EDIBON
Technical Teaching Equipment
Equipamiento didáctico técnico

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UCP Process Control Series

CLARIFICATION NOTE

I. Technical and Commercial Notes.

The UCP Process Control Series is a unit with many configurations allowing you to study Process Control by different ways and studying several parameters individually. We start from the formula you have in the books and taking into consideration this mathematical formula, we design the teaching unit.

This formula involved in the process can be analyzed in all the UCP Process Control Series, at any time separately, even section by section or globally. The Proportional band, the Derivative and the Integral values can be analyzed, not only the values but also the curves either individually and /or globally, at any time during the process. The Lab View software structure allow to see at any time the PID curves with different colors, different zoom and with any values chosen by the students. The unit can be calibrated by the student, adjusting the GAIN, OFFSET etc. But the teacher calibration done can be protected by the "Teacher Password".

When the student see the values of any parameter related with the PID process globally or separately as P or I or D, the condition of values can be changed so the effect can be seen "in the formula itself" and in the curves, one or another, or both.
The parameters that can be analyzed are Temperature, Flow, Level, Pressure, pH, Conductivity and Turbidity. So any PID control can be done separately with anyone of these parameters.

What is the Unit structure?

- One base Unit (UB). Always you need that.
- One Electronic Interface Box. Always you need that.
- One Data Acquisition Board getting 250.000 d/s. always you need that.
- The software packages, with Lab View structure, one for control, other for data acquisition and the other for data management. Always you need that but EDIBON supply only the 3 software packages related with the parameter chosen.
- Several Sensors. All can be analyzed one by one, and each parameter uses a "different" one, so any parameter use a particular sensor.
- Of course some cables, manual and other element are included to for immediately and normal operation.

The unit can use any computer available in the market.

What are the configuration possibilities?

There are 3 possibilities:

1. Unit with ELECTRONIC CONTROL VALVE included in base unit UB. (UCP)
2. Unit with PNEUMATIC CONTROL VALVE included in base unit UB. (UCPCN)
3. Unit with SPEED CONTROLLED included in the interface box. (UCPCV)

These are the three main control possibilities normally used in most of the cases in the industry. In any configuration, you need the Base Unit (UB) and any of the complements related with any parameter to be measured. Example UCP-T (Temperature), UCP-C (Flow), UCP-N (Level), UCP-PA (Pressure), UCP-PH (pH) and UCP-CT (Conductivity) with UCP-UB Base Unit for UCP. With Electronic Control Valve. Similar for UCP-CN with Pneumatic Control Valve and UCP-CV (Speed Control), with the difference that the parameters references change. Example of UCPCV; the base unit is UCPCV- UB and the parameter are UCPCV-T, UCPCV-N, UCPCV-PA, UCPCV-PH, UCPCV-CT. Example of UCPCN, in this case the require will be UCPCN-UB and for the parameters UCPCN-T, UCPCN-C...

There is an additional and special configuration where you can have the three-control system in only one unit. The reference in this case is UCPCNCV. So in the UCPCNCV we can offer Electronic Control Valve, Pneumatic Control Valve and Spend Control in the same unit. And all six parameters involved.

What are the complementary possibilities?

a) Programmable Logical Controller (PLC), Ref: PLC-PI. A Panasonic PLC with touch screen can be supplied, as complement. The Panasonic PLC is inside a box. EDIBON add to the panoramic PLC, the box, the power supply, all connection inside the box and several connector and switches in the front panel, in order to manipulate the unit from outside and by the touch screen. The PID control can be done by using the PLC-PI, and with PLC-PI software related with the process we are working on. We include in the supply, the proper software, related with the unitary process that we analyzer in any case, too.

b) A projector. The projector can be connected with the computer so all the results can be seen at the same time by all the students in a big screen in the classroom.

c) Mini SCADA-NET
The Mini SCADA-NET is a EDIBON design system that by making some electronics modifications in the Control Interface and by making a complex software packages, allow to work simultaneously 30 students with 30 computers, with only one unit, so the cost per student go down drastically. Another advantage is that the teacher can tech much easier as all the students can have the same result screen in his computer and any one can make any changes, visualizing the results by the rest of students.

d) FAULTS.
A Computer Control Aided Learning Software can be supplied on request. This CAL Soft allows to make calculations related with the results obtained, to plot and print the results. Many values of many physics constants are included. Some integral and alternative tables are included too. See the results screen in the catalogue and complementary information.

e) CAL.
EDIBON has designed a Software Faults System, where many faults can be included in the process and the student has to find out and to analyze the reason. This is available on request.

f) Future possibilities.

New Control Optional Facilities will be available soon.

What can be other complementary units?

UCP-P	Process Control Unit for the study of Pressure (Air), Computer Controlled
CPIC	Process Control Plant with Industrial Instrumentation and Service Module, Computer Controlled (Flow, Temperature, Level and Pressure)

There are other important units for learning about concepts?

SAIT	Transducers and Instrumentation Trainer
BS	Modular System for the Study of Sensors
RYC	Teaching Unit for the Study of Regulation and Control, Computer Controlled

Other unit related with other concepts related with?

CADDA	Teaching Unit for the study of Analog/Digital and Digital/Analog converters
TDS	Teaching Unit for the Study of Digital Signal Processing
TECNEL	Teaching Unit for the Study of Power Electronics, Computer Controlled
SERIN/CA	Industrial Servosystem Trainer (for AC Motors), Computer Controlled
SERIN/CC	Industrial Servosystem Trainer (for DC Motors), Computer Controlled
SCE	Generation Stations Control Simulator, Computer Controlled
CPVM	DC Motor Position and Speed Control
PLCE	PLC Training

II. Additional general informative notes.

- Design.
  - *Beginning:* We design the original unit on 1995.
  - *Evolution:* Since 1995 technically we have improved gradually this unit.
  - *Technical Problems along the time:* Originally, we had many difficulties with the electronics.
  - *Final design:* This is gotten after 7 issues. Today the design is finalised since 2001. No changes expected in next years.
  - *Own design*: EDIBON has designed the unit, the soft and the electronics, so we own 100% all "know-how". This gives full guarantee to the end customer.
  - *Documentation*: The designed documentation has several issues and it is already completed.
  - *Update*: As EDIBON has the complete "know-how", we can update in few days if there are any changes in components, software, environment or any particular reasons. Example, in case any particular component changes. We have to make the proper corrections in the unit itself**,** in the software, in the interface and in the manual.

- Quality.
  - *Rod material used:* The main materials we use are anodise aluminium and stainless steel. We use commercial electronic top quality components.
  - *Finnish: S*mall technical details included for nice look.
  - *Manuals:* **We include 8 manuals** with these units: Required Service Manual, Assembly and Installation Manual, Interface and Software / Control Console Manual, Set in Operation Manual, Safety Norms Manual, Practices Manual, Maintenance Manual and Calibration Manual.
  - *Some main suppliers:* Festo, Panasonic, National Instruments, National Semiconductors, Bosch, Fuji Electronics, Schneider Electronic, SMC, Lab View, Hitachi, Motorola, Simon, etc. We also custom made some components indoor.
  - *Quality control:* We do 20 tests before the unit leaves EDIBON. We do the manual quality control for the unit, interface and software separately. The **final** quality control is done **automatically** using the computer and we keep all the results for using as a "mirror" for after sales troubleshooting.
  - *Quality control review:* Due to EDIBON has all the "know-how" for unit, interface and software, we can easily update any of them, in case of any changes possibility in components, soft or computer changes.
  - *Quality certificates:* This unit has been designed, manufactured and has to work in accordance with **ISO9001:2000, ISO14001:2004 Worlddidac Quality Charter (WQC) and CE standard.**

- Technology.
  - *Hardware:* EDIBON has designed totally the hardware and we manufacture it on our own premises, only we are buying components. Some components are manufactured indoor.
  - *Software:* EDIBON has designed totally the software supplied working with the unit.

- *Teaching systems:* With this unit you can get about 300.000 data per second (we use the Texas Instrument PCI board) and additionally the real time computer control. EDIBON System (SCADA).
- *"Know-how" control:* As all software and hardware have been designed totally by EDIBON and because we manufacture everything in our factory we CONTROL TOTALLY the "know-how". This is an essential matter for future after sales service. As the units are not manufactured in big quantities, this is the most appropriate know-how control management.

➢ Efficiency ratios.

- *Unit facilities / cost:* The ratio is very high compared with other units available in the market, as with this unit you can do some more exercises by working with the base system and about 20 more exercises by working with additional accessories.
- *Student efficiency / cost:* The ratio efficiency is much higher than others as the students can learn better and quicker, as we use new teaching techniques. Several expansions are available.
- *Teaching techniques:* In this unit, we use several teaching techniques as: Calculation Soft, Simulation Soft, Computer Controlled, PLC Control and as expansion, the Mini ESN (EDIBON Scada – Net) and Technical Distance Learning (TDL).
- *Teaching efficiency / cost:* The teaching efficiency is much higher than others units in the market, as the teacher can teach quicker and he can check if the students understand the matter he is explaining. With this unit you can do real time control, open control and multicontrol, as standard and included in the minimum supply.
- *Accessories:* There is a list of accessories for 5 year operations. All these accessories can be supplied with the unit at additional cost.
- *Future expansions:* When you buy EDIBON unit or system, you open the door for many other future expansions. If you buy the minimum elements for running normally, you can expand afterwards.

➢ Warranties.

- *Training setting up:* We can train our representative engineer or the customer at our premises. Alternatively our engineers are ready to move to the customer place. We supply more than enough, technical information for running the unit without complicated problems.
- *Components warranty:* We guarantee the component use for 10 years. In case we do not find a component identical, we can do the proper modifications, as we **keep in our premises the list of components** for ANY UNIT supplied.
- *Units future update:* We have the complete "know-how", so no problem for updating the technology in future. Every year, EDIBON use to update some old units.
- *Maintenance warranty:* We supply the proper manual for that.
- *Sustainability warranty:* The 8 manuals supplied and the components plus the unit future update means SUSTAINABILITY.
- *After sales warranty:* We offer 3 years after sales warranty.
- *Engineers technical team:* We have a strong team of different engineers at EDIBON full time dedicated, as Electrical, Electronic, Mechanic, Telecommunications, Physics, Chemistry, etc.
- *Company future:* The first and the second board of directors generation, both are involved.
- *Spare pare list:* We have it at your disposition.

➢ SCADA and/or SCADA – NET:

What means SCADA?
A SCADA is a Software for Data Acquisition (ADA) and Control (C) System (S). EDIBON has designed **its own SCADA.** The EDIBON SCADA is similar as industrial one, offered by companies as Hanewell, Siemens, etc., but with many advantages, very useful for "Teaching", "Research" and "Courses", as it is Open Control, Multi Control and Real Time Control. The difference and advantages are explained in another clarification note "The real meaning of computerised units", available on request.

What means SCADA-NET?
A SCADA – NET is another software that allows many students to work with many units, all using SCADA, or many students to work with one unit using SCADA, too.

This note corresponds to unit UCP Process Control Series of Unit and for technical details, please read carefully the unit catalogue available in **www.edibon.com** and EDIBON products CD-ROM.