



Always included
in the supply:

EDIBON PATENT

Teaching
Technique
used

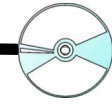
SCADA. EDIBON Computer Control System



②
Control
Interface Box



③
Data
Acquisition
Board



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



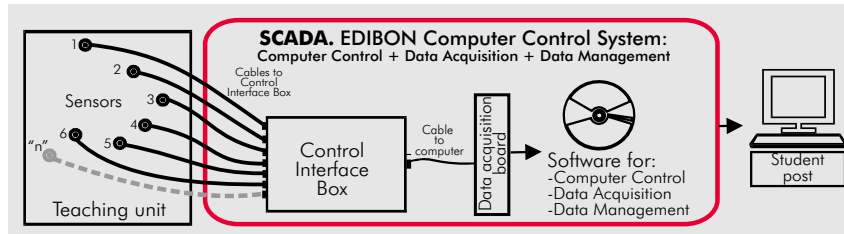
Computer
(not included
in the supply)

⑤ Cables and Accessories

⑥ Manuals

**OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL**

① Unit: AMTC. Pipe Network Unit, with Hydraulics Bench (FME00)



www.edibon.com
Products
Products range
Units
8.-Fluid Mechanics
& Aerodynamics

DESCRIPTION

The EDIBON Pipe Network Unit has been designed for enabling different pipe network installations, measuring the flow and pressure, always using water as test fluid.

The objective of this unit is to simulate the problems that could be originated in pipe networks, having this pipes different lengths and diameters, as it happens in the cities.

With these studies, the dimensions of the networks will be clearer, in order to obtain the flow and pressure necessary for them.

A typical case is, for instance, a water distribution network in a town. Predictions of pressure and flow and their variations that take place in a network are of great interest, because, with these data, the pipe types required for such network could be determined with more accuracy.

This Computer Controlled Unit is supplied with the EDIBON Computer Control System (SCADA), including: Control Interface Box + Data Acquisition Board + Computer Control and Data Acquisition Software, for controlling the process and the parameters involved.



ISO 9000: Quality Management
(for Design, Manufacturing,
Commercialization and After-sales service)



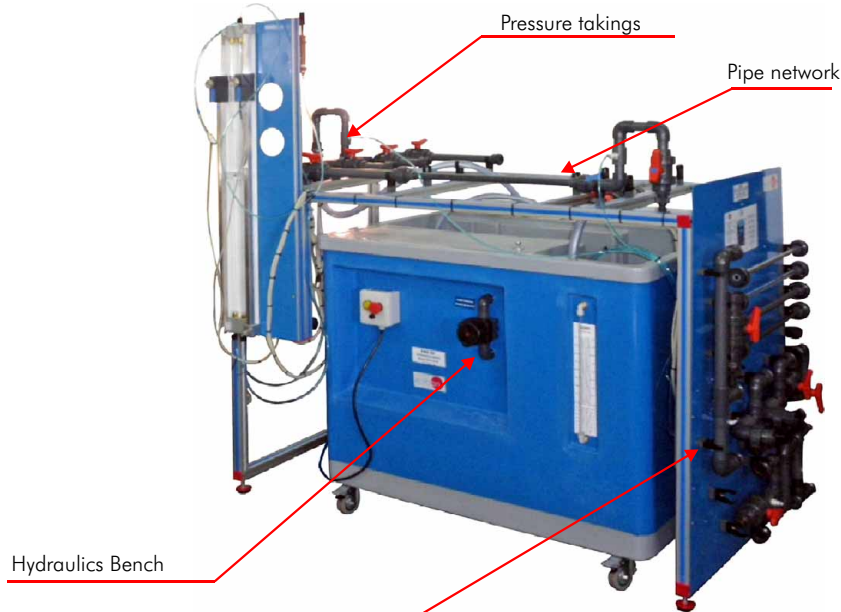
European Union Certificate
(total safety)



**Certificates ISO 14000 and
ECO-Management and Audit Scheme**
(environmental management)

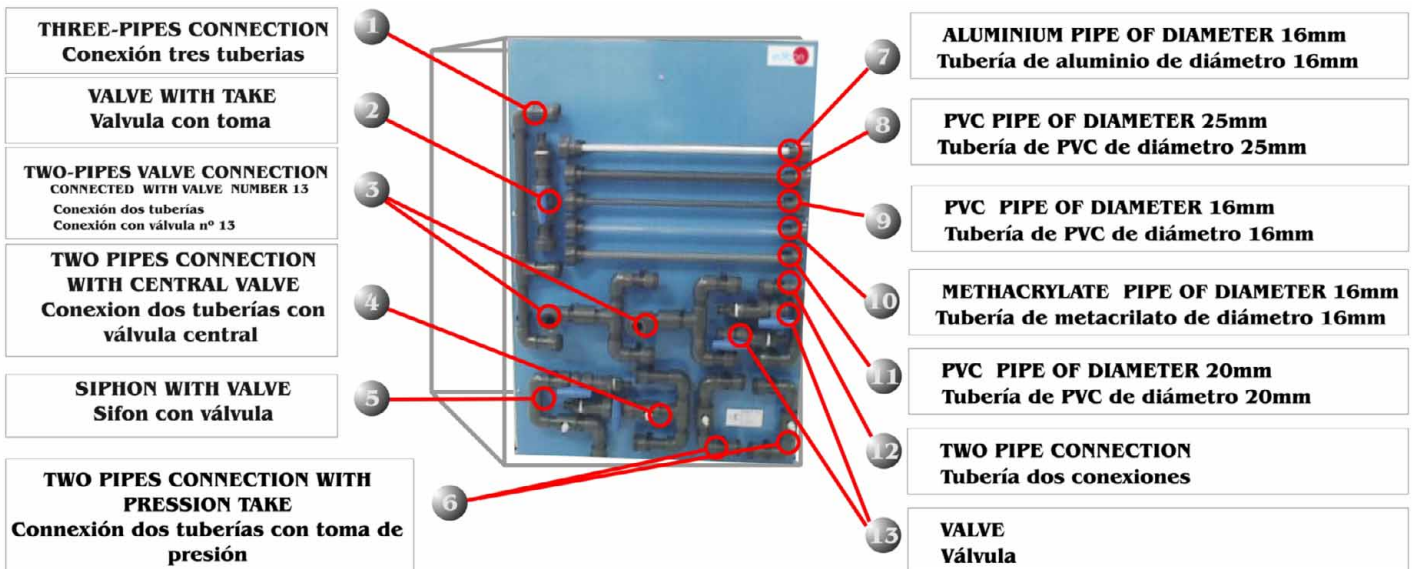


**Worlddidac Quality Charter
Certificate**
(Worlddidac Member)

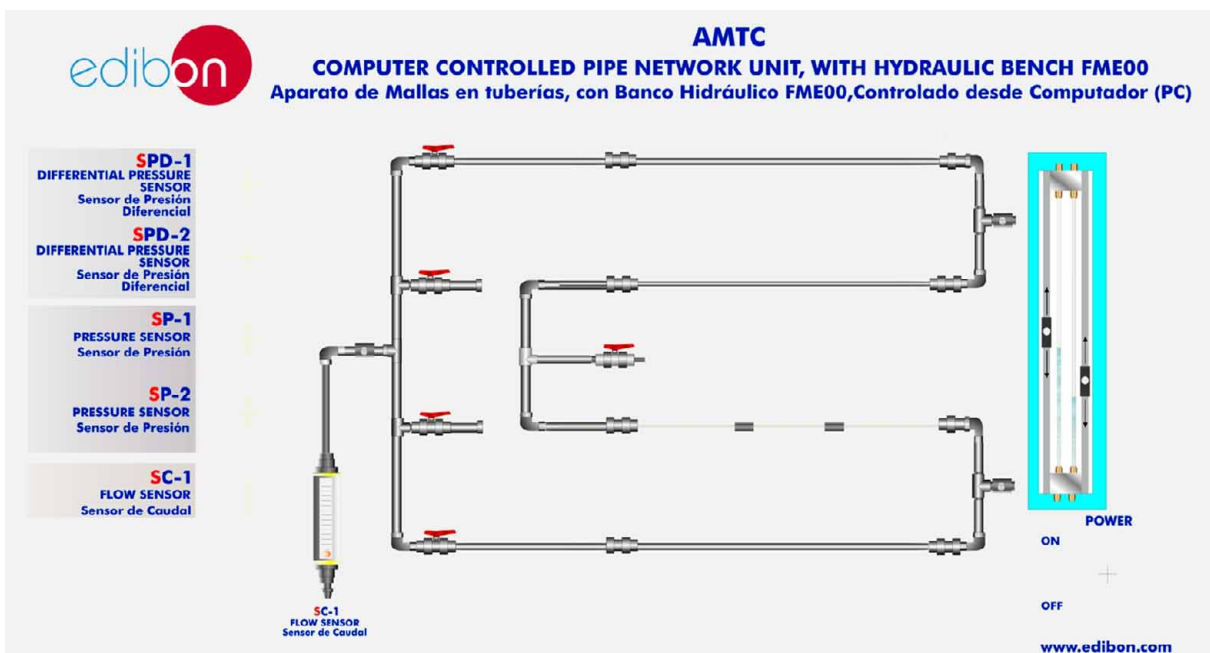


**OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL**

Lateral panel with elements to test:



Front panel of the Control Interface Box :



Items supplied as standard

① AMTC. Unit:

Anodized aluminium structure and panels in painted steel (epoxy paint).

Main metallic elements in stainless steel.

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

Pipe network.

Lateral panel where all test elements are located.

Test pipes:

Aluminium pipe, 16 mm outer diameter.

PVC pipe, 25 mm outer diameter.

PVC pipe, 16 mm outer diameter.

PVC pipe, 20 mm outer diameter.

Methacrylate pipe, 16 mm outer diameter.

Test Connections:

Connection of 4 pipes with drain or outlet valve.

Connection of 3 pipes

Straight connection of a pipe with outlet valve.

Pipe connection with outlet pipe in the shape of a siphon.

Connection of 2 pipes with outlet valve. (3 units).

Connection of 2 pipes with pressure taking.

Connection of 2 pipes without pressure taking.

2 Differential Pressure sensors, range: 0-1000 mm (0.5 accuracy).

2 Pressure sensors, range: 0-2 bar.

Pressure takings in the test elements.

Flow sensor, range: 0-80 l./min.

Valves for distributing the flow to the network.

Hydraulics Bench (FME00):

Mobile Hydraulics Bench, made in polyester reinforced with fibreglass, and mounted on wheels for mobility.

Centrifugal pump, computer controlled, 0.37 KW, 30-80 l/min at 20.1-12.8 m., single phase 220V./ 50 Hz or 110V./60 Hz.

Runner made in stainless steel.

Sump tank capacity: 165 litres.

Small channel: 8 litres.

Flow measurement: volumetric tank, gauged from 0 to 7 litres for low flow values and from 0 to 40 litres for high flow values.

Level tube with a scale that shows the water level in the upper tank.

Flow stilling baffle for reducing the turbulence rate.

Control valve for regulating the flow.

Remote hand-operating dump valve in the base of the volumetric tank.

Safety switch and contact light.

Manufactured with corrosion resistant materials ensuring a long life of the unit.



AMTC. Unit

② AMTC/CIB. Control Interface Box:

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.

Simultaneously 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 placed in only one computer screen.

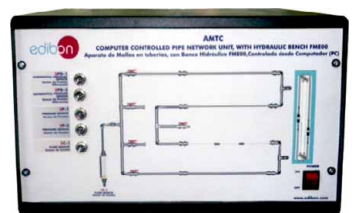
Shield and filtered signals to avoid external interferences.

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, resistances, control valves, etc.

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

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



AMTC/CIB

Continue...

Items supplied as standard (continuation)

③ DAB. Data Acquisition Board:

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

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).

Input range (V) = $\pm 10V$.

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

Number of DMA channels= 6.

Analog output:

Channels=2. Resolution= 16 bits, 1 in 65536.

Maximum output rate up to: 833 KS/s.

Output range(V) = $\pm 10V$.

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

Digital Input/Output:

Channels=24 inputs/outputs.

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

Timing: **Counter/timers=2.**

Resolution: Counter/timers: 32 bits.



DAB

④ AMTC/CCSOF. Computer Control+ Data Acquisition+ Data Management Software:

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 simultaneously 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 250,000 data per second guaranteed.

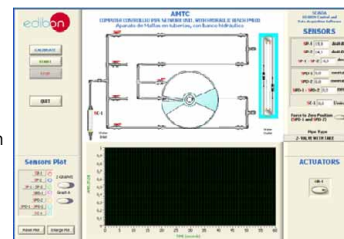
Calibration system for the sensors involved in the process.

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

This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.



AMTC/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: AMTC + AMTC/CIB + DAB + AMTC/CCSOF + Cables and Accessories + Manuals are included in the minimum supply, enabling a normal operation.**

Complementary items to the standard supply

PLC. Industrial Control using PLC (7 and 8):

⑦ PLC-PI. PLC Module:

Circuit diagram in the 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 (-10V. to + 10V.) (through SCSI connector).

Analog outputs block:

4 Analog outputs (-10V. to + 10V.) (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.

Free input AC voltage(100 to 240 V AC).

DC input:16 (24 VDC).

Relay output: 14 (250 VA AC/2 A).

High-speed counter.

Multi-point PID control.

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

Communication RS232 wire, to computer (PC).

⑧ AMTC/PLC-SOF. PLC Control Software:

For this particular unit, always included with PLC supply.



PLC-PI

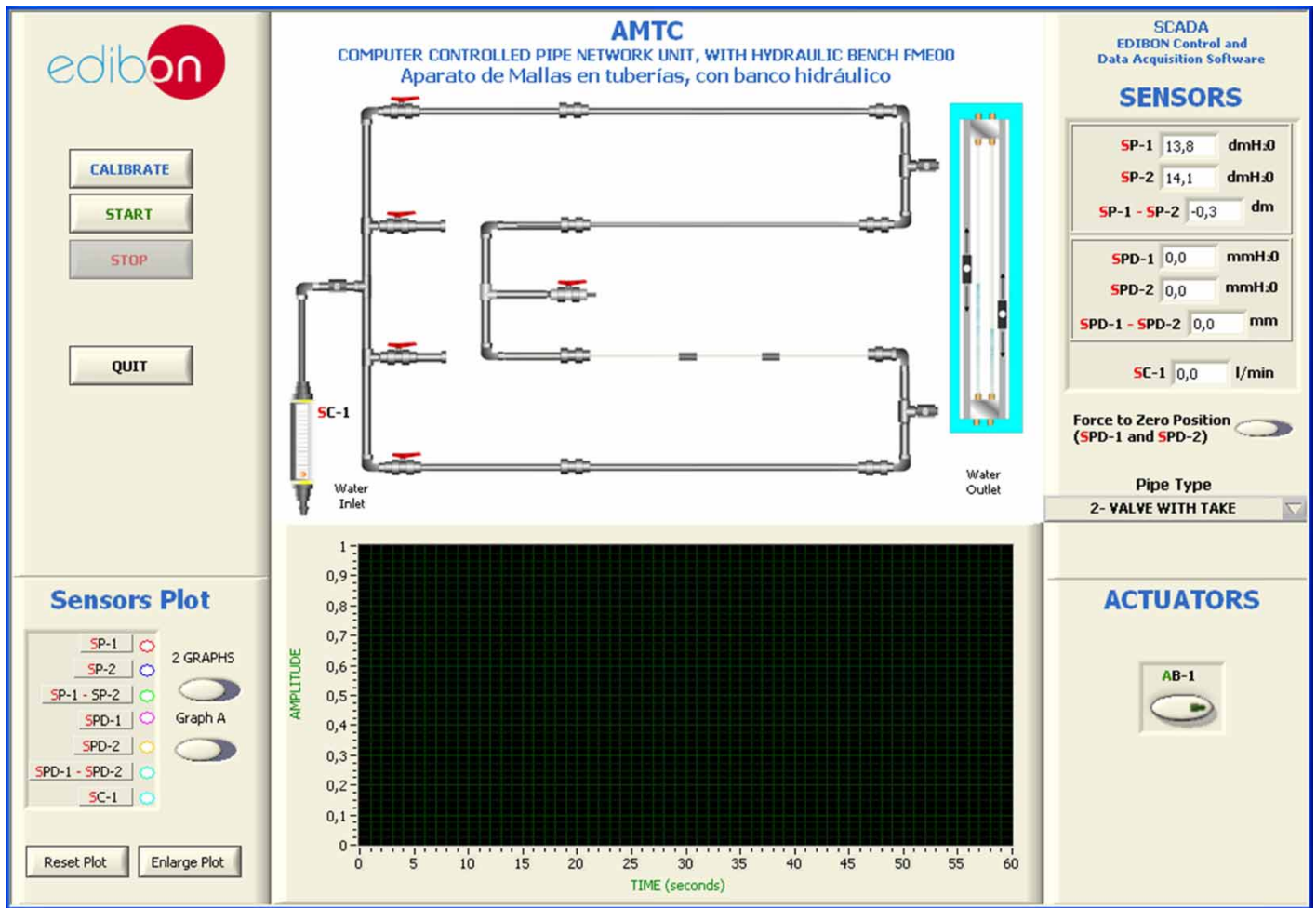
Items available on request

⑨ AMTC/CAL. Computer Aided Learning Software (Results Calculation and Analysis).

⑩ AMTC/FSS. Faults Simulation System.

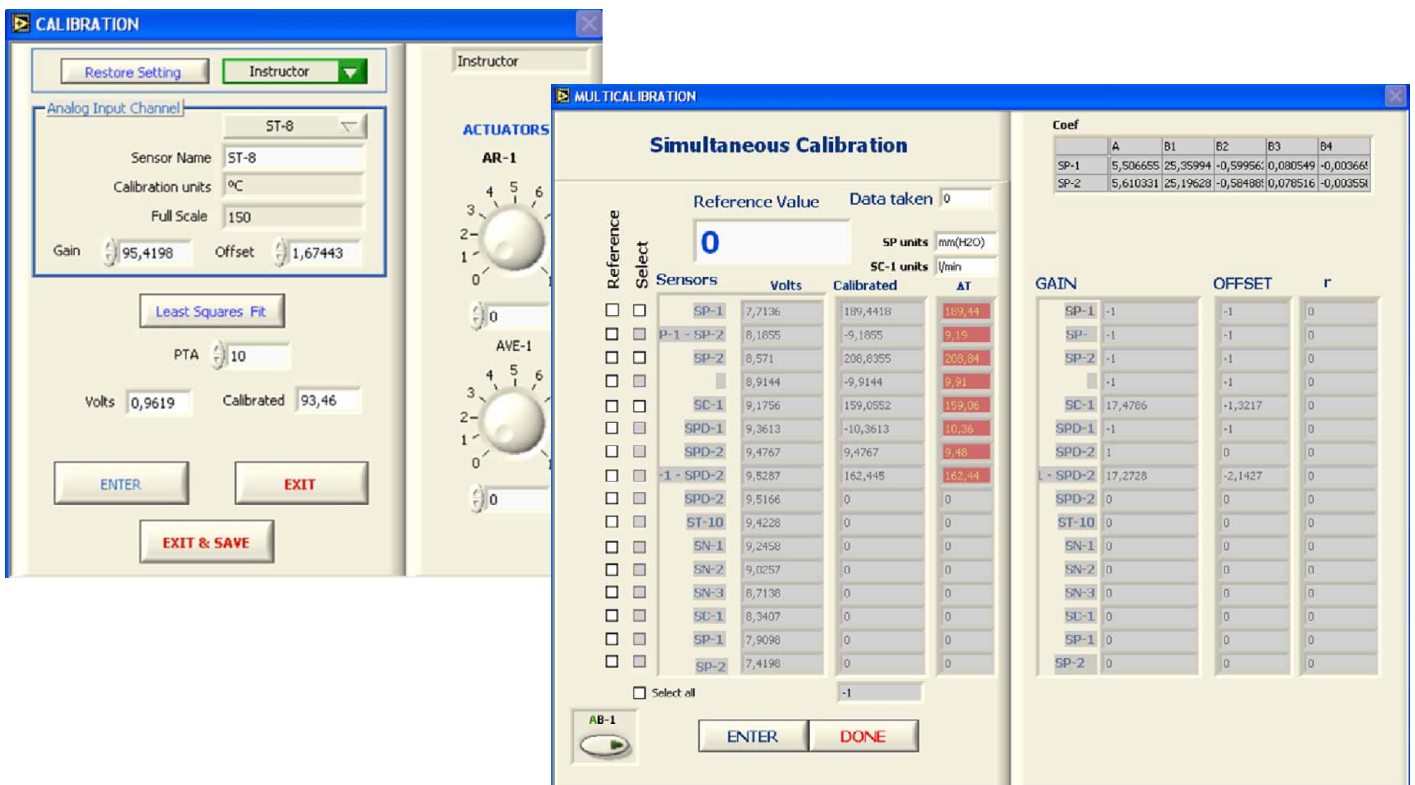
Software Main Screens

Main screen



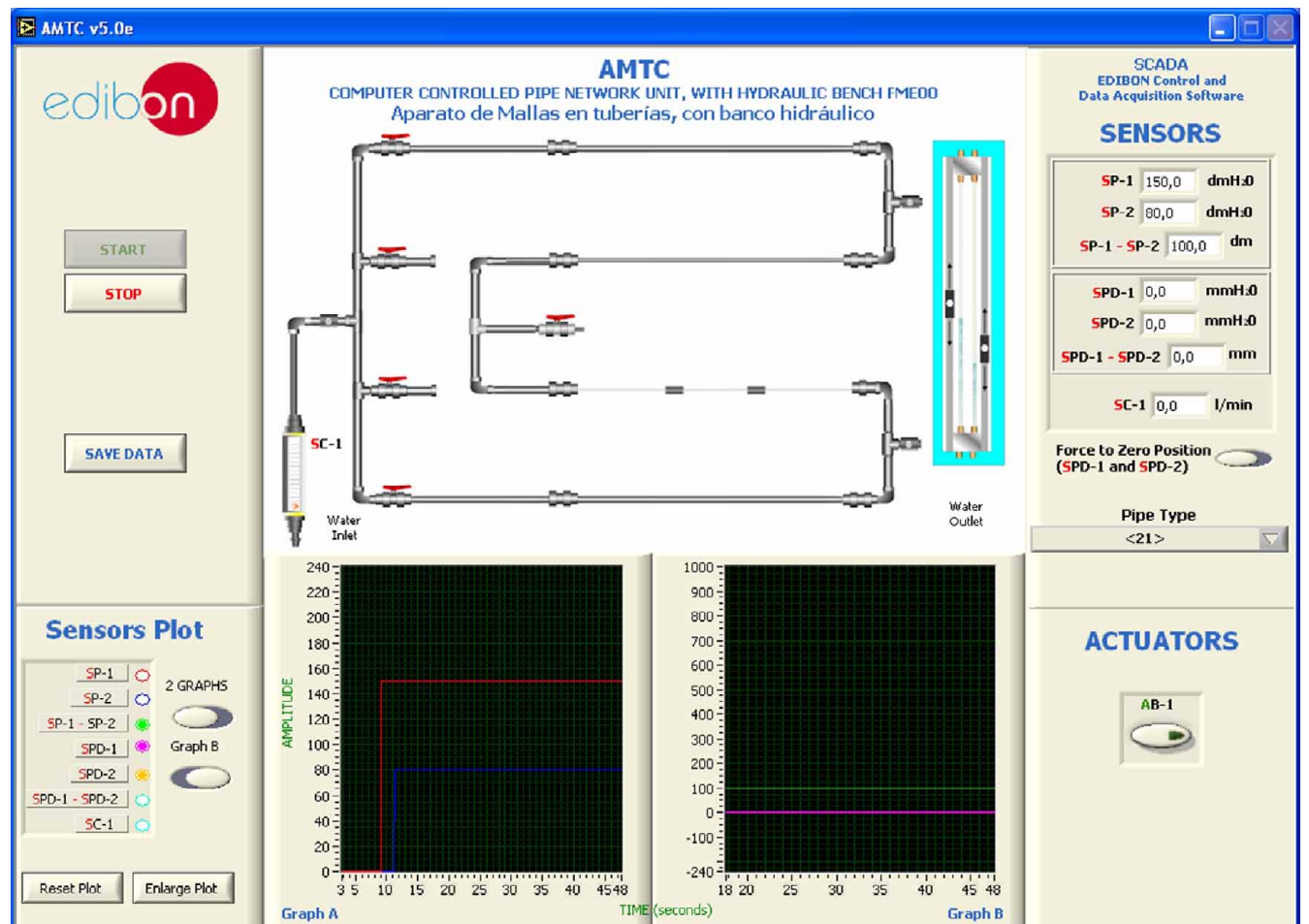
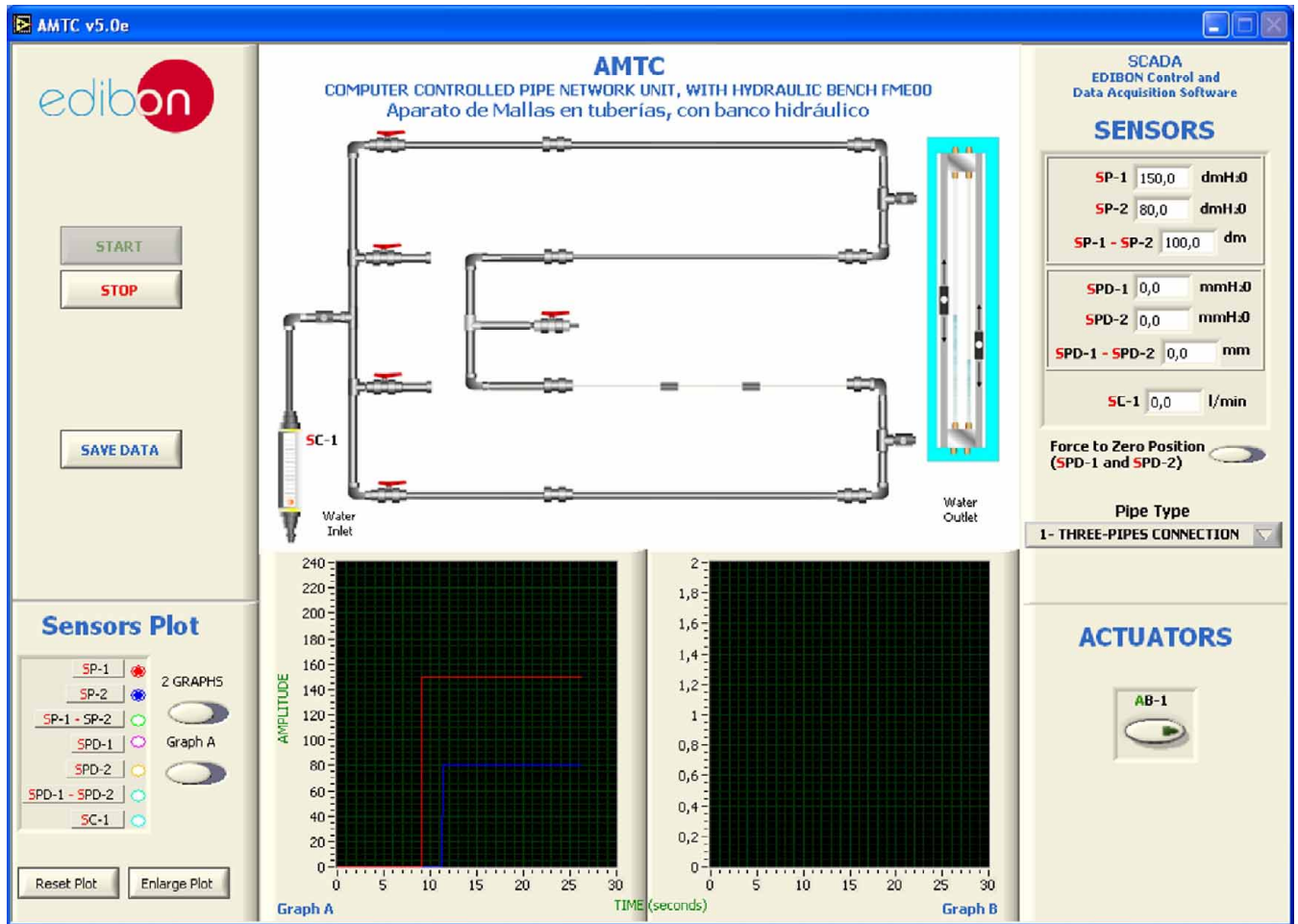
Note: SPD= Differential Pressure Sensor. SP= Pressure Sensor. SC= Flow Sensor. AB= Pump.
Pipe Type: selection of the pipe type or pipes connections type to test.

Examples of Sensors Calibration screens



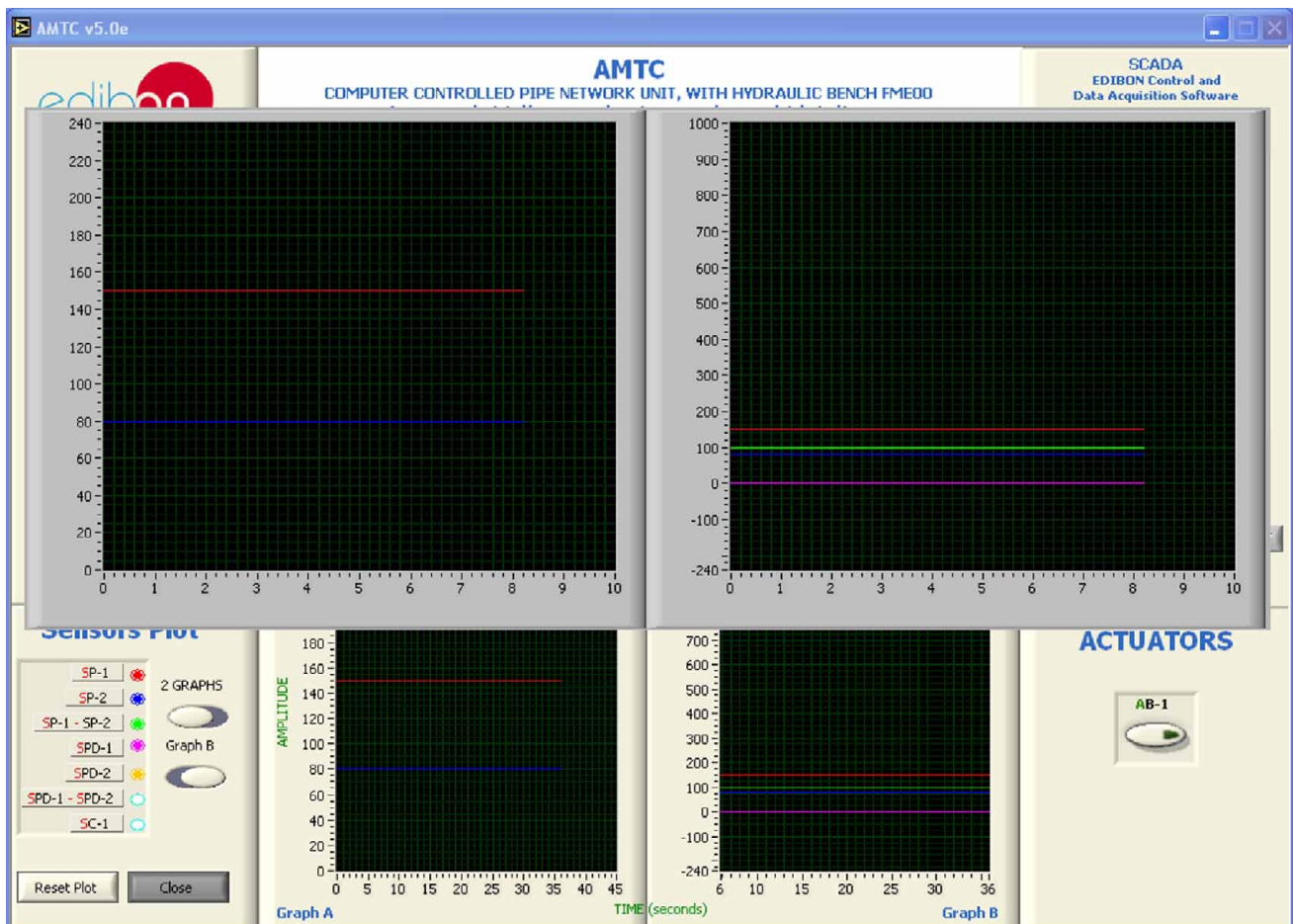
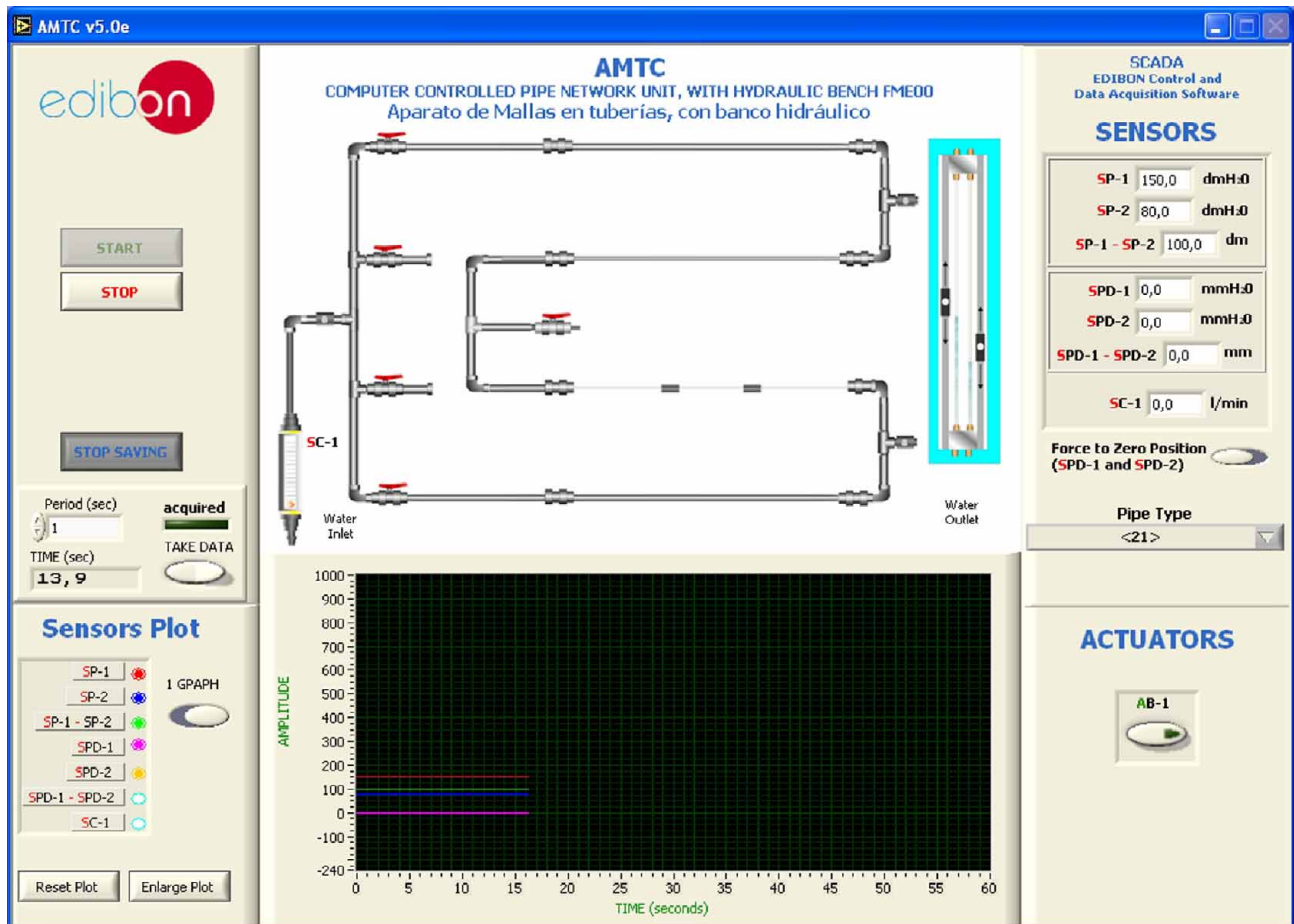
Continue...

Some typical exercises results



Continue...

Some typical exercises results



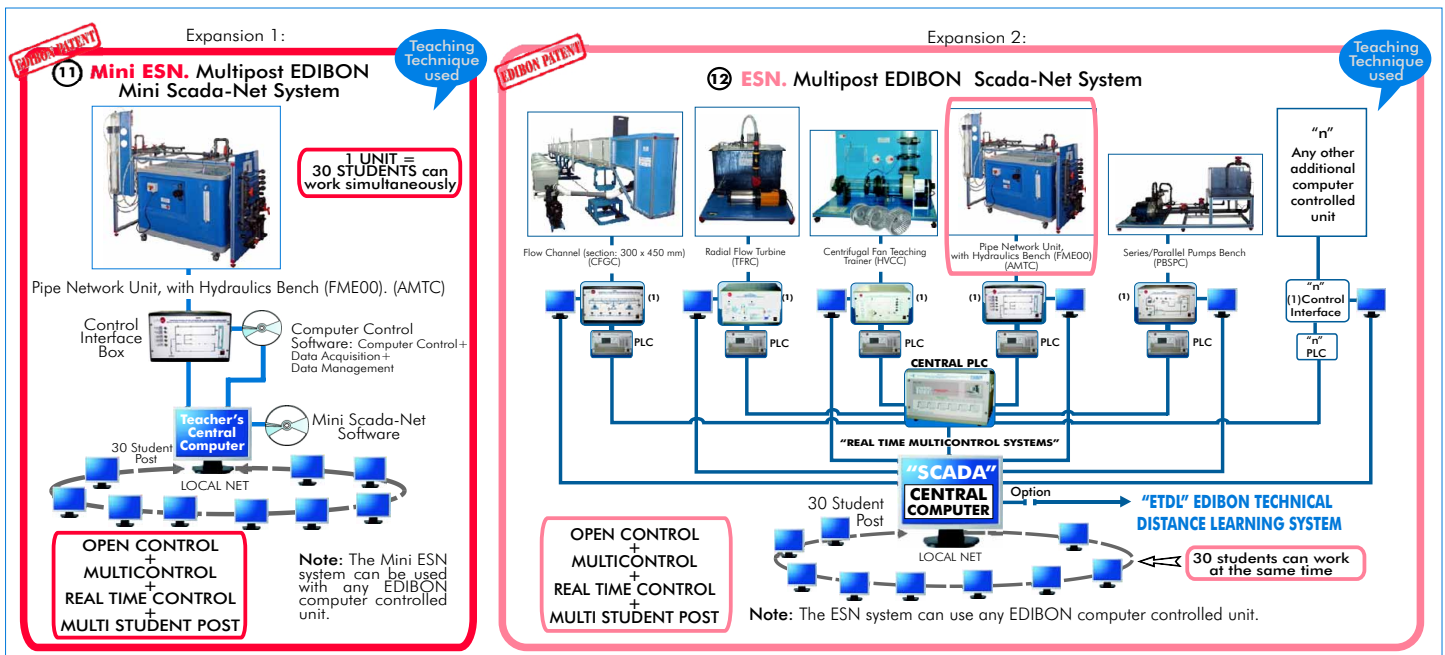
EXERCISES AND PRACTICAL POSSIBILITIES

Some Practical Possibilities of the Unit:

- 1.- Head losses in a PVC pipe.
 - 2.- Head losses in an aluminium pipe.
 - 3.- Head losses in a methacrylate pipe.
 - 4.- Study of head losses in pipes of the same material.
 - 5.- Study of head losses in function of the material.
 - 6.- Friction coefficient in a PVC pipe.
 - 7.- Friction coefficient in an aluminium pipe.
 - 8.- Friction coefficient in a methacrylate pipe.
 - 9.- Study of the friction coefficient in function of the material.
 - 10.- Study of the friction coefficient in function of the diameter.
 - 11.- Parallel network configuration for pipes of same material and different diameter.
 - 12.- Parallel network configuration for pipes of different material and same diameter.
 - 13.- Series network configuration for pipes of different material and different diameter.
 - 14.- Series network configuration for pipes of different material and same diameter.
 - 15.- Characteristics of a circular circuit.
 - 16.- Double piping circuit.
- Other possible practices:
- 17.- Sensors calibration.
- Practices to be done by PLC Module (PLC-PI)+PLC Control Software:
- 18.- Control of the AMTC unit process through the control interface box without the computer.
 - 19.- Visualization of all the sensors values used in the AMTC unit process.
 - 20.- Calibration of all sensors included in the AMTC unit process.

- 21.- Hand on of all the actuators involved in the AMTC unit process.
- 22.- Realization of different experiments, in automatic way, without having in front the unit. (This experiment can be decided previously).
- 23.- Simulation of outside actions, in the cases do not exist hardware elements. (Example: test of complementary tanks, complementary industrial environment to the process to be studied, etc).
- 24.- PLC hardware general use and manipulation.
- 25.- PLC process application for AMTC unit.
- 26.- PLC structure.
- 27.- PLC inputs and outputs configuration.
- 28.- PLC configuration possibilities.
- 29.- PLC program languages.
- 30.- PLC different programming standard languages.
- 31.- New configuration and development of new process.
- 32.- Hand on an established process.
- 33.- To visualize and see the results and to make comparisons with the AMTC unit process.
- 34.- Possibility of creating new process in relation with the AMTC unit.
- 35.- PLC Programming Exercises.
- 36.- Own PLC applications in accordance with teacher and student requirements.

POSSIBILITIES OF OTHER AVAILABLE EXPANSIONS



ORDER INFORMATION

Items supplied as standard

Minimum configuration for normal operation includes:

- ① Unit: AMTC. Pipe Network Unit, with Hydraulics Bench (FME00).
- ② AMTC/CIB. Control Interface Box.
- ③ DAB. Data Acquisition Board.
- ④ AMTC/CCSOF. Computer Control + Data Acquisition + Data Management Software.
- ⑤ Cables and Accessories, for normal operation.
- ⑥ Manuals.

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

Complementary items to the standard supply

PLC. Industrial Control using PLC (7 and 8):

- ⑦ PCL-PI. PLC Module.
- ⑧ AMTC/PLC-SOF. PLC Control Software.
- ⑨ AMTC/CAL. Computer Aided Learning Software (Results Calculation and Analysis). (Available on request).
- ⑩ AMTC/FSS. Faults Simulation System. (Available on request).

Expansions

- ⑪ Mini ESN. Multipost EDIBON Mini Scada-Net System.
- ⑫ ESN. Multipost EDIBON Scada-Net System.

REQUIRED SERVICES

- Electrical supply: single-phase 220V./50Hz or 110V./60Hz.
- Water supply and drainage.
- Computer (PC).

DIMENSIONS & WEIGHTS

AMTC. Unit:	-Dimensions: 1500 x 1000 x 2100 mm. approx.
	-Weight: 200 Kg. approx.
Control Interface Box:	-Dimensions: 490 x 330 x 310 mm. approx.
	-Weight: 10 Kg. approx.
PLC Module (PLC-PI):	-Dimensions: 490 x 330 x 310 mm. approx.
	-Weight: 30 Kg. approx.

AVAILABLE VERSIONS

Offered in this catalogue:

- AMTC. **Computer Controlled Pipe Network Unit, with Hydraulics Bench (FME00).**

Offered in other catalogue:

- AMT. **Pipe Network Unit, with Hydraulics Bench (FME00).**

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



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REPRESENTATIVE:

