements.

b) Technical and Vocational Education configuration

⑧ **ESHC(2x1m)/ICAI. Interactive Computer Aided Instruction Software System.**

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 6).

- 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.

Instructor Software

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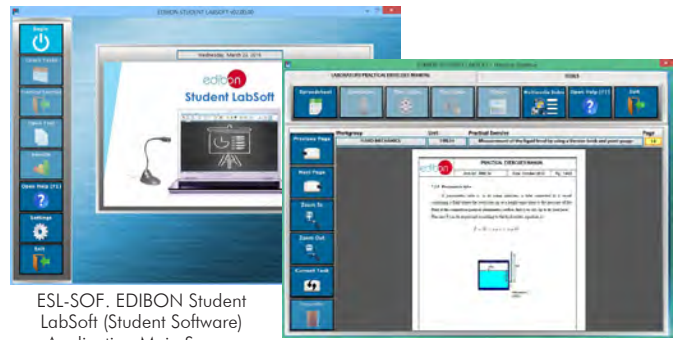

ECAL. EDIBON Calculations Program Package - Formula Editor Screen

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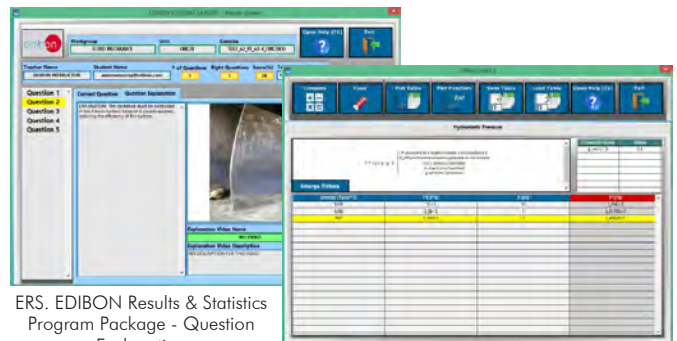

ETTE. EDIBON Training Test & Exam Program Package - Main Screen with Numeric Result Question

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

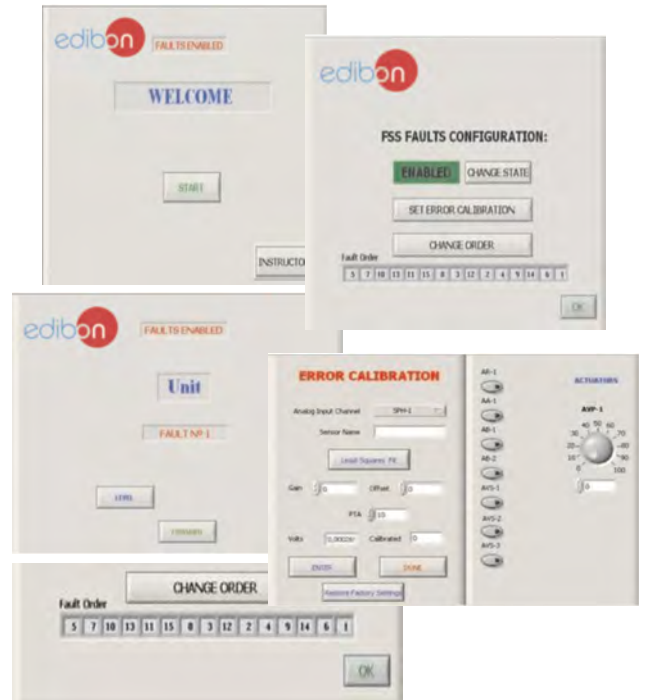ECAL. EDIBON Calculations Program Package Main Screen

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

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

⑨ ESHC(2x1m)/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.

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

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

Example of some screens

---

c) Multipost Expansions options

⑩ 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/files/expansion/MINI-ESN/catalog

**MINI ESN.
EDIBON Mini Scada-Net System**

1 UNIT= up to 30 STUDENTS can work simultaneously

Computer Controlled Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (2x1 m) (ESHC(2x1m))

Control Interface Box

Software for:
- Computer Control
- Data Acquisition
- Data Management

Instructors' Central Computer

Mini Scada-Net Software

LOCAL NET FOR 30 STUDENTS

OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL
+
MULTI STUDENT POST

Note: The MINI ESN system can be used with any EDIBON computer controlled unit

---

⑪ 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/files/expansion/ESN/catalog
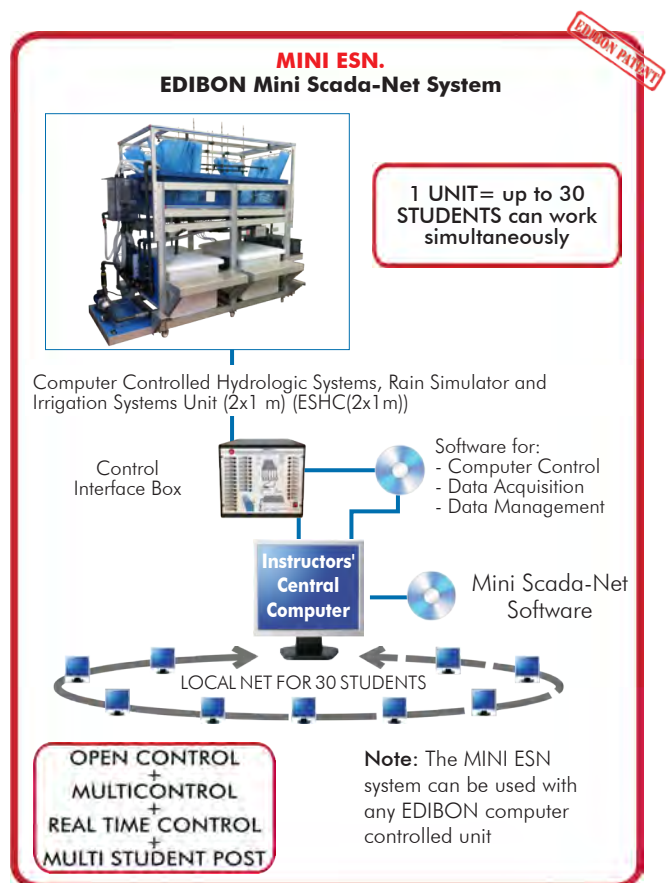
Main items (always included in the supply)

Minimum supply always includes:

① Unit: ESHC(2x1m). Computer Controlled Hydrologic Systems, Rain Simulator and Irrigation Systems Unit (2x1 m).

② ESHC(2x1m)/CIB. Control Interface Box.

③ DAB. Data Acquisition Board.

④ ESHC(2x1m)/CCSOF. Computer Control + Data Acquisition + Data Management Software.

⑤ Cables and Accessories, for normal operation.

⑥ Manuals.

*IMPORTANT: Under ESHC(2x1m) we always supply all the elements for immediate running as 1, 2, 3, 4, 5 and 6.

Optional items (supplied under specific order)

a) Industrial configuration

⑦ PLC. Industrial Control using PLC (it includes PLC-PI Module plus PLC-SOF Control Software):

   - PCL-PI. PLC Module.

   - ESHC(2x1m)/PLC-SOF. PLC Control Software.

b) Technical and Vocational Education configuration

⑧ ESHC(2x1m)/ICAI. Interactive Computer Aided Instruction Software System.

⑨ ESHC(2x1m)/FSS. Faults Simulation System.

c) Multipost Expansions options

⑩ MINI ESN. EDIBON Mini Scada-Net System for being used with EDIBON Teaching Units.

⑪ ESN. EDIBON Scada-Net Systems.

① ESHC(2x1m). Unit:

Anodized aluminum frame and panels made of painted steel.

Main metallic elements made of stainless steel.

Diagram in the front panel with distribution of the elements similar to the real one.

This unit includes wheels for its mobility and steps for a correct visualization of the practical exercises performed in the test tank.

Test tank, made of fiberglass with four windows made of polycarbonate, to be filled with sand. It provides a large working surface, dimensions: 2 m long, 1 m wide and 0.40 m deep.

Lifting system to regulate the tilt.

Two storage tanks of 400 l, that supply the water required to the test tank.

These tanks are interconnected with a butterfly valve and overflows and they include a drain device and a filter to stop any possible solid particle.

Two flexible separate hoses, placed at the test tank front side, allow to add great inlet flows.

A tank attached to the inlet of the test tank and other tank attached to the outlet of the test tank to simulate a river:

    Both tanks include a valve to drain them.

    The river outlet tank allows to measure the amount of sediment collected over a certain period of time.

    The communication of the river tanks with the test tank is done through a floodgate that includes two trap doors. The unit includes two hermetic trap doors and two meshed trap doors.

Spray and shower nozzles located above the test tank to simulate rain:

    It has a metallic frame located at the upper side of the test tank. It includes a curtain to reduce possible spillages.

    Eight spray nozzles are mounted at a double line mobile bridge to give an even distribution across the test tank. These nozzles are also adjustable in height and width. Each nozzle has an associated ball valve, allowing a wide variety of moving rainfall patterns to be simulated.

    Two shower nozzles with multiple flows allow to simulate storms and local inputs. These nozzles are also adjustable in height and length and can be separated from the holder to move them manually.

Two french drains: they include a metallic filter to avoid sand transport to the storage tanks.

Two drainages: they include a metallic filter to avoid sand transport to the storage tanks.

Two overflows: they allow to keep water table (or phreatic surface) constant in the test tank.

Three outlet tanks (made of PVC glass) for the flow measurement in the drainages and french drains:

    Each outlet tank includes: one spillway and one differential pressure sensor that allow to determine the flow removed in the drainages and frenchdrains.

    They include a valve to drain them.

Computer controlled centrifugal pump (max. pressure: 7 bar, max. flow: 106 l/min) that impels water from the storage tank to the test tank through six different inlets. A cylindrical filter at the inlet of the pump stops any possible solid particle.

The test tank includes 23 tapping points, configured in a cruciform pattern. These tapping points have two functions: to take water samples and to use with 23 differential pressure sensors (range: 0 – 1 PSI).

Five orifice plates that, together with differential pressure sensors, and two flow sensors (ranges: 2 – 150 l/min and 1.5 – 30 l/min), allow to determine the flow through every inlet that connect the outlet of the pump to the test tank.

Load cell (force sensor) to measure the quantity of sediment collected over a certain period of time in the river outlet tank, range: 0 – 5 Kg.

Nine diaphragm valves: six of them are located in each inlet that connect the outlet of the pump to the test tank, and three of them are located in each outlet tank that connect the drainages and french drains to the outlet tanks.

<u>Recommended elements:</u> (Not included)

    - ESH-1. Surface models for use with ESH.

        The optional accessory "ESH-1" contains a set of models with different shapes to investigate surface flow effects and run-off effects when using those models.

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.

② ESHC(2x1m)/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 ESHC(2x1m)/CCSOF. Computer Control +Data Acquisition+Data Management Software:

The three softwares are part of the SCADA system.

Compatible with the industry standards.

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.

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.

⑤ Cables and Accessories, for normal operation.

⑥ 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

1.-Determination of the surface drag.

2.-Determination of a hydrograph.

3.-Study of the hydrograph of one or several storms.

4.-Calculation of concentration time for a short storm.

5.-Determination of the compactness index.

6.-Determination of the drainage density.

7.-Obtaining of the pressure profile in a dike.

8.-Determination of the water obtained thanks to the gravity force and the field capacity.

9.-Study of fluvial-mechanical experiments.

10.-Formation and development of rivers over time.

11.-Study of sediment transport in models of rivers.

12.-Study of a meandering river.

13.-Study of the erosion on river beds and the speed of the flow.

14.-Study of groundwater catchment.

15.-Study of the cone of depression of a well.

16.-Study of the interaction of cones of depression by two adjoining wells.

17.-Study of a well in the center of a round island (it requires the ESH-1 accessory).

18.-Influence of a rainfall water catchment reservoir (it requires the ESH-1 accessory).

19.-Obstacle in a riverbed (it requires the ESH-1 accessory).

20.-Extracting water from an isolated well in a confined aquifer (it requires the ESH-1 accessory).

21.-Draining an excavation area (it requires the ESH-1 accessory).

22.-Draining a polder or lake (requiere el accesorio ESH-1).

23.-Well at the center of a round island (it requires the ESH-1 accessory).

Additional practical possibilities:

24.-Study of the storm hydrograph of a previously saturated catchment.

25.- Study of the storm hydrograph of an impermeable catchment.

26.- Study of the effect of a moving storm on a flood hydrograph.

27.- Study of the effect of reservoir storage on a flood hydrograph.

28.- Study of the effect of drain pipes on a flood hydrograph.

29.- Investigation of stream flows modeled in alluvial material.

30.- Study of sediment transport, bedload motion, scour and erosion.

31.- Construction of drawdown curves for one well and two wells systems.

Other possibilities to be done with this Unit:

32.- Many students view results simultaneously.

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

33.-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.

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

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

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

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

38.- Control of the ESHC(2x1m) unit process through the control interface box without the computer.

39.- Visualization of all the sensors values used in the ESHC(2x1m) unit process.

- By using PLC-PI additional 19 more exercises can be done.

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

<u>a) Industrial configuration</u>

⑦**PLC. Industrial Control using PLC** (it includes PLC-PI Module plus PLC-SOF Control Software):

-PLC-PI. PLC Module:

Metallic box.

Circuit diagram in the module front panel.

Digital inputs (X) and Digital outputs (Y) block: 16 Digital inputs. 14 Digital outputs.

Analog inputs block: 16 Analog inputs.

Analog outputs block: 4 Analog outputs.

Touch screen.

Panasonic PLC:

High-speed scan of 0.32 μsec. Program capacity of 32 Ksteps. High-speed counter. Multi-point PID control.

Digital inputs/outputs and analog inputs/outputs Panasonic modules.

-ESHC(2x1m)/PLC-SOF. PLC Control Software:

For this particular unit, always included with PLC supply.

Practices to be done with PLC-PI:

1.- Control of the particular unit process through the control interface box without the computer.

2.- Visualization of all the sensors values used in the particular unit process.

3.- Calibration of all sensors included in the particular unit process.

4.- Hand on of all the actuators involved in the particular unit process.

5.- Realization of different experiments, in automatic way, without having in front the particular unit. (These experiments can be decided previously).

6.- Simulation of outside actions, in the cases do not exist hardware elements. (Example: test of complementary tanks, complementary industrialenvironment to the process to be studied, etc).

7.- PLC hardware general use.

8.- PLC process application for the particular unit.

9.- PLC structure.

10.-PLC inputs and outputs configuration.

11.-PLC configuration possibilities.

12.-PLC program languages.

13.-PLC different programming standard languages (ladder diagram (LD), structured text (ST), instructions list (IL), sequential function chart (SFC), function block diagram (FBD)).

14.-New configuration and development of new process.

15.-Hand on an established process.

16.-To visualize and see the results and to make comparisons with the particular unit process.

17.-Possibility of creating new process in relation with the particular unit.

18.-PLC Programming Exercises.

19.-Own PLC applications in accordance with teacher and student requirements.

<u>b) Technical and Vocational Education configuration</u>

⑧**ESHC(2x1m)/ICAI. Interactive Computer Aided Instruction Software System.**

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.

⑨ **ESHC(2x1m)/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.

<u>c) Multipost Expansions options</u>

⑩ **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.

REPRESENTATIVE: