edibon

Technical Teaching Equipment

Computer Controlled **Process Control System**
(with electronic control valve),
with SCADA and PID Control

UCP

EDIBON **SCADA** System
and **PID CONTROL** included

Teaching Technique used

EDIBON PATENT

① UCP-UB. Base Unit

② Control Interface Box

③ Data Acquisition Board

✛ Computer Control Software for each Set for Process Control

Computer (not included in the supply)

⑤ Cables and Accessories

⑥ Manuals

④ Sets (sensor and elements + computer control software) used in the base unit:

Sensor and elements + Computer Control Software for Temperature Process Control ✛	Sensor and elements + Computer Control Software for Flow Process Control ✛	Sensor and elements + Computer Control Software for Level Process Control ✛	Sensor and elements + Computer Control Software for Pressure Process Control ✛	Sensor and elements + Computer Control Software for pH Process Control ✛	Sensor and elements + Computer Control Software for Conductivity and TDS Process Control ✛
4.1 UCP-T. Set for **Temperature** Process Control	**4.2** UCP-C. Set for **Flow** Process Control	**4.3** UCP-N. Set for **Level** Process Control	**4.4** UCP-PA. Set for **Pressure** Process Control	**4.5** UCP-PH. Set for **PH** Process Control	**4.6** UCP-CT. Set for **Conductivity** and **TDS** (Total Dissolved Solids)Process Control

Key features:

➤ **Advanced Real-Time SCADA and PID Control.**

➤ **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 CAL software helps the user perform calculations and comprehend the results.**

➤ **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**

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   ↳Products range
      ↳Units
         ↳10.-Process Control

For more information about Key Features, click here:

Common items for all Process Control parameters

① UCP-UB. Base Unit:

Bench-top unit.

This unit is common for all Sets for Process Control type "UCP" and can work with one or several sets.

Anodized aluminium structure and panels in painted steel.

Main metallic elements in stainless steel.

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

A transparent main tank and collector with an orifice in the central dividing wall (2x25 dm^3), and drainage in both compartments.

A transparent dual process tank (2x10 dm^3), interconnected through an orifice and a ball valve and an overflow in the dividing wall; a graduate scale and a threaded drain of adjustable level with bypass.

2 Centrifugal pumps, range: 0-10 l./min.

2 Variable area flow meters (0.2-2 l./min., and 0.2-10 l./min.), and with a manual valve.

Line of on/off regulation valves (solenoid). Usually one is normally opened, and the other two are normally closed, and manual drainage valves of the upper tank.

Proportional valve: a motorized control valve:

Brass valve G ½":

Pmax. 4 bar. 24 volts. Control 12-24 V. 200-1000 mA. Temperature :-10 to 60°C.

Any Set for Process Control type "UCP" will be supplied installed in the Base Unit and ready for working.

UCP-UB

② UCP/CIB. Control Interface Box :

This unit is common for all Sets for Process Control type "UCP" and can work with one or several sets.

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 int 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 PID control with flexibility of modifications from the computer keyboard of the PID parameters, at any moment during the process. Real time PID and on/off control for pumps, compressors, resistances, control valves, etc. **Real time PID 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.

Proportional control, integral control and derivative control, based on the real PID mathematical formula, by changing the values, at any time, of the three control constants (proportional, integral and derivative constants).

Possibility of automatization of the actuators involved in the process.

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

UCP/CIB

③ DAB. Data Acquisition Board:

This board is common for all Sets for Process Control type "UCP".

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

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)=±10V.

Data transfers=DMA, interrupts, programmed I/0. Number of DMA channels=6.

Analog output:

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

Maximum output rate up to: 833 KS/s.

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

Digital Input/Output:

Number of **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 Sets (sensor and elements + computer control software) used in the base unit:

④.1 UCP-T. Set for Temperature Process Control:

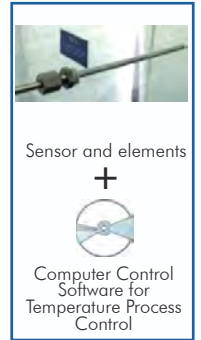This Set will be **supplied and installed in the Base Unit** and ready for working.

a) **Sensor and elements:**

Temperature sensor "J type".

Electric resistor (0.5 KW), with thermostat (70 °C).

Helix agitator, range: 0-300 r.p.m.

On/off level switch; safety element that permits the resistance to operate just when the level of water is sufficient.

b) **Computer Control Software:**

Computer Control+Data Acquisition+Data Management Software for Temperature Process Control.

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

Analog and digital PID control. Menu for PID and set point selection required in the whole work range.

Management, processing, comparison and storage of data.

Sampling velocity up to 250,000 data per second.

Student calibration system for all 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 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 results and manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

Sensor and elements
+
Computer Control Software for Temperature Process Control

UCP-T

④.2 UCP-C. Set for Flow Process Control:

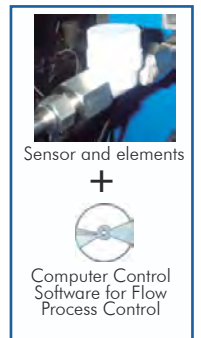This Set will be **supplied and installed in the Base Unit** and ready for working.

a) **Sensor and elements:**

Turbine type flow sensor, range: 0.25-6.5 l./min.

b) **Computer Control Software:**

Computer Control+Data Acquisition+Data Management Software for Flow Process Control.

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

Analog and digital PID control. Menu for PID and set point selection required in the whole work range.

Management, processing, comparison and storage of data.

Sampling velocity up to 250,000 data per second.

Student calibration system for all 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 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 results and manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

Sensor and elements
+
Computer Control Software for Flow Process Control

UCP-C

④.3 UCP-N. Set for Level Process Control:

This Set will be **supplied and installed in the Base Unit** and ready for working.
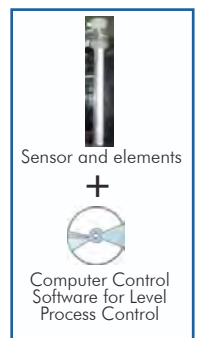
a) **Sensor and elements:**

0-300mm level sensor (of capacitive immersion, 4-20mA), **made with tephlon to avoid any corrosion.**

b) **Computer Control Software:**

Computer Control+Data Acquisition+Data Management Software for Level Process Control.

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

Analog and digital PID control. Menu for PID and set point selection required in the whole work range.

Management, processing, comparison and storage of data.

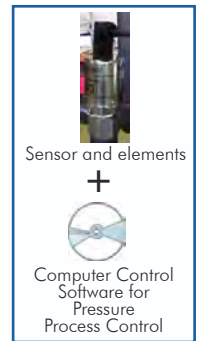**Sampling velocity up to 250,000 data per second.**

Student calibration system for all 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 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 results and manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

Sensor and elements
+
Computer Control Software for Level Process Control

UCP-N

④ Sets (sensor and elements + computer control software) used in the base unit:

④.4 UCP-PA. Set for Pressure Process Control:

This Set will be **supplied and installed in the Base Unit** and ready for working.

a) **Sensor and elements:**

Pressure sensor, range: 0-1psi.

b) **Computer Control Software:**

Computer Control+Data Acquisition+Data Management Software for Pressure Process Control.

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

Analog and digital PID control. Menu for PID and set point selection required in the whole work range.

Management, processing, comparison and storage of data.

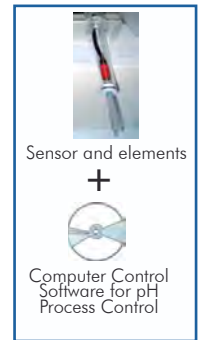**Sampling velocity up to 250,000 data per second.**

Student calibration system for all 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 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 results and manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

④.5 UCP-PH. Set for pH Process Control:

This Set will be **supplied and installed in the Base Unit** and ready for working.

a) **Sensor and elements:**

pH sensor:

Simple electrode Ag/Agcl.

Accuracy:± **0.2 pH.**

Resolution: 0.1 pH.

Range: 0-14.

Helix agitator, range: 0-300 r.p.m.

b) **Computer Control Software:**

Computer Control+Data Acquisition+Data Management Software for pH Process Control.

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

Analog and digital PID control. Menu for PID and set point selection required in the whole work range.

Management, processing, comparison and storage of data.

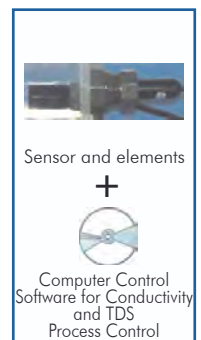**Sampling velocity up to 250,000 data per second.**

Student calibration system for all 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 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 results and manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

④.6 UCP-CT. Set for Conductivity and TDS (Total Dissolved Solids) Process Control:

This Set will be **supplied and installed in the Base Unit** and ready for working.

a) **Sensor and elements:**

Conductivity and TDS (Total Dissolved Solids) sensor:

Conductivity range: 0-1999 μs/cm.

Accuracy:± **2% μs/cm.**

Resolution: 10 μs/cm.

TDS range: 0-1999 ppm.

Accuracy:± **2% ppm.**

Resolution: 10 ppm.

Helix agitator, range: 0-300 r.p.m.

b) **Computer Control Software:**

Computer Control+Data Acquisition+Data Management Software for Conductivity and TDS (Total Dissolved Solids) Process Control.

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

Analog and digital PID control. Menu for PID and set point selection required in the whole work range.

Management, processing, comparison and storage of data.

Sampling velocity up to 250,000 data per second.

Student calibration system for all 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 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 results and 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 system is **supplied with 8 manuals for each process control**: Required Services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices Manuals.

Sensor and elements

+

Computer Control Software for Pressure Process Control

UCP-PA

Sensor and elements

+

Computer Control Software for pH Process Control

UCP-PH

Sensor and elements

+

Computer Control Software for Conductivity and TDS Process Control

UCP-CT

Additional and optional items

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

⑦ **PLC-PI. PLC Module:**

This module is common for all Sets for Process Control type "UCP" and can work with one or several sets.

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.

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).

⑧ **UCP/PLC-SOF. PLC Control Software:**

For each particular control process, always included with PLC supply.

PLC-PI

⑨ **UCP/FSS. Faults Simulation System:**

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

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

Faults affecting the sensors measurement:

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

In this case, the student should proceed to calibrate the affected sensor through the values collection.

- **Non-linearity.**

When we have the measures taken by the sensor, a quadratic or inverse function is applied to them. Thus, the value measured will not be the real one, as in the case above mentioned, but when we calibrate again, the sensor will not operate linearly and we will not be able to calibrate it by lest squares fits.

Faults affecting the actuators: (These do not admit solutions. The student must just realise it and notify it.)

- **Actuators canals interchange at any time during the program execution.**

This error does not admit any solution.

- **Response reduction of an actuator.**

By the reduction of the output voltage in analog outputs, we can get an response with a fraction of what it should be, either with a manual execution or with any control type (ON/OFF, PID...).

Faults in the controls execution:

- **Inversion of the performance in ON/OFF controls.**

The state of some actuator is inverted, when it should be ON is OFF instead, and vice versa. The student should provide the correct operating logic.

- **Reduction or increase of the calculated total response.**

We multiply by a factor the total response calculated by the PID, provoking, thus, the reduction or increase of the action really applied to the actuator, and the consequent instability of the control. The student should notify it and try to calculate this factor.

- **The action of some controls is annulled.**

For example, in a PID control, the derivative action is annulled, becoming thus in a PI control. The student will be able to realise it if for some moments, calculates the PID action and check that the calculations are not correct. In this case, he should say what is the real control applied (PI,PD, etc...).

(1)
Welcome screen.
From the instruccion button (with instructor's password) the faults mode is activated.

(2)
Faults Configuration Menu screen

(3)
Sensors Calibration/ Descalibration screen

(4) Faults Navigation screen

(5)
Faults order screen

(6) Practice access screen

Software Main Screens
Control Modes screens for any Process Control

Note: SPH=pH sensor. SN=Level sensor. ST=Temperature sensor. SC=Flow sensor. SP=Pressure sensor. AVP=Proportional Valve.
AA=Agitator. AB=Pump. AR=Heating resistance. AVS=Solenoid valve.

Software Main Screens
Control Modes screens for any Process Control

Note:
SPH=pH sensor. SN=Level sensor. ST=Temperature sensor. SC=Flow sensor. SP=Pressure sensor. AVP=Proportional Valve.
AA=Agitator. AB=Pump. AR=Heating resistance. AVS=Solenoid valve.

Example of Sensors Calibration screen
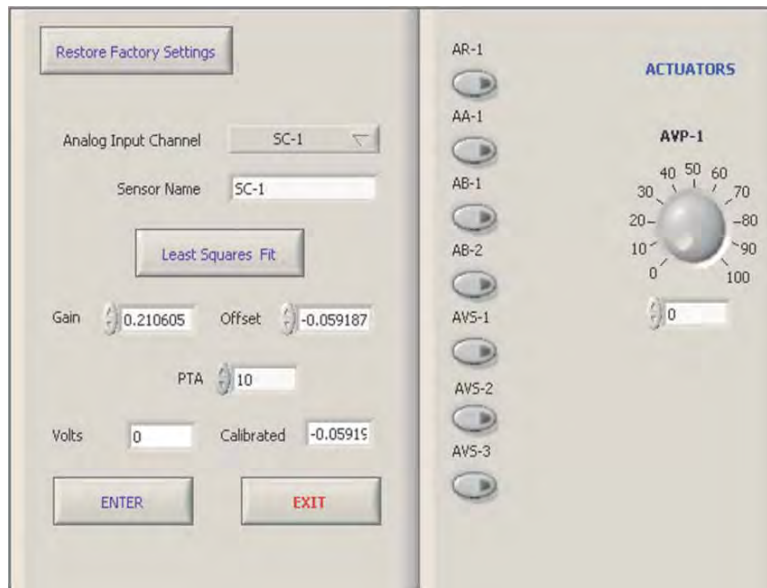
Examples of On/Off Controls screens
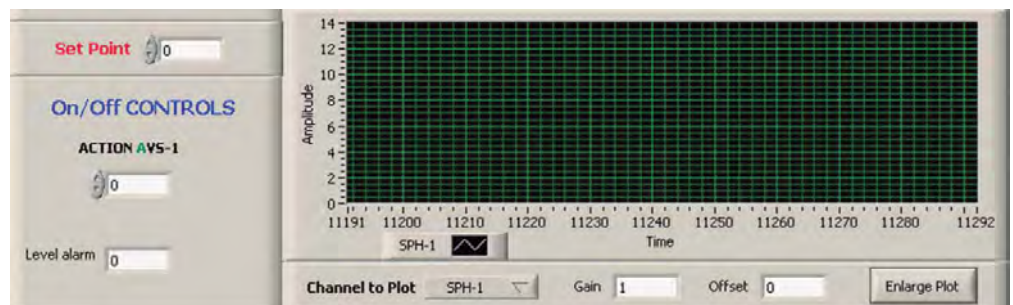
Examples of PID Control screens
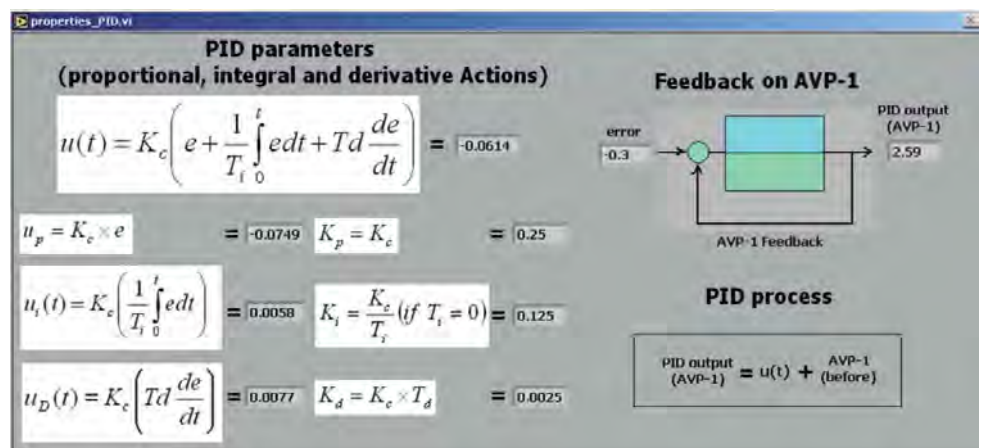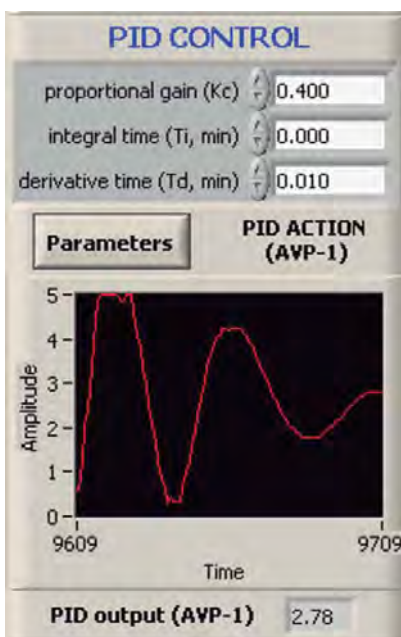
Some typical exercises results

Example of PID Control on Level:
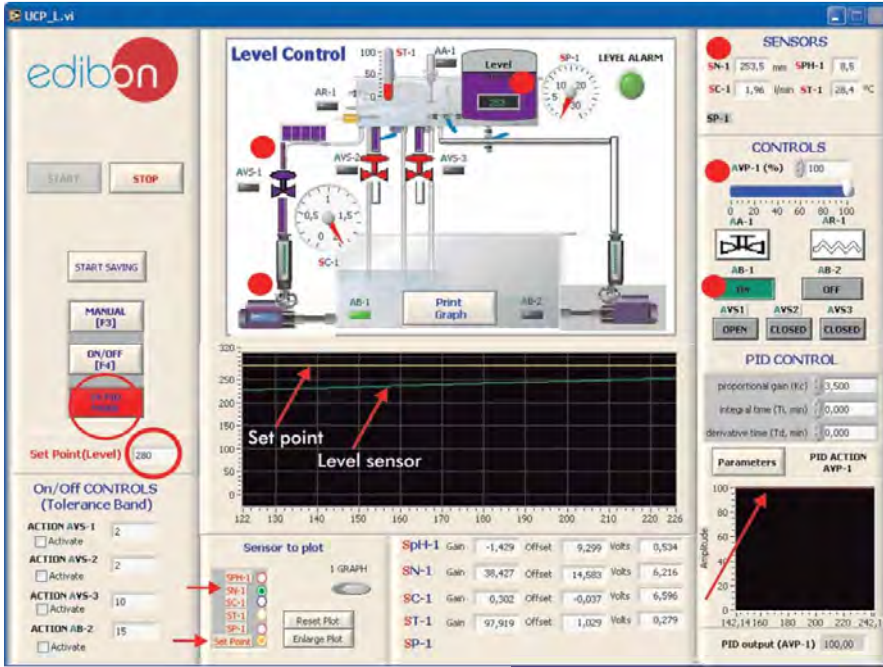
Actions:
1.- We establish the set point for level on 280mm.
2.- We turn on PID.

Effects:
1.- The system turns on the AB-1 pump.
2.- It opens the proportional valve.
3.- The level increases.

Effects:
1.- When the water level reaches the set point value, the system closes the AVP-1 valve, in order to close the water inlet.
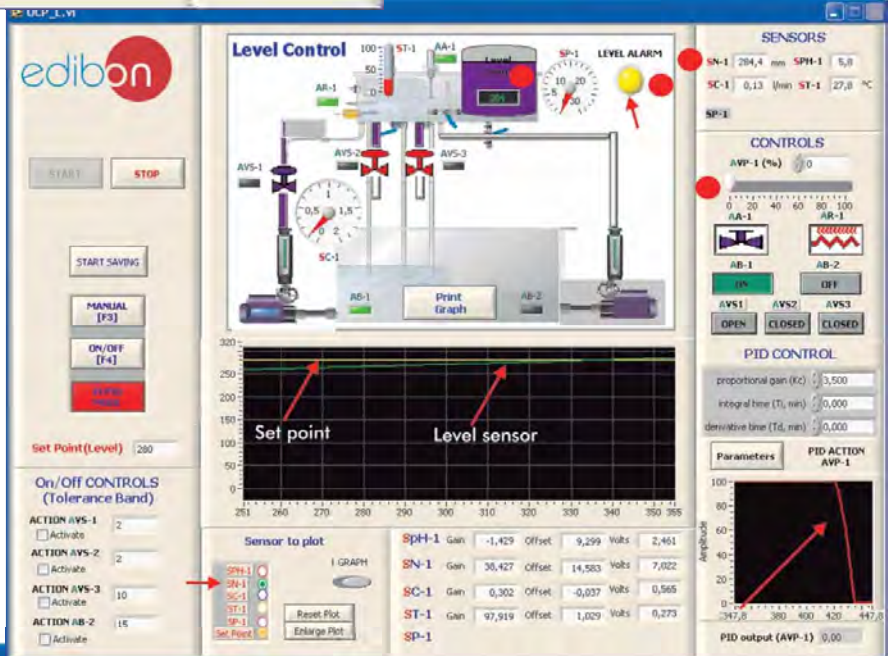
Effects:
1.- As the level is higher than what we are looking for (observed in the screen above) the system opens the AVS-2 solenoid valve in order to decrease the level.
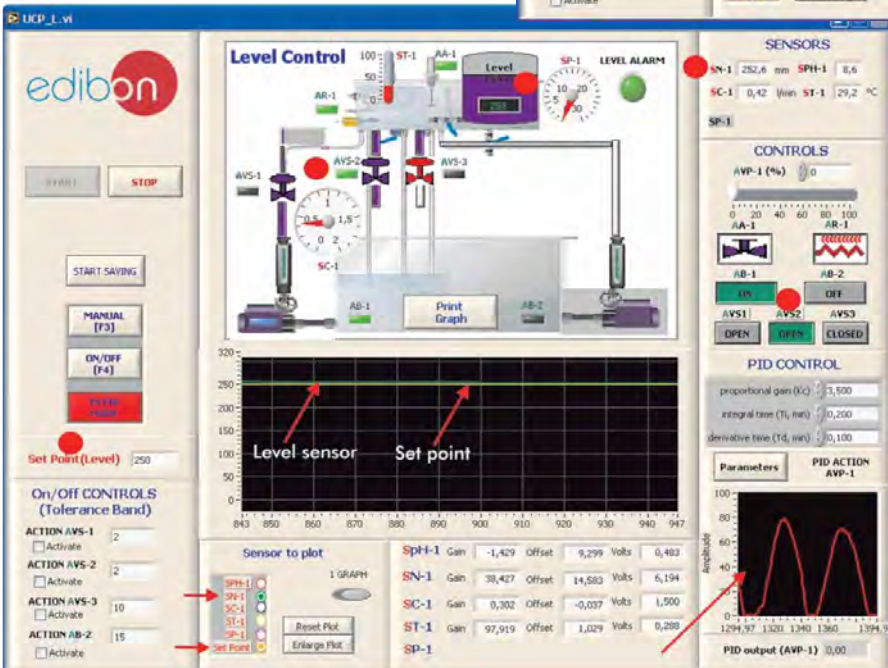
Some typical exercises results

Example of PID Control on Temperature:
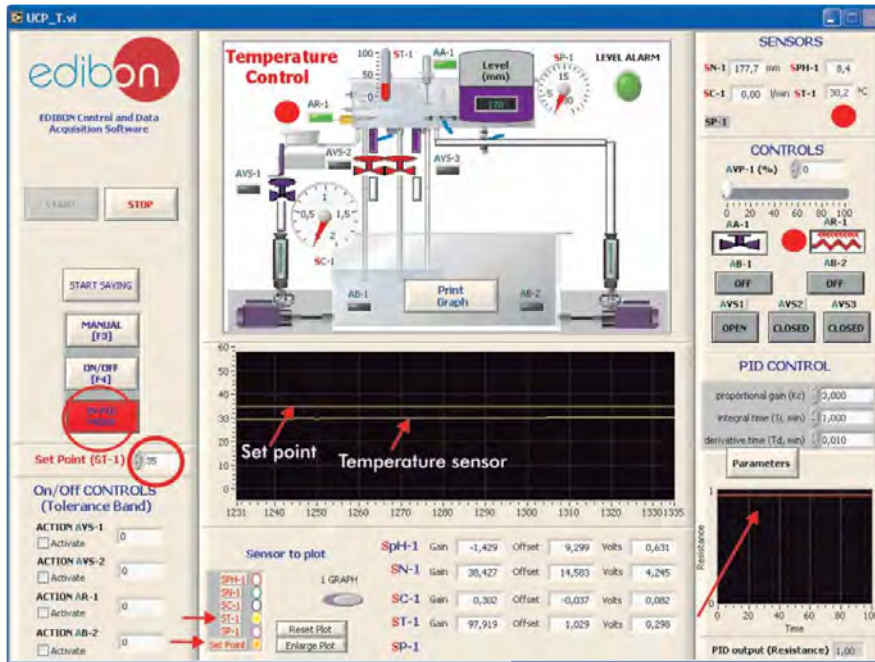
○ Actions:
  1.- We establish the set point for temperature on 35°C.
  2.- We turn on PID.

● Effects:
  1.- The electrical resistance (AR-1) turns on.
  2.- The resistance stars to heat the water in the tank.
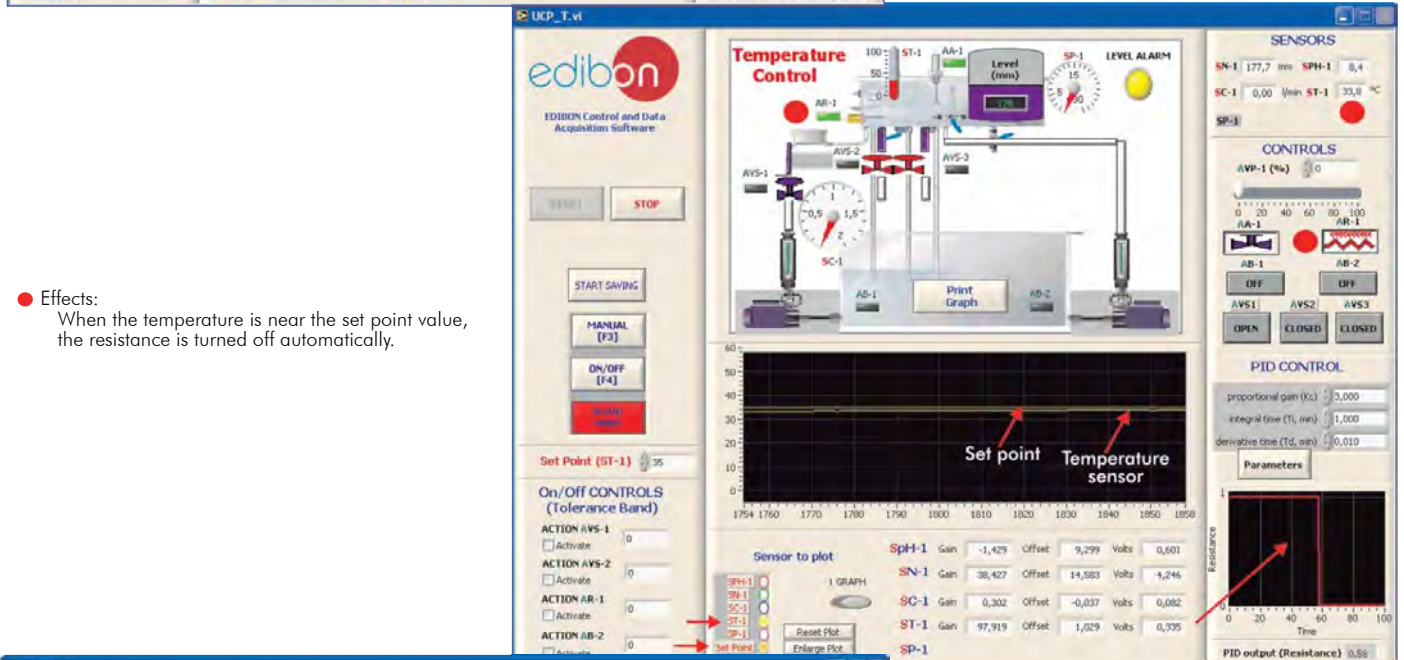
● Effects:
  When the temperature is near the set point value, the resistance is turned off automatically.
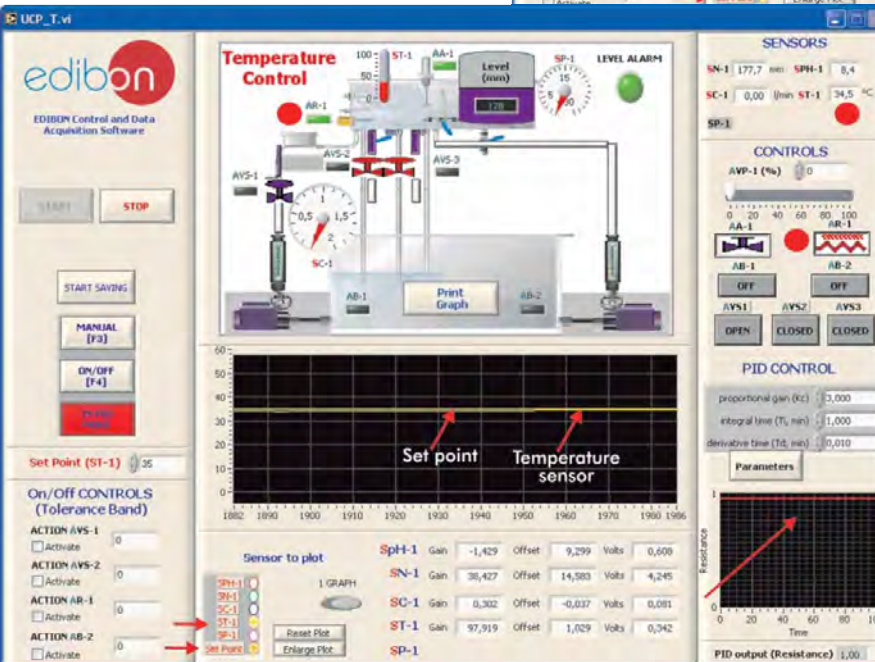
● Effects:
  The system is not able to reach the set point value with the resistance turned off, so the system turns on the resistance again in order to reach the set point value.

Some Practical Possibilities of the System

Temperature Process Control:
1.- Temperature control loops(Manual).
2.- Temperature control loops(On/Off).
3.- Temperature control loops(Proportional).
4.- Temperature control loops (Proportional + Integral).
5.- Temperature control loops (Proportional + Derivative).
6.- Temperature control loops (Proportional + Derivative +Integral).
7.- Adjustment of the constant of a controller of temperature (Ziegler-Nichols).
8.- Adjustment of the constant of a controller of temperature (Reaction Curves).
9.- Temperature sensor calibration.

Flow Process Control:
10.- Flow control loops (Manual).
11.- Flow control loops (On/Off).
12.- Flow control loops (Proportional).
13.- Flow control loops (Proportional + Integral).
14.- Flow control loops (Proportional + Derivative).
15.- Flow control loops (Proportional + Derivative + Integral).
16.- Adjustment of the flow controller constants (Ziegler-Nichols).
17.- Adjustment of the flow controller constants (Reaction Curves).
18.- Flow sensor calibration.

Level Process Control:
19.- Level control loops (Manual).
20.- Level control loops (On/Off).
21.- Level control loops (Proportional).
22.- Level control loops (Proportional + Integral).
23.- Level control loops (Proportional + Derivative).
24.- Level control loops(Proportional + Derivative + Integral).
25.- Adjustment of the constants of a flow controller (Ziegler-Nichols).
26.- Adjustment of the constants of a flow controller (Reaction Curves).
27.- Level sensor calibration.

Pressure Process Control:
28.- Pressure control loops (Manual).
29.- Pressure control loops(On/Off).
30.- Pressure control loops (Proportional).
31.- Pressure control loops (Proportional + Integral).
32.- Pressure control loops (Proportional + Derivative).
33.- Pressure control loops (Proportional + Derivative + Integral).
34.- Adjustment of the constant of a Pressure controller (Ziegler-Nichols).
35.- Adjustment of the constant of a Pressure controller (Reaction Curves).
36.- Pressure sensor calibration.

pH Process Control:
37.- pH control loops (Manual).
38.- pH control loops(On/Off).
39.- pH control loops (Proportional).
40.- pH control loops (Proportional + Integral).
41.- pH control loops (Proportional + Derivative).
42.- pH control loops (Proportional + Derivative + Integral).
43.- Adjustment of the constant of a pH controller (Ziegler-Nichols).
44.- Adjustment of the constant of a pH controller (Reaction Curves).
45.- pH sensor calibration.

Conductivity and TDS (Total Dissolved Solids) Process Control:
46.- Conductivity control loops (Manual).
47.- Conductivity control loops(On/Off).
48.- Conductivity control loops (Proportional).
49.- Conductivity control loops (Proportional + Integral).
50.- Conductivity control loops (Proportional + Derivative).
51.- Conductivity control loops (Proportional + Derivative + Integral).
52.- Adjustment of the constant of a Conductivity controller (Ziegler-Nichols).
53.- Adjustment of the constant of a Conductivity controller (Reaction Curves).
54.- TDS control loops (Manual).
55.- TDS control loops(On/Off).
56.- TDS control loops (Proportional).
57.- TDS control loops (Proportional + Integral).
58.- TDS control loops (Proportional + Derivative).
59.- TDS control loops (Proportional + Derivative + Integral).
60.- Adjustment of the constant of a TDS controller (Ziegler-Nichols).
61.- Adjustment of the constant of a TDS controller (Reaction Curves).
62.- Conductivity and TDS sensor calibration.

Practices to be done by PLC (PLC-PI) + PLC Control Software:
(These practices to be able done with each Process Control)

1- Control of the unit process through the control interface box without the computer.
2.- Visualization of all the sensors values used in the unit process.
3.- Calibration of all sensors included in the unit process.
4.- Hand on of all the actuators involved in the unit process.
5.- Realization of different experiments, in automatic way, without having in front the unit. (This experiment can be decided previously).
6.- Simulation of outside actions, in the cases hardware elements do not exist . (Example: test of complementary tanks, complementary industrial environment to the process to be studied, etc).
7.- PLC hardware general use and manipulation.
8.- PLC process application for the unit.
9.- PLC structure.
10.- PLC inputs and outputs configuration.
11.- PLC configuration possibilities.
12.- PLC program languages.
13.- PLC different programming standard languages.
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 unit process.
17.- Possibility of creating new process in relation with the unit.
18.- PLC Programming exercises.
19.- Own PLC applications in accordance with teacher and student requirements.

Practices to be done by Faults Simulation System (UCP/FSS)

Incorrect Calibration:
1.- Load the calibration error of the PH sensor.
2.- Load the calibration error of the Level sensor.
3.- Load the calibration error of the Flow sensor.
4.- Load the calibration error of the Temperature sensor.

Non Linearity:
5.- Non inverse linearity of the pH sensor.
6.- Non quadratic linearity of the Level sensor.
7.- Non quadratic linearity of the Flow sensor.
8.- No inverse linearity of the Temperature sensor.

Interchange of actuators:
9.- Interchange the bombs AB-1 and AB-2 between them during the operations of the controls ON/OFF and PID. (Affected sensor: Level sensor)

Reduction of an actuator response:
10.- In the PID, the real response of the proportional valve is half the amount calculated by the PID control. Thus, the maximum real opening that will be able to reach is 50%. (Affected sensor: Flow sensor).

Inversion of the performance in ON/OFF controls:
11.- In the ON/OFF control, the actuation of the AVS-1 is inverted, acting, thus, on the same way as the others 2 valves (for a good control, it should operate the other way around to how the others 2 do it). (Affected sensor: pH).

Reduction or increase of the calculated total response:
12.- In the PID, the real action in the resistance is half of the total calculated. (Affected sensor: Temperature sensor).

The action of some controls is annulled:
13.- The Integral control does not work. It is reduced to a PD control (Proportional-Derivative).
14.- The Derivative Control does not work. It is reduced to a PI Control (Proportional-Integral).
15.- The Integral and Derivative controls do not work. They are reduced to a Proportional Control.

Expansion 1:

⑩ Mini ESN. Multipost EDIBON Mini Scada-Net System

Teaching Technique used

1 UNIT = 30 STUDENTS can work simultaneously

Sensor and elements
+
Computer Control Software for Temperature Process Control

6 available process controls

Base Unit

Control Interface Box

Computer Control Software: Computer Control + Data Acquisition + Data Management

Teacher's Central Computer

Mini Scada-Net Software

30 Student Post

LOCAL NET

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

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

Expansion 2:

⑪ESN. Multipost EDIBON Scada-Net System

Teaching Technique used

Sensor and elements
+
Computer Control Software for Temperature Process Control

PROCESS CONTROL SYSTEM (with electronic control valve) (UCP)

PROCESS CONTROL UNIT (PRESSURE) (UCP-P)

INDUSTRIAL PROCESS PLANT TRAINER (CPIC)

PROCESS CONTROL SYSTEM (with pneumatic control valve) (UCPCN)

SENSORS (Modular System) (BS)

"n" Any other additional computer controlled unit

(1) PLC
(1) PLC
(1) PLC
(1) PLC
(1) PLC

"n" control (1)Interface

"n" PLC

CENTRAL PLC

"REAL TIME MULTICONTROL SYSTEMS"

"SCADA" CENTRAL COMPUTER

Option

"ETDL" EDIBON TECHNICAL DISTANCE LEARNING SYSTEM

30 Student Post

LOCAL NET

30 students can work at the same time

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

Note: The ESN system can use any EDIBON computer controlled unit.

ORDER INFORMATION

Items always supplied as minimum configuration

Common items for all Process Control parameters:

① UCP-UB. **Base Unit.** (Common for all Sets for Process Control type "UCP")

② UCP/CIB. **Control Interface Box.** (Common for all Sets for Process Control type "UCP")

③ DAB. **Data Acquisition Board.** (Common for all Sets for Process Control type "UCP")

④ Sets (sesor and elements + computer control software) used in the base unit:

  4.1 UCP-T. Set for **Temperature Process Control** , and / or

  4.2 UCP-C. Set for **Flow Process Control,** and / or

  4.3 UCP-N. Set for **Level Process Control,** and / or

  4.4 UCP-PA. Set for **Pressure Process Control,** and / or

  4.5 UCP-PH. Set for **pH Process Control,** and / or

  4.6 UCP-CT. Set for **Conductivity** and **TDS (Total Dissolved Solids)** Process control.

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

⑥ **Manuals.**

Additional and optional items

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

⑦ PCL-PI.PLC Module. (Common for all Sets for Process Control type "UCP").

⑧ UCP/PLC-SOF. PLC Control Software. (Particular for each Set for Process Control type "UCP").

⑨ UCP/FSS. Faults Simulation System.

Expansions

⑩ Mini ESN. Multipost EDIBON Mini Scada-Net System.

⑪ 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

UCP-UB Base Unit: -Dimensions: 500 x 1000 x 1000 mm. approx.
    -Weight :40 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:

- **UCP.** Computer Controlled **Process Control System** (with electronic control valve).

Offered in other catalogues:

- **UCPCN.** Computer Controlled **Process Control System** (with pneumatic control valve).

- **UCPCV.** Computer Controlled **Process Control System** (with speed controller).

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

REPRESENTATIVE: