Computer Controlled Process Control Unit for the Study of Pressure (Air)

Unit: UCP-P. Process Control Unit for the study of Pressure (Air)

Always included in the supply:
- Computer
- Data Acquisition Board
- Cables and Accessories
- Manuals

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

Teaching Technique used: EDIBON Computer Control System

Unitary Process Configuration

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OPEN CONTROL + MULTICONTROL + REAL TIME CONTROL

1 actuators and 2 sensors controlled from any computer, and working simultaneously

PROCESS DIAGRAM AND ELEMENTS ALLOCATION

European Union Certificate

Worlddidac Quality Charter Certificate
Worlddidac Member

www.edibon.com
This unit basically consists of the following elements:

- Pneumatic circuit consisting of a tank, valves, pressure sensors, pressure regulators and pressure manometers.
- Computer Control and Data Acquisition Software, for controlling the process and the parameters involved.
- Reference to 6 UCP-P + UCP-P/CIB + DAB + UCP-P/CCSOF + Cables and Accessories + Manuals are included in the minimum.

## SPECIFICATIONS

### UCP-P. Unit:
- Bench-top unit.
- Anodized aluminium structure.
- Main metallic elements in stainless steel.

### DAB. Data Acquisition Board:
- PCI Data acquisition board (National Instruments) to be placed in a computer slot. Bus PCI.

### UCP-P/CIB. Control Interface Box:
- Control interface box with process diagram in the front panel and with the same distribution that the elements in the real unit.

### UCP-P/CCSOF. Computer Control + Data Acquisition + Data Management Software:
- Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen.
- 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.
- Analog and digital PID control. Menu for PID and set point selection required in the whole work range.

### REFERENCES

1. UCP-P + UCP-P/CIB + DAB + UCP-P/CCSOF + Cables and Accessories + Manuals are included in the minimum system, enabling a normal operation.
SPECIFICATIONS

Complementary items to the standard supply

 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.
  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 V DC).
      Relay output: 14 (250 V A/2 A).
      High-speed counter.
      Multi-point PID control.
    Digital inputs/outputs and analog inputs/outputs Panasonic modules.
    Communication RS232 wire, to computer (PC).

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 Items available on request

 UCP-P/CAL. Computer Aided Learning Software (Results Calculation and Analysis).
 UCP-P/FSS. Faults Simulation System.
1. Control of the pneumatic valve.
3. PID parameters.
4. Select plot channels.
5. Air Flow Display and Pressure Display.
(Sensors: SPD = Differential Pressure sensor. SP = Pressure sensor.)

Examples of Sensors Calibration screens
Examples of On /Off Controls screens

Examples of PID Control screens
Some Practical Possibilities of the Unit:

1.- Calculating the fluid flow in function of different pressure sensors.
2.- Calibration processes.
3.- Pressure sensor calibration. Study of the hysteresis curve.
4.- I/P converter calibration.
5.- Identification of the pneumatic valve type.
6.- Determination of the influence of the flow rate of the conductors.
7.- Pressure control in conduction using a PID controller.
8.- Proportional control (P) characteristics.
9.- Characteristics of a proportional and integral control (P + I).
10.- Characteristics of a proportional and derivative control (P + D).
11.- Optimization of the variables of a PID controller.
12.- Optimization of the variables of the PID controller, flow control.
13.- Flow rate control in conduction with a PID controller.
14.- Control of the UCP-P unit process through the control interface box without the computer.
15.- Visualization of all the sensors values used in the UCP-P unit process.
16.- Calibration of all sensors included in the UCP-P unit process.
17.- Hand on of all the actuators involved in the UCP-P unit process.
18.- Realization of different experiments, in automatic way, without having in front the unit. (This experiment can be decided previously).
19.- 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).
20.- PLC hardware general use and manipulation.
21.- PLC process application for UCP-P unit.
22.- PLC structure.
23.- PLC inputs and outputs configuration.
24.- PLC configuration possibilities.
25.- PLC program languages.
26.- PLC different programming standard languages (literal structured, graphic, etc.).
27.- New configuration and development of new process.
28.- Hand on an established process.
29.- To visualize and see the results and to make comparisons with the UCP-P unit process.
30.- Possibility of creating new process in relation with the UCP-P unit.
31.- PLC Programming Exercises.
32.- Own PLC applications in accordance with teacher and student requirements.

POSSIBILITIES OF OTHER AVAILABLE EXPANSIONS

Expansion 1:

Mini ESN. Multipost EDIBON

Mini Scada-Net System

Process Control Unit for the study of Pressure (Air) (UCP-P)

Expansion 2:

ESN. Multipost EDIBON

Scada-Net System

Any other additional computer controlled unit

"REAL TIME MULTICONTROL SYSTEMS"

"ETDI" EDIBON TECHNICAL DISTANCE LEARNING SYSTEM

ORDER INFORMATION

Items supplied as standard

Minimum configuration for normal operation includes:

① Unit: UCP-P: Process Control Unit for the study of Pressure (Air).
② UCP-P/CIB: Control Interface Box.
③ DAB: Data Acquisition Board.
④ UCP-P/CCSOF: Computer Control + Data Acquisition + Data Management Software.
⑤ Cables and Accessories, for normal operation.
⑥ Manuals.

* IMPORTANT: Under UCP-P 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):
① PCL-PI: PLC Module.
② UCP-P/PLC-SOF: PLC Control Software.
③ UCP-P/CAL: Computer Aided Learning Software (Results Calculation and Analysis). (Available on request).

Expansions

① Mini ESN. Multipost EDIBON Mini Scada-Net System.
② ESN. Multipost EDIBON Scada-Net System.
**REQUIRED SERVICES**

- Electrical supply: 220V./50Hz or 110V./60Hz.
- Air supply, pressure: 8 bar (max.), flow up to 180 l/min. approx.
- Computer (PC).

**DIMENSIONS & WEIGHTS**

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCP-P Unit</td>
<td>1000 x 500 x 600 mm. approx.</td>
<td>20 Kg. approx.</td>
</tr>
<tr>
<td>Control Interface Box</td>
<td>490 x 330 x 310 mm. approx.</td>
<td>30 Kg. approx.</td>
</tr>
<tr>
<td>PLC Module (PLC-PI)</td>
<td>490 x 330 x 175 mm. approx.</td>
<td>5 Kg. approx.</td>
</tr>
</tbody>
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Specifications subject to change without previous notice, due to the convenience of improvements of the product.