Summarized
Catalogue

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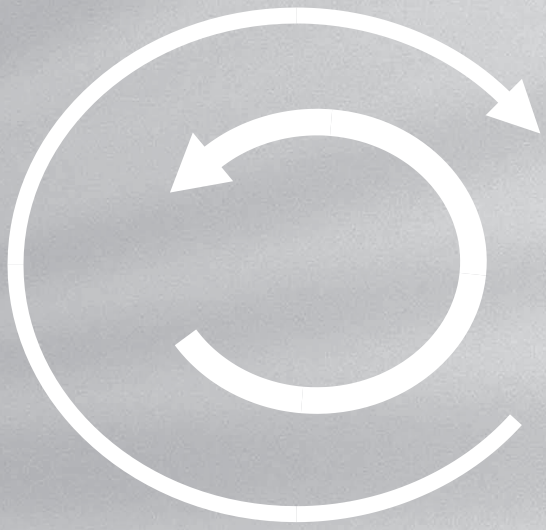

6. Mechatronics & Automation

edibon

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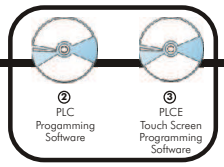
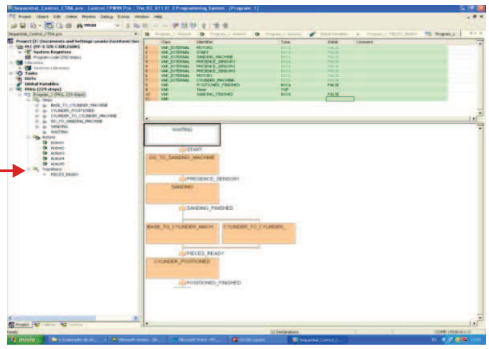
PLCE. **PLC Trainer**





① Unit: PLCE. PLC Trainer

SPECIFICATIONS SUMMARY

Items supplied as standard

The PLCE is a PLC trainer designed by EDIBON. It allows the user to learn about logic programming without any background knowledge or experience.

The PLCE includes digital and analog inputs and outputs, switches, push buttons, potentiometers, etc., allocated in the front panel of the box.

This trainer is provided with a set of practices, through which the user will understand how a PLC works and how to program a PLC application to obtain a required functionality.

The PLCE can also be used to work with the PLC Process Emulators.

① PLCE. Unit:

Steel box.

Power supply 110-240Vac.

RS232 cable to communicate with PC.

SUB-D connector to communicate with the PLCE applications.

FP-X C30R Panasonic PLC unit. The key features are:

Ultra-high processing speed of 0.32 µs per instruction.

Large Program Capacity of 16 Kstep.

Independent Comment Memory.

Maximum number of I/O points is 300.

3 different I/O modules:

1) Digital I/O module:

Inputs: Number of inputs: 16. Voltage: 24Vdc.

Outputs: Number of outputs: 14. Output type: relay. Output capacity: 2A.

8 On/off switches.

8 Push-buttons.

2) Analog I/O module:

Inputs: Number: 8. Input Range: 0 to +10V.

Outputs: Number: 4. Output Range: -10V to +10V. Resolution: 12bits.

6 Adjustable analog signals: Range: 0 to +10V.

3) Touch screen.

② PLC Programming Software:

Programming software developed according to the standard IEC 61131-3.

Compatible with Windows operating systems.

Five programming languages.

Remote programming, service, and diagnostics.

Minimum program size.

Powerful debugging and monitoring tools.

Supports user created functions and function blocks.

Saves project files inside the PLC.

③ PLCE Touch Screen Programming Software:

Tools for Screen Creation.

Plenty of functions. Screens Creation.

Drawing Functions.

Easy Operativity (Click and slip).

Easy creation of user libraries:

Printing. The different screens of the project can be printed.

Easy use. Bitmaps Editor.

④ Cables and Accessories, for normal operation.

⑤ Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.) = Unit: 490 x 330 x 310 mm.

Weight: 20 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PRACTICAL POSSIBILITIES

Using the PLC Programing Software:

1.- Understanding how to create different PLC applications and downloading to PLCE.
2.- Developing fundamental programs in different languages:
- Ladder Diagram (LD).
- Structured Text (ST).
- Instructions list (IL).
- Sequential Functional Chart (SFC).
- Functional Block Diagram (FBD).

3.- Studying number systems and data types:
- Decimal, Binary, Octal, Hexadecimal Systems.
- Bool, Integer, Word, Double, etc.

4.- Studying the fundamentals of logic:
- AND, OR, and NOT Functions and Bool Algebra.
- Developing Circuits from Boolean Expressions.
- Producing the Boolean Equation from a Given Circuit.
- Hardwired Logic versus Programmed Logic.
- Programming Word-Level Logic Instructions.

5.- Creating basic applications to test the digital I/O modules:
- Using switches and push-buttons as digital inputs.
- Using LEDs as outputs indicator.

6.- Creating basic applications to test the analog I/O modules:
- Using the analog input to read real analog signals.
- Using the analog outputs to generate analog signals and waveforms.

7.- Understanding how timers work and how to use them to control time-based processes:
- On-Delay timer instructions and function blocks.
- Off-Delay timer instructions and function blocks.
- Cascading Timers.

8.- Understanding how counters work and how counting is carried out:
- Up-Counter.
- Down-Counter.
- Cascading Counters.

9.- Data Manipulation Instructions:
- Data Manipulation.
- Memorize data.
- Data Transfer Operations.
- Data Compare Instructions.

10.- Understanding program control instructions:
- Jump and Conditional Instructions and Subroutines.
- Sequential control.

11.- Using math and arithmetic instructions:
- Addition.
- Subtraction.
- Multiplication.
- Division.
- Additional instructions.

12.- Functions Blocks and libraries.
13.- Complex control systems. PID function.

* Some applications related to these practices are included in the supply.

Using the PLCE Touch Screen Programming Software:

14.- How to create a simple application for the PLCE screen.
15.- How to commute digital outputs of the PLC through the screen.
16.- How to commute several digital outputs simultaneously. (Working with words).
17.- Writing on and reading from a data register.
18.- How to write a data register in a range of values.
19.- Switching from one screen to another.

* Some applications related to these practices are included in the supply.

Specific Applications with the PLC Process Emulators.

Other practical possibilities:

- It is possible to make simulations without need of any external element, causing analog inputs and/or digital ones, and to observe what happens in the outputs.
- It is also possible to introduce real analog inputs (for example: the transducer value in volts of a temperature sensor) and/or digital inputs (for example: an external pulser) and to connect real actuators in the output, (for example: a pump).

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

They are units that emulate different process, systems, machines, etc, controlled by the PLCE.
The emulators include:
- Metallic box.
- Diagram or drawing of the simulated application.
- Fuse protection.
- D-SUB connector to communicate with PLCE.
- LEDs and different displays as indicators.
- Switches and push-buttons.
- Potentiometers.

These process emulators are provided with switches, push buttons and LEDs to emulate common elements such as motors, detectors, sensors, pumps, valves, conveyors, etc.
Dimensions: 410 x 298 x 107 mm. approx. Weight: 2 Kg. approx.
These emulators offer us, among many others, several practical possibilities: industrial complex processes control, how to control machines with different controllable elements, control of electrical systems, control of hydraulic and electromechanic systems, using the analog inputs and outputs with the systems control, simulation of distributed control of processes, etc.

➤Traffic and Parking

PLCE-CST. **Traffic Signal Control**

SPECIFICATIONS SUMMARY

The PLCE-CST is a two roads traffic light control system. This unit is provided with switches, push buttons and leds to simulate common elements such as traffic lights, car detectors, etc. These elements simulate requests conditions such as pedestrians requests, sensors, etc. These requests are produced by these elements and the PLCE recognizes these signals in order to perform the required action.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-AV. **Car Parking**

SPECIFICATIONS SUMMARY

The PLCE-AV is a training unit to work with PLCE. The unit is provided with switches, push buttons and leds to simulate the commonly elements in an automatic parking for vehicles. These elements simulate conditions such as barrier open, motor off, motor on, etc. These conditions are evaluated by the PLCE in order to perform the required action.
The PLCE-AV unit is a model of an automatic parking for vehicles. It includes the most common elements in this system such as a sensor up/down, motors, barriers, traffic lights, etc.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-AG2Z. **Two Zones Parking Garage**

SPECIFICATIONS SUMMARY

It represents a parking garage with two zones where is possible to emulate the control of four barriers, two in the entrances an two in the exits, in the automatic parking.
We can know the number of vehicles inside the parking with lights and if the parking is full or free.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

➤Small Industrial Machines

PLCE-CA. **Elevator Control**

SPECIFICATIONS SUMMARY

The PLCE-CA represents a three-level elevator system. This unit is provided with switches, push buttons and leds to simulate the common elements in an elevator like calling buttons, floor indicators, sensors, etc. These elements simulate requesting conditions such as calling, lights, alarms, etc. These requests are produced by these common elements and the PLCE recognizes these signals in order to perform the required action.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CLA. **Automatic Washing Machine Control**

SPECIFICATIONS SUMMARY

The PLCE-CLA is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in an automatic washing machine. These elements simulate conditions such as door open, drum empty, motor on, etc. These conditions are evaluated by the PLCE in order to perform the required action.
The PLCE-CLA unit represents an automatic washing machine. It includes the most common elements in this device such as a program selector, motor, pum, agitator, thermostat, etc.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤Small Industrial Machines

PLCE-MB. **Drinks Machine**

SPECIFICATIONS SUMMARY

The PLCE-MB is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in an automatic drinks machine. These elements simulate conditions such as sensors, leds, etc. These conditions are evaluated by the PLCE in order to perform the required action.
The PLCE-MB unit represents an automatic drinks machine. It includes the most common elements in this device such as a sensor on/off, leds inputs and outputs, etc.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-MBC. **Hot Drinks Machine**

SPECIFICATIONS SUMMARY

It represents an automatic hot drinks machine where we have the possibility of work with a complete scheme of actions of an automatic hot drinks machine.
We can select a drink, we can know the level of drink using sensors and the status of the machine.
Finally we can select sugar and extra-milk.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CB. **Pump Control**

SPECIFICATIONS SUMMARY

It represents a pump control where we have four pumps inserting water in a big tank.
We can regulate the number of pumps working and to know the level of water into the tank using level sensors.
Is possible to regulate the discharge rate with the output valve in the tank.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-MA. **Embossing Machine**

SPECIFICATIONS SUMMARY

It represents the embossing process of metal disks controlled with an electropneumatic system.
The valves regulate the flow of gas to the electropneumatic system moving the steel punches and we can know the position of the steel punches using position sensors.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

➤Small Industrial Systems

PLCE-ST. **Drilling System**

SPECIFICATIONS SUMMARY

It represents a drilling system where we can emulate the movements of a drill.
We have two motors one for vertical movements and the other one is the motor of the drill.
We can switch on/off the coolant valve and to select the clamping pressure.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-SBAR. **Dirty-Water Pump System**

SPECIFICATIONS SUMMARY

It represents a dirty-water pump system where we can emulate the control of the dirty-water flow using a valve and two pumps which insert dirty-water in the pipe from the dirty-water tank.
The level of dirty-water into the tank is measured using four level sensors.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤**Small Industrial Systems**

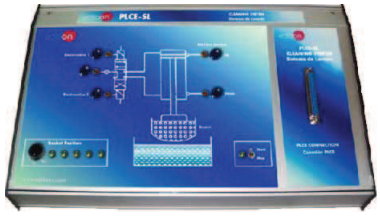
PLCE-SBP. **Pump System (Pressure)**

SPECIFICATIONS SUMMARY

It represents a pressure system where we use two pumps with their motors when we have to introduce air in the tank.
We can activate or deactivate the pumps with the three-phase contactors.
In the tank we have two level sensors and a pressure sensor.
The output of the pressured air is controlled using a flow sensor.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-SL. **Cleaning System**



SPECIFICATIONS SUMMARY

It represents a cleaning system where is possible to emulate the movement of a basket which has vertical movements.
The electrovalve has three positions and it can move the basket from its position to the designated position with a manual regulator.
We can know the position of the basket using position sensors.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-SALL. **Automatic Filling System**

SPECIFICATIONS SUMMARY

It represents an automatic filling system where we can choose the number of elements packed in each pack.
We can emulate the motors and the presence sensor of the system working.
We can emulate the movement of the conveyor belt with the packs in this filling process.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-SBT. **Conveyor Belts System**

SPECIFICATIONS SUMMARY

The PLCE-SBT is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in conveyor control system. These elements simulate conditions such as motor left, motor right, conveyors, etc. These conditions are evaluated by the PLCE in order to perform the required action.
It includes the most common elements in this system such as a positioning sensor, presence sensor, etc.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-SCCT. **Conveyor Charging System**

SPECIFICATIONS SUMMARY

It represents a conveyor charging system where is possible to emulate the work of four conveyor belts switching on/off their motors and we can open or close three lock gates.
With this system we can control the conveyor charge process.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-SCA. **Canalization System**

SPECIFICATIONS SUMMARY

It represents a channeling system where we have a dam which provides water using a general pipe with a general valve.
This general pipe provides water to other pipes, those pipes provides water to the houses, parks, etc using their own little valves.
In the homes the valves which regulate the water flow are taps.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤Small Industrial Systems

PLCE-SDT. **Pipe Bending System**

SPECIFICATIONS SUMMARY

It represents a pipe bending system where we can emulate the bending process of the pipe.
We can start/stop the system using a switch and to know the state of the machine with maximum/minimum sensors, to insert pipes with an electrovalve and to control the conveyor belt.
We will know if we have a pipe in the machine with the piece presence sensor.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-PAE. **Automatic Stamping Press**

SPECIFICATIONS SUMMARY

It represents an automatic stamping press where is possible to emulate the pressing process of steel sheets.
We can know the state of the press and electrovalve with the maximum/minimum sensors.
The press has a piece presence sensor, and warning lights.
We can control the rollers and the conveyor belt with switches.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

➤Big Industrial Systems

PLCE-PLLT. **Filling Process of Tanks**

SPECIFICATIONS SUMMARY

It represents a filling process of tanks with three tanks where we can emulate the filling and emptying processes of the tanks and the level of the liquid inside the tanks.
Is possible to switch on or switch off the different input or output valves of each tank.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-SCC. **Collecting Belt Conveyor**

SPECIFICATIONS SUMMARY

It represents a collecting belt conveyor system where is possible to emulate five conveyor belts transporting different materials to the general conveyor belt.
We can activate or deactivate the five conveyor belt motors and switch on/off the general conveyor belt in two directions left and right.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-MCC. **Mails Allocation Machine**

SPECIFICATIONS SUMMARY

It represents a mails allocation machine which allocate the mails to different cities.
It uses five motors, one for each city and a conveyor belt.
We can activate or deactivate each motor and the general conveyor belt.
The general system can be activated or deactivated.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-RAC. **Compressed Air Network**

SPECIFICATIONS SUMMARY

It represents a compressed air network where is possible to emulate the actions in an air network.
We can control valves, dryer, motors with contactors and we can know the flow in the output of the compressor with a sensor.
The electrovalve moves the final piston.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

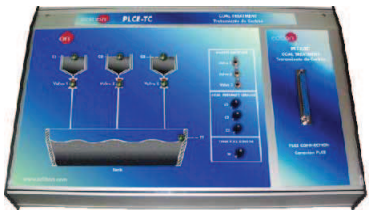
More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤**Big Industrial Systems**

PLCE-TC. **Coal Treatment**



SPECIFICATIONS SUMMARY

It represents a coal treatment system where we can see three chutes with three valves each one and a big tank.
We can control the flow of coal with the three valves and is possible to know if the tank or the chutes are full using coal presence sensors.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-PELE. **Packing Line and Bottling Plant**

SPECIFICATIONS SUMMARY

The PLCE-PELE is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in a automatic bottling line. These elements simulate conditions such as presence sensors, control switches, etc. These conditions are evaluated by the PLCE in order to perform the required action.
The PLCE-PELE unit represents an automatic bottling line. It includes the most common elements in this system such as a sensor, piston, motors, conveyor, etc.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

➤**Simple Control Applications**

PLCE-CA2P. **Two-Doors Access Control**

SPECIFICATIONS SUMMARY

It represents two automatic doors where is possible to emulate the movements and positions of each automatic door using sensors and electrical motors.
We have the option of activate or deactivate the electrical motors.
The doors can be opened using the presence sensors.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CI. **Fire Control**

SPECIFICATIONS SUMMARY

The PLCE-CI is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in a fire control. These elements simulate conditions such as smoke detectors, heat sensors, etc. These conditions are evaluated by the PLCE in order to perform the required action.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CP. **Proximity Control** (security)

SPECIFICATIONS SUMMARY

The PLCE-CP is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in an automatic proximity control. These elements simulate conditions such as PIR detector activated, infrared sensor activated, magnetic detector, etc. These conditions are evaluated by the PLCE in order to perform the required action.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CCO. **Sluice Gate Control**

SPECIFICATIONS SUMMARY

The PLCE-CCO represents an automatic sluices or barriers system and it is a training unit to work with PLCE. This unit is provided with switches, push buttons, sensors and leds to simulate the commonly elements in an automatic sluices control system. These elements simulate conditions such as sluice closed, valve open, motor off, motor on, etc.
These conditions are evaluated by the PLCE in order to perform the required action.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤**Simple Control Applications**

PLCE-CNC. **Level and Flow Control**

SPECIFICATIONS SUMMARY

The PLCE-CNC is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in a flow and level controller system. These elements simulate conditions such as barrier open, motor off, motor on, etc. These conditions are evaluated by the PLCE in order to perform the required action.

It includes common elements in this system such as level sensors, flow controllers, etc.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CNTA. **Water Tower Level Control**

SPECIFICATIONS SUMMARY

It represents a water tower level control where is possible to emulate the water flow control with the input valve and the motor of the pump. We can measure the level of water in the tank and in the water tower using sensors.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CF. **Photo Control**

SPECIFICATIONS SUMMARY

The PLCE-CF represents an automatic photo control machine and it is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in an automatic photo control. These elements simulate conditions such as, coins detected, camera on, flash activated, switches, etc. These conditions are evaluated by the PLCE in order to perform the required action.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CMM. **Molding Machine Control**

SPECIFICATIONS SUMMARY

It represents a molding machine control where we can emulate a machine which gives shape to the pieces pushing them.

It works with three electrovalves which we can activate or deactivate, each electrovalve has a limit switch.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CPOS. **Position Control**

SPECIFICATIONS SUMMARY

It represents a position control where we can move the sheet to the correct position using a motor with a lefthand and righthand rotation and crowling speed the incremental shaft encoder can count pulses and to give a fine sincronism.

We have the possibility of saw the sheet connecting the saw motor.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CS. **Silo Control**

SPECIFICATIONS SUMMARY

It represents a silo control system where we can emulate the filling process.

The filling motor has a manual rate or an automatic rate and the output valve has its own discharge rate.

We can measure the level with four presence sensors and to know if the silo is full with the full sensor.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤**Simple Control Applications**

PLCE-CACV. **Vehicle Feeding & Loading Control**

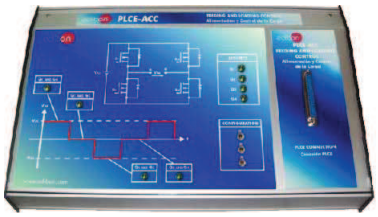
SPECIFICATIONS SUMMARY

The PLCE-CACV is a training unit to work with PLCE. It represents the process of obtaining tequila through the agave fermentation.
This unit is provided with switches, push buttons and leds to simulate the commonly elements in an automatic feed control and load truck. These elements simulate conditions such as open and close valves, motor running, etc. These conditions are evaluated by the PLCE in order to perform the required action.
It is a model of feed control and load on truck and includes the most common elements in this system such as presence sensors, pressure sensors, level detectors, etc.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

➤**Industrial Control Applications**

PLCE-ACC. **Feeding and Loading Control**

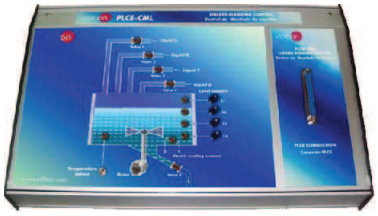


SPECIFICATIONS SUMMARY

It represents a feeding and loading control system where we can control the voltage in the load between the A-B terminals.
We have to select a configuration which activate or deactivate the mosfets and we can know what switch is closed with its own light.
We can see in the graph the state of the voltage in the load between the A-B terminals.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CML. **Liquids Blending Control**



SPECIFICATIONS SUMMARY

It represents a liquids blending control where is possible to emulate the mix of different liquids and their flows are regulated using four valves.
The liquids are mixed using a mixer with its own motor.
The flow of the mix is regulated using an output valve.
We can measure the temperature and the level of liquid with sensors.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CME. **Mixer Control**

SPECIFICATIONS SUMMARY

It represents a mixer control where we can emulate the mix with two different products in a big chute from two little chutes using conveyor belts, finally the general conveyor belt will transport the mix.
We will control the motors of the conveyor belts and the valves in the system and we will know the big chute's level using sensors.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CR. **Reactor Control**

SPECIFICATIONS SUMMARY

It represents a reactor control where is possible to emulate the mix of a catalyst, an inert gas and the substance.
We can regulate the catalyst and the inert gas flow with valves, and the substance with a pump.
The inlet and the output of the product are regulated using valves.
We mix the substances with an agitator into the reactor.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CCP. **Count and Position Control**

SPECIFICATIONS SUMMARY

The PLCE-CCP is a training unit to work with PLCE. This unit is provided with switches, pushbuttons and leds to simulate the commonly elements in the counting and positioning controller. These elements simulate the control and movement of motors and pincer hand by presence sensors.
It represents of counting and positioning controller that distributes industrial pieces to specific positions. It includes the most common elements in this system such as presence sensors, control switches, etc.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤Industrial Control Applications

PLCE-CL. **Rolling Mill Control**

SPECIFICATIONS SUMMARY

The PLCE-CL is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in a laminate control system. These elements simulate conditions such as cooling control to vary the hardness of the alloy, motor on, motor off, metal cutter, simple effect cylinder, etc. These conditions are evaluated by the PLCE in order to perform the required action.

It is a model of an automatic laminate control. It includes the most common elements in this system such as a sensor up/down, presence sensors, control switches, etc.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CTRA. **WorkCell Application**

SPECIFICATIONS SUMMARY

The PLCE-CTRA is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in an automatic working cell. These elements simulate conditions such as sanding, soldering, motor off, motor on, etc. These conditions are evaluated by the PLCE in order to perform the required action.

It is a model of an automatic working cell. It includes the most common elements in this system such as sensors, control switches, etc.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CTI. **Tower Lighting Control**

SPECIFICATIONS SUMMARY

It represents a tower lighting control where is possible to emulate the lighting of different levels of a tower using a lights system.

It has two directions up and down and we can know the level using a display.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

➤Thermal Applications

PLCE-AC. **Buffer Storage**

SPECIFICATIONS SUMMARY

It represents a buffer storage system where is possible to emulate the storage of heat using fluids.

We can control the valves state, the pumps, the boiler, and the buffer storage tank state.

Is possible to know when the collector is working using a sensor.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-RT. **Temperature Regulation**

SPECIFICATIONS SUMMARY

The PLCE-RT is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in a temperature controller system. These elements simulate conditions such as level sensor, temperature sensor, etc. These conditions are evaluated by the PLCE in order to perform the required action.

It is a model of a temperature controller and includes the most common elements in this system such as a level sensors, filling a tank, temperature sensor, flood sensor, etc.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CSC. **Heating System Control**

SPECIFICATIONS SUMMARY

It represents a heating system control where is possible to emulate the heating process controlling the flow of hot water into the circuit activating or deactivating the valves in the pipes and using the temperature control regulator.

We can start/stop the system using a general switch.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤Thermal Applications

PLCE-CSV. **Ventilation System Control**

SPECIFICATIONS SUMMARY

It represents a ventilation system control where we are trying to clean the air in a garage.
We can control the air inside measuring the level of CO and smoke with sensors.
We can activate four pumps and two fans.
Is possible to control the traffic lights and the automatic barriers.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

➤Electrical Machines Control (Motors)

PLCE-M. **Motor Control**

SPECIFICATIONS SUMMARY

The PLCE-M is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the common elements in an automatic motor control. These elements simulate conditions such as motor off, motor on, etc. These conditions are evaluated by the PLCE in order to perform the required action.
It is a model of an automatic motor control and includes the most common elements in this system such as a speed buttons, control switches, etc.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

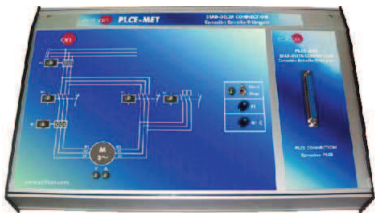
PLCE-MPP. **Stepper Motor Control**

SPECIFICATIONS SUMMARY

It represents a motor control where is possible to emulate the stepper motor.
We can start/stop the stepper motor using a switch.
It has reverse/forward directions controlled by a switch, and it can be controlled in manual or automatic mode.
The speed regulation is controlled using three switches and the position is controlled using an encoder.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-MET. **Star-Delta Connection**



SPECIFICATIONS SUMMARY

It represents a star-delta connection in the secondary and emulates the motor's movement.
Is possible to switch on/off the motor and connect the secondary in star-delta connection using the three-phase contactors.
We can simulate faults with the three-phase fuses and the magnetothermics.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-MCETI. **Reversing Star-Delta Connection**

SPECIFICATIONS SUMMARY

It represents a reversing motor with star-delta connection in the secondary and emulates the motor's movement.
Is possible to switch on/off the motor in both turning directions and connect the secondary in star-delta connection using the three-phase contactors.
We can simulate faults with the three-phase fuses and the magnetothermics.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-MD. **Dahlander Motor Circuit**

SPECIFICATIONS SUMMARY

It represents a Dahlander motor which has two connections of velocity with 2 and 4 poles and emulates the motor's movement.
Is possible to switch on/off the motor in both turning directions and to connect it with 2 or 4 poles using the three-phase contactors.
We can simulate faults with the three-phase fuses and the magnetothermics.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**

PLC Process Emulators for working with PLCE:

➤Electrical Machines Control (Motors)

PLCE-M2BS. **Motor with 2 Separate Windings**

SPECIFICATIONS SUMMARY

It represents a motor with two separate windings and emulates the motor's movement.
Is possible to switch on/off the motor and to connect the different windings and the secondary with the three-phase contactors.
We can simulate faults with the three-phase fuses and the magnetothermics.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-MAC. **Starting a Wound-Rotor Motor**

SPECIFICATIONS SUMMARY

It represents the starting of a wound-rotor motor where is possible to emulate the motor's movement.
Is possible to switch on/off the motor and to connect the secondary with different loads with the three-phase contactors.
We can simulate faults with the three-phase fuses and the magnetothermics.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

➤Alarms/Current

PLCE-AN. **Annunciator**

SPECIFICATIONS SUMMARY

The PLCE-AN is a training unit to work with PLCE. This unit is provided with switches, push buttons and leds to simulate the commonly elements in an annunciator. These conditions are evaluated by the PLCE in order to perform the required action.
It is a model of an annunciator that is used to display messages through a seven digits display. It includes the most common elements in this device such as a keypad, selection switches, etc. These elements are simulated using switches, push buttons and leds and they are connected to the inputs and outputs of the PLC.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

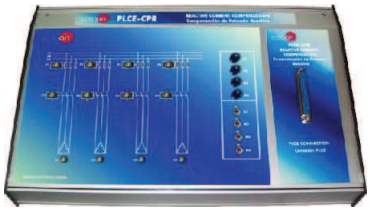
PLCE-SLU. **Running Lights**

SPECIFICATIONS SUMMARY

It represents a running lights system where we can emulate the control of the eight lights in different speed, sequence and direction.
We can start/stop the system using a switch and we can do it in automatic or manual state.
We have three kinds of sequences and two directions and an speed control.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE-CPR. **Reactive Current Compensation**



SPECIFICATIONS SUMMARY

It represents a reactive current compensation system where is possible to emulate the connection of three-phase capacitive loads.
We can connect each load using the three-phase contactors.
We can simulate faults with the three-phase fuses.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

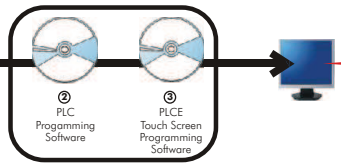
PLCE-MCI. **Reversing Contactor**

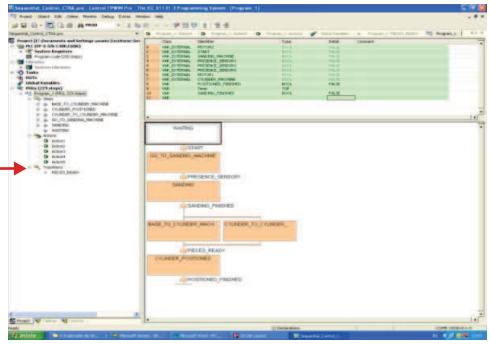
SPECIFICATIONS SUMMARY

It represents a three-phase motor with reversing contactors and emulates the motor's movement.
Is possible to switch on/off the motor in both turning directions using the three-phase contactors.
We can simulate faults with the three-phase fuses and the magnetothermics.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcprocessemulation/PLCE.pdf

PLCE. **PLC Trainer**





① Unit: PLCE. PLC Trainer

SPECIFICATIONS SUMMARY

Items supplied as standard

The PLCE is a PLC trainer designed by EDIBON. It allows the user to learn about logic programming without any background knowledge or experience.

The PLCE includes digital and analog inputs and outputs, switches, push buttons, potentiometers, etc., allocated in the front panel of the box.

This trainer is provided with a set of practices, through which the user will understand how a PLC works and how to program a PLC application to obtain a required functionality.

The PLCE can also be used to work with the PLC Small Scale Real Applications.

① PLCE. Unit:

Steel box.

Power supply 110-240Vac.

RS232 cable to communicate with PC.

SUB-D connector to communicate with the PLCE applications.

FP-X C30R Panasonic PLC unit. The key features are:

Ultra-high processing speed of 0.32 μs per instruction.

Large Program Capacity of 16 Kstep.

Independent Comment Memory.

Maximum number of I/O points is 300.

3 different I/O modules:

1) Digital I/O module:

Inputs: Number of inputs: 16. Voltage: 24Vdc.

Outputs: Number of outputs: 14. Output type: relay. Output capacity: 2A.

8 On/off switches.

8 Push-buttons.

2) Analog I/O module:

Inputs: Number: 8. Input Range: 0 to +10V.

Outputs: Number: 4. Output Range: -10V to +10V. Resolution: 12bits.

6 Adjustable analog signals: Range: 0 to +10V.

3) Touch screen.

② PLC Programming Software:

Programming software developed according to the standard IEC 61131-3.

Compatible with Windows operating systems.

Five programming languages.

Remote programming, service, and diagnostics.

Minimum program size.

Powerful debugging and monitoring tools.

Supports user created functions and function blocks.

Saves project files inside the PLC.

③ PLCE Touch Screen Programming Software:

Tools for Screen Creation.

Plenty of functions. Screens Creation.

Drawing Functions.

Easy Operativity (Click and slip).

Easy creation of user libraries:

Printing. The different screens of the project can be printed.

Easy use. Bitmaps Editor.

④ Cables and Accessories, for normal operation.

⑤ Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.) = Unit: 490 x 330 x 310 mm.

Weight: 20 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PRACTICAL POSSIBILITIES

Using the PLC Programing Software:

1.- Understanding how to create different PLC applications and downloading to PLCE.
2.- Developing fundamental programs in different languages:
- Ladder Diagram (LD).
- Structured Text (ST).
- Instructions list (IL).
- Sequential Functional Chart (SFC).
- Functional Block Diagram (FBD).

3.- Studying number systems and data types:
- Decimal, Binary, Octal, Hexadecimal Systems.
- Bool, Integer, Word, Double, etc.

4.- Studying the fundamentals of logic:
- AND, OR, and NOT Functions and Bool Algebra.
- Developing Circuits from Boolean Expressions.
- Producing the Boolean Equation from a Given Circuit.
- Hardwired Logic versus Programmed Logic.
- Programming Word-Level Logic Instructions.

5.- Creating basic applications to test the digital I/O modules:
- Using switches and push-buttons as digital inputs.
- Using LEDs as outputs indicator.

6.- Creating basic applications to test the analog I/O modules:
- Using the analog input to read real analog signals.
- Using the analog outputs to generate analog signals and waveforms.

7.- Understanding how timers work and how to use them to control time-based processes:
- On-Delay timer instructions and function blocks.
- Off-Delay timer instructions and function blocks.
- Cascading Timers.

8.- Understanding how counters work and how counting is carried out:
- Up-Counter.
- Down-Counter.
- Cascading Counters.

9.- Data Manipulation Instructions:
- Data Manipulation.
- Memorize data.
- Data Transfer Operations.
- Data Compare Instructions.

10.- Understanding program control instructions:
- Jump and Conditional Instructions and Subroutines.
- Sequential control.

11.- Using math and arithmetic instructions:
- Addition.
- Subtraction.
- Multiplication.
- Division.
- Additional instructions.

12.- Functions Blocks and libraries.
13.- Complex control systems. PID function.
* Some applications related to these practices are included in the supply.

Using the PLCE Touch Screen Programming Software:

14.- How to create a simple application for the PLCE screen.
15.- How to commute digital outputs of the PLC through the screen.
16.- How to commute several digital outputs simultaneously. (Working with words).
17.- Writing on and reading from a data register.
18.- How to write a data register in a range of values.
19.- Switching from one screen to another.
* Some applications related to these practices are included in the supply.

Specific Applications with the PLC Small Scale Real Applications.

Other practical possibilities:

- It is possible to make simulations without need of any external element, causing analog inputs and/or digital ones, and to observe what happens in the outputs.
- It is also possible to introduce real analog inputs (for example: the transducer value in volts of a temperature sensor) and/or digital inputs (for example: an external pulser) and to connect real actuators in the output, (for example: a pump).

PLCE. **PLC Trainer**

PLC Small Scale Real Applications for working with PLCE:

They are real applications of processes using small units, controlled by the PLCE. We can control process like liquid level, vibration, pressure, flow, proximity, deformation, temperature, etc.
These units are provided with real elements like Hall effect sensors, manometric pressure sensors, thermocouples, LVDT sensors, ultrasound sensors, air compressors, thermistors, encoders, etc.

➤**Sensors**

PLCE-BS1. **Vibration and/or Deformation Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
Extensiometric gauges:
- Gauges of a metallic material that vary their resistance depending on the distortion to which they are going to be subjected.

Heating resistance and thermocouple:
- Resistance used to produce temperature variations in the vibrant bar and to see how this situation affects the extensiometric gauges.
- A K thermocouple place near the resistance measures the bar temperature.

LVDT Sensor:
- Linear displacement sensor, that detects the relative displacement of a ferromagnetic core between the primary and the secondary.

D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions (approx.): 405 x 300 x 350 mm. Weight: 10 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE-BS2. **Temperature Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
Bimetallic switch sensor.
Adjustable bimetallic thermostat, with heater resistor that allows minimizing the differential cycles and preventing overpeaks.
Relay AC:
- It allows to turn on and off the heater light bulbs placed over the temperature sensors.

Capillary thermostat.
Thermocouples:
- 3 Cromel-Alumel thermocouples type K.

D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions (approx.): 405 x 280 x 335 mm. Weight: 10 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE-BS3. **Pressure Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
Linear positioning sensor (Potentiometer).
LVDT sensor.
Differential pressure sensor.
Extensiometric gauges.
Manometric pressure sensor.
Absolute pressure sensor.
Air Compressor.
D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions (approx.): 400 x 270 x 320 mm. Weight: 10 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE. **PLC Trainer**

PLC Small Scale Real Applications for working with PLCE:

➤**Sensors**

PLCE-BS4. **Flow Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
Flow optical sensor:
It gives an output in pulses proportional to the liquid flow. It is made up of a paddle wheel, placed on the fluid current that turns producing a pulse signal while passing between the emitter and the paddle detector.
High resolution optical flow sensor:
It works in the same way as the sensor just described with the difference that it is able to measure with a good resolution very low flow. At the output of this sensor we get a pulse signal with a frequency proportional to the flow volume that crosses the sensor.
Underwater pump:
The variation in the pump power supply voltage enables to change the water volume in the test module.
Level sensor by pressure:
It is a differential pressure sensor that measures the pressure practice by the water in relation to the atmospheric pressure, so the liquid level in the tank can be calculated.
Differential pressure sensor (Hole board system):
This sensor is connected to a hole-board system to measure the pressure difference caused by the volume narrowing of the conduct through which the water flows.
On this way, with the measurement of the pressure difference between the hole board water output and input, it is possible to calculate the water volume that crosses the board.
Changeable flow meter:
Using a small floating buoy that is inside the tube calibrated in liter/minute, it can be read the volume measure flowing through the pipe.
V narrowing:
The connection between the main and the secondary tank, a dam, includes a "V" narrowing. The altitude of the water level above the dam bottom is a very precise measure of the flow relation. The ruler fixed on the right end of the tank will show this height. Main and secondary tanks.
D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions: 405 x 280 x 400 mm. approx. Weight: 10 Kg. approx.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE-BS5. **Ovens Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
Oven chamber.
Heating resistance:
Oven heating resistance made up of two parallel resistances with a maximum dissipation power of 500W.
Inside the heating element there is a temperature sensor element.
Fan:
Fan with changeable speed that can be operated varying the fan energy supply voltage.
Thermocouples:
4 thermocouples placed inside the oven, each one of them at a different height.
Platinum resistance thermometer:
Platinum resistance temperature detector, suitable for measuring air and gas temperatures.
Thermistor:
NTC thermistor for temperature measurement and control, with great sensitivity and stability.
Semiconductor temperature sensor:
Reverse polarized diode. The current through the diode depends on the temperature at which balance with the surrounding environment is achieved.
Therefore it needs a conditioning circuit able to transform this current variation in voltage proportional to temperature.
D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions: 405 x 300 x 470 mm. approx. Weight: 10 Kg. approx.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE. **PLC Trainer**

PLC Small Scale Real Applications for working with PLCE:

➤**Sensors**

PLCE-BS6. **Liquid Level Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
Water tanks.
Capacitative level sensor:
Level sensor immersed in the tank.
Pressure level sensor.
It is a differential pressure sensor that measures the pressure practiced by the water compared to the atmospheric pressure.
Level gauge changeable resistance with path end and beginning switches:
It is a resistance fixed to a float arm that will vary its position compared to the water level. This system complements itself with two end and beginning path switches respectively.
Conduction sensor:
This sensor works with two electrodes immersed in one of the tanks. As the water level rises and covers the electrodes its resistance will decrease until it arrives to KΩ unit values, as long as the water does not touch the electrodes, the resistance between them will be very big and will behave like an open circuit.
Magnetic float level sensor:
Sensor formed by a small float that has inside a magnetic element, the float base has a Hall effect element that detects when the float has gone up due to the effect of the water.
Optical level sensor:
It is a photodiode and phototransistor, which in presence of water changes its refraction properties and make the output state approximately change from 3Vdc to 0Vdc.
2 Minipumps:
The volume supplied by these pumps can be regulated varying the dc voltage value with which they are supplied.
D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions: 400 x 300 x 400 mm. approx. Weight: 10 Kg. approx.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE-BS7. **Tachometers Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
Inductive Sensor.
DC Motor.
DC Tachometer.
Refractive Infrared Sensor:
Sensor where an infrared emitting diode and an NPN silicon phototransistor encased side-by-side on coverging optical axes in a black thermoplastic housing.
Slot Sensor:
Slotted optical switch where an input LED and an output phototransistor are capsulated.
Hall Effect:
Hall-effect position sensor where exist a relationship between supply voltage and the combined effects of a change in sensitivity (gain) and null voltage output at room temperature.
Encoder:
This optical encoder contains a lensed LED source, an integrated circuit with detectors and output circuit, and a codewheel which rotates between the emitter and the detector IC.
D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions: 300 x 200 x 200 mm. approx. Weight: 10 Kg. approx.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE. **PLC Trainer**

PLC Small Scale Real Applications for working with PLCE:

➤**Sensors**

PLCE-BS8. **Proximity Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
DC Motor.
Proximity capacitative sensor:
It can detect metallic objects.
Hall effect sensor:
Proximity switch using the Hall effect, switching when there is a magnetic field.
Infrared sensor by reflection:
Emission narrow beam GaAs IR Emitter. Detection narrow beam IR Photodetector.
Transmission infrared sensor:
Emission narrow beam GaAs IR Emitter. Detection narrow beam IR Photodetector.
Conduction sensor:
Proximity sensor with plate sensible to magnetic fields. Contact material: Rhode.
Inductive sensor:
Sensor that gives variations in the output voltage as a variation of the magnetic field, caused by the near ferromagnetic material movement.
Ultrasound sensor.
D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions: 400 x 270 x 200 mm. approx. Weight: 10 Kg. approx.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE-BS9. **Pneumatic Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Real industrial elements.
Proportional valve 1 and 2.
Differential pressure sensor.
Pneumatic switch.
LVDT Sensor.
Regulation filter.
D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions: 300 x 300 x 300 mm. approx. Weight: 10 Kg. approx.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLCE-BS10. **Light Test Module**

SPECIFICATIONS SUMMARY

Painted steel box.
Connection diagrams for each transducer are represented graphically.
Photodiode:
This sensor converts light into either current or voltage, depending upon the mode of operation.
Phototransistor: It also consists of a photodiode with internal gain.
Light Dependent Resistor:
A LDR is a resistor whose resistance decreases with increasing incident light intensity.
Photovoltaic Cell:
A photovoltaic cell converts solar radiation into direct current electricity.
Infrared emitter-receiver:
This element consists of a IR emitter LED and IR phototransistor.
D-SUB to communicate with PLCE.
Connection pins.
Cables and Accessories, for normal operation.
Manuals: This unit is supplied with 8 manuals.
Dimensions: 405 x 300 x 350 mm. approx. Weight: 10 Kg. approx.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcrealapplications/PLCE.pdf

PLC-IN. **PLC Industrial Control System**

SPECIFICATIONS SUMMARY

The EDIBON PLC-IN is a PLC Industrial Control System that use Allen-Bradley ControlLogix system. The ControlLogic system allows to connect elements like HMI (Human Machine Interface), drives, frequency controllers, starters, sensors, safety elements and much more other devices for simulating real situations in the industry.

* Note: This PLC-IN system can work with any other PLC, as: Siemens, Omron, Panasonic, etc.

The system is composed by a PLC connected to a switch for creating an EtherNet/IP network. HMI touch screen is integrated in this network.

The system will allow to program different real industrial situations like use of PID and analogue signal and digital inputs/outputs.

The system admits four different programming languages:

Relay Ladder programming language.

Function block diagram.

Sequential function chart.

Structured text.

The system also shows how to program HMI and configure different front panels and applications. During practices user learns how to program faults and status messages and inputs and outputs variables.

There is also a panel with AC and DC busbars for supply different voltage levels. And also the inputs and Outputs of the PLC will be easily presented for making connections.

Additionally in this panel there are typical elements like pushbuttons, lights, and other to simulate inputs and outputs to the PLC.

Some of the elements presented in this panel will be used in the assembly of different typical electrical applications.

Technical Data:

Allen-Bradley ControlLogix system:

-32 Digital Inputs. and 32 Digital Outputs.

-8 Analogue Inputs of current or voltage.

-4 Analogue Outputs of current or voltage.

-Logix Processor 5561.

-Bridge EtherNet Module 10/100.

-Power supply 110/220 Vac for PLC.

-Software.

Allen-Bradley Versa View 1200P. Integrated Display and Workstation (HMI):

-Touchscreen Option: Resistive anti-glare.

-Processor Type: Celeron M 1.06 GHz.

-I/O: 4 USB 2.0, 2 10/100/1000 EtherNet, 1 serial port, audio in/out and microphone.

-Software.

Stratix 2000 Unmanaged EtherNet Switch:

For network, and all devices communication (included some devices from the applications).

-5 ports for RJ 45 EtherNet/IP standard cables.

Additional elements: 8 Pushbuttons with NO/NC contacts. 2 Start/Stop push buttons. 3 ON/OFF switches. 1 Cylinder lock operator. 2 End switches. 2 Power relays. 4 Contactors. 1 Timer. 2 Emergency pushbutton. 8 lights (different colours). 2 Buzzers. Three-phase 380/220 V. transformer.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

Available Industrial PLC Applications:

(for working with PLC-IN)

PLC-IN-1. **Motor Control Application:**

- Direct Starter.
- Soft Starter.
- Frequency Drive.
- Squirrel Cage AC Motor.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcindustrial/PLC-IN.pdf

PRACTICAL POSSIBILITIES

PLC-IN. **PLC Industrial Control System:**

Some PLC Practical Possibilities:

1.- PLC Programming and Download to the PLC. Running Applications.

PLC Programming with different languages:

2.- Relay Ladder (LD).
3.- Function Block Diagram (FBD).
4.- Sequential Function Chart (SFC).
5.- Structured Text (ST).

Using math and arithmetic instructions:

6.- Addition.
7.- Subtraction.
8.- Multiplication.
9.- Division.
10.- Aditional instructions.

Studying Number Systems and Data Types:

11.- Decimal, Binary, Octal, Hexadecimal Systems.
12.- Bool, Integer, Word, Double, etc.

Studying the fundamentals of logic:

13.- AND, OR, and NOT Functions and Bool Algebra.
14.- Developing Circuits from Boolean Expressions.
15.- Producing the Boolean Equation from a Given Circuit.
16.- Hardwired Logic versus Programmed Logic.
17.- Programming Word-Level Logic Instructions.
18.- Use of Functions Blocks and libraries.
19.- Timer/Counter instructions and function blocks.

Creating basic applications to test the analog I/O modules:

20.- Using the analog input to read real analog signals.
21.- Using the analog outputs to generate analog signals and waveforms.

Creating basic applications to test the digital I/O modules:

22.- Connecting hardware inputs (push buttons, timers, etc).
23.- Connecting hardware outputs (lamps, contactor coils, etc.).

Configuration of control loops:

24.- An open loop (start end switch stop).
25.- An analogue input PID with analogue output and alarm.
26.- An analogue input PID with PWM output.
27.- Configuring single and dual loops.

* Some applications related to these practices are included in the supply.

Some HMI (Human Machine Interface) Practical Possibilities:

28.- Connection of the HMI to the PLC.
29.- Ethernet/IP connection and starting.
30.- How to create a simple application for the HMI screen.
31.- How to simulate digital / analog inputs from the HMI
32.- How to operate digital/analog outputs from the HMI.
33.- Industrial type applications simulation.

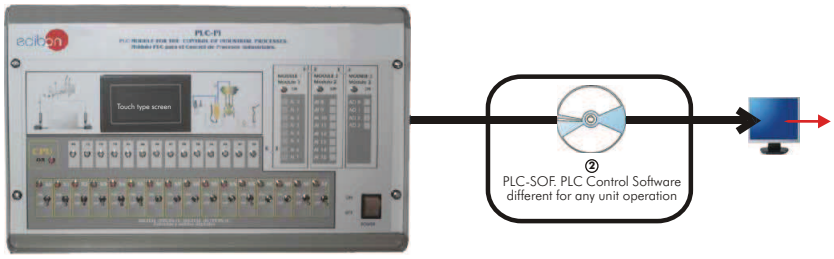
Some Electrical Applications Practical Possibilities:

34.- Programmable interlocks in control circuits.
35.- Relay operation from control line to power line.
36.- Contactors and power elements control from the PLC.
37.- Timer configuration for on delay, off delay, etc.
38.- Contactors actuated by hardware timers.
39.- Manoeuvre Counters and actuation according to pushbutton pulses.
40.- Alarm actuation caused by end switches detection.
41.- Emergency stop and acoustic and light alarms.

PLC-IN-1. **Motor Control Application:**

1.- Connecting devices to the Ethernet / IP.
2.- Squirrel cage Delta/Star connection and parameters measurement.
3.- Electrical protections wiring associated to the electrical machine installation.
4.- Delta/Star running of a squirrel cage asynchronous machine.
5.- Direct/Inverse rotation of motor.
6.- Connecting a Direct Starter. Local Mode start and setting adjustment.
7.- Connecting a Direct Starter. Remote Mode start and setting adjustment.
8.- Connecting a Soft Starter. Local Mode start and setting adjustment.
9.- Connecting a Soft Starter. Remote Mode start and setting adjustment.
10.- Connecting a Frequency Drive. Local Mode start and setting adjustment.
11.- Connecting a Frequency Drive. Remote Mode start and setting adjustment.
12.- Ramps up and slow down program of the Frequency converter.
13.- Programming steps in motor control devices, according to external signals.
14.- Alarm wiring and programming of Electrical machines control devices.

PLC-PI. **PLC Module for Unit Operations Control** (for working with EDIBON Computer Controlled Units)



①Unit: PLC-PI. PLC Module for Unit Operations Control (for working with EDIBON Computer Controlled Units)

SPECIFICATIONS SUMMARY

Items supplied as standard

①PLC-PI. Unit:

This PLC-PI unit contains a box, with a front panel in order to manipulate the unit in a simple and easy way, the power supply and all necessary connectors and cabling and, additionally, the PLC itself with its own touch screen. We have design and supply the proper software for any particular application (for each particular EDIBON Computerized Teaching Unit).

Steel box.

Circuit diagram in the front panel.

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.

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.

Multi-point PID control.

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

Communication RS232 wire, to computer (PC).

②PLC-SOF. PLC Control Software:

For each particular EDIBON Computerized Teaching Unit.

③ Cables and Accessories, for normal operation.

④ Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.) = Unit: 490 x 330 x 310 mm. Weight: 30 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcunitoperations/PLC-PI.pdf

PRACTICAL POSSIBILITIES

1.- Control of the particular unit process through the control interface box without the computer (PC).
2.- PID control.
3.- Visualization of all the sensors values used in the particular unit process.
4.- Calibration of all sensors included in the particular unit process.
5.- Hand on of all the actuators involved in the particular unit process.
6.- Realization of different experiments, in automatic way, without having in front the particular unit. (This experiment can be decided previously).
7.- Simulation of outside actions, in the cases hardware elements do no exit.
8.- PLC hardware general use and manipulation.
9.- PLC process application for the particular unit.
10.- PLC structure.
11.- PLC inputs and outputs configuration.
12.- PLC configuration possibilities.
13.- PLC program languages.
14.- PLC different programming standard languages.
15.- New configuration and development of new process.
16.- Hand on an established process.
17.- Visualization and see the results and to make comparisons with the particular unit process.
18.- Possibility of creating new process in relation with the particular unit process.
19.- PLC Programming exercises.
20.- Own PLC applications in accordance with teacher and student requirements.

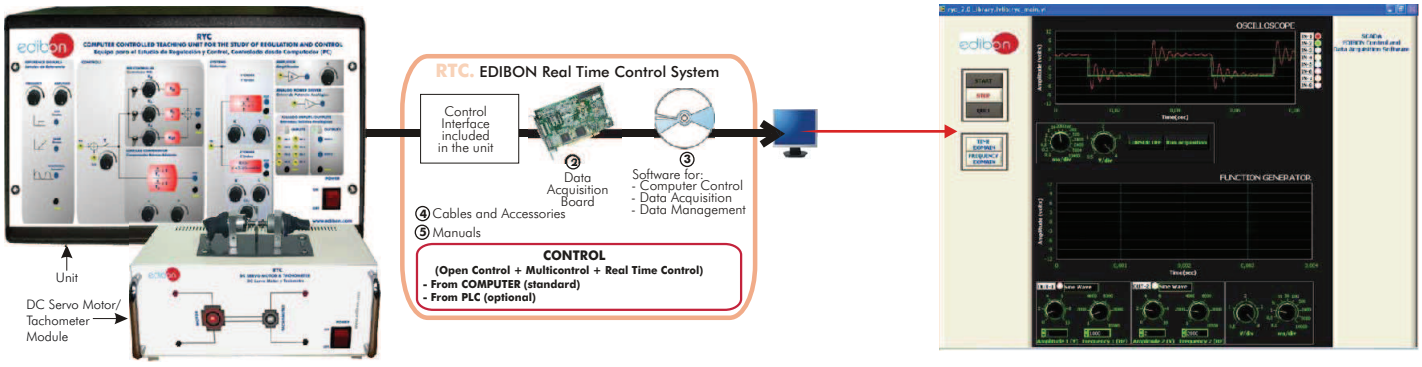
EDIBON FP-X-CPU. **PLC,** with no additional elements

SPECIFICATIONS SUMMARY

Inputs: 8.
Output: 6.
Output type: Relay 2A/pt Max.
Execution time: 0.32µs.
Data memory: 12285.
Bit memory: 4096.
High Speed Counter.
Number of interruption programs: 15 programs (14 external, 1 internal).
Dimension (w, d, h): 60 x 79 x 90 mm.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/plcunitoperations/EDIBON%20FP-X-CPU.pdf

RYC. Computer Controlled **Teaching Unit for the Study of Regulation and Control**



① Unit: RYC. Teaching Unit for the Study of Regulation and Control

SPECIFICATIONS SUMMARY

Items supplied as standard

① RYC. Unit:
The RYC is a Regulation and Control training unit designed by EDIBON. It allows students to learn the most important concepts about Regulation and Control in an easy and quick way. The unit is provided with a set of practices, through which the user will understand how to characterize first and second order systems and how a PID controller works.

Unit:
Metallic box. Diagram in the front panel with similar distribution to the elements in the real unit.
This unit includes the following modules:
Reference signals module: It allows to generate three different types: step, ramp and sinusoidal. The frequency and amplitude of the signals can be adjusted using the potentiometers.
PID controller module: It is subdivided into proportional, integrative and derivative blocks. Each block has its own potentiometer to adjust each parameter independently.
Lead / Lag Compensator: It represents a compensator system in the Laplace domain. The system has a potentiometer z to modify the zero, p to modify the pole and K to modify the gain of the compensator.
First Order System: It represents a first order system in the Laplace domain. The system has a potentiometer T to modify the time constant of the system. The gain can be also adjusted using the K potentiometer.
Second Order System: It represents a second order system in Laplace domain. The system has three potentiometers to modify the three parameters of the system: gain K, damping coefficient and the natural frequency.
Amplifier module: It can be used for signal amplification. There is a potentiometer, K, to adjust the gain of the amplifier.
Analog Power Driver: It consists of a power amplifier that can be used as the last stage when a application requires high power supply (for example a DC Motor, pump, etc).
Analog I/O: It is provided with 8 analog inputs and 2 analog outputs. The inputs are used to visualize different signals in the computer. The analog outputs are for signal generation.
Control Interface included.

DC Servo Motor/Tachometer Module:
Metallic box. DC Servo Motor (speed: 3600 rpm max.). Tachometer (speed: 3600 rpm max.).

② DAB. Data Acquisition Board:
PCI Data acquisition board (National Instruments) to be placed in a computer slot. 16 Analog inputs. Sampling rate up to: 250 KS/s. 2 Analog outputs. 24 Digital Inputs/Outputs.

③ RYC/CCSOF. Computer Control + Data Acquisition + Data Management Software:
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 KS/s (kilo samples per second). Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

④ Cables and Accessories, for normal operation.

⑤ Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.) = Unit: 490 x 330 x 310 mm. Weight: 10 Kg.
DC Servo Motor/Tachometer Module: 310 x 220 x 145 mm. Weight: 10 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/automationregulation/RYC.pdf

PRACTICAL POSSIBILITIES

1.- Response of a first order system in time domain. (Step-response).
2.- Response of a first order system in time domain. (Ramp-response).
3.- Response of a first order system in time domain. (Sinusoidal-response).
4.- Response of a first order system in frequency domain. (Sinusoidal-response).
5.- Response of a second order system in time domain. (Step-response).
6.- Response of a second order system in time domain. (Ramp-response).
7.- Response of a second order system in time domain. (Sinusoidal-response).
8.- Response of a second order system in frequency domain. (Sinusoidal-response).
9.- Phase Lead Compensator experiment.
10.- Phase Lag Compensator experiment.
11.- Structure of a PID controller (Proportional-Integrative-Derivative blocks).
12.- PID control of a first order system in open-loop.
13.- PID control of a second order system in open-loop.
14.- PID control of a first order system in closed- loop. (Mathematical tuning)
15.- PID control of a first order system in closed- loop. (Experimental tuning)
16.- PID control of a first order system in closed- loop. (Ziegler -Nichols tuning).
17.- PID control of a second order system in closed- loop. (Mathematical tuning).
18.- PID control of a second order system in closed- loop. (Experimental tuning).
19.- PID control of a second order system in closed- loop. (Ziegler -Nichols tuning).
20.- Characterization of a DC motor.
21.- DC motor speed control with a PID controller.

RYC/B. **Basic Teaching Unit for the Study of Regulation and Control**

SPECIFICATIONS SUMMARY

RYC/B allows the user to learn the basics about regulation and control of first and second order systems. This unit enables to carry a set of practices related with basic regulation and control, through which the user will understand how to characterize first and second order systems and how a PID controller works.

Metallic enclosure, including all the modules and elements.

Power Supply.

Protection fuse.

Block diagrams in the front panel.

The unit includes the following modules:

Reference signals:
Step, Ramp and Sine.

PID controller:
P controller, I controller and D controller.

Systems:
First Order System.
Second Order System.

Cables and Accessories, for normal operation.

Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.) = Unit: 490 x 330 x 310 mm.
Weight: 10 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/automationregulation/RYC-B.pdf

PRACTICAL POSSIBILITIES

1.- Response of a first order system in time domain. (Step-response).
2.- Response of a first order system in time domain. (Ramp-response).
3.- Response of a first order system in time domain. (Sinusoidal-response).
4.- Response of a first order system in frequency domain (Sinusoidal-response).
5.- Response of a second order system in time domain (Step-response).
6.- Response of a second order system in time domain. (Ramp-response).
7.- Response of a second order system in time domain. (Sinusoidal-response).
8.- Response of a second order system in frequency domain (Sinusoidal-response).
9.- Structure of a PID controller (Proportional-Integrative-Derivative blocks).
10.- PID control of a first order system in open-loop.
11.- PID control of a second order system in open-loop.
12.- PID control of a first order system in closed- loop. (Mathematical uning).
13.- PID control of a first order system in closed- loop. (Experimental tuning)
14.- PID control of a first order system in closed- loop. (Ziegler - Nichols tuning).
15.- PID control of a second order system in closed- loop. (Mathematical tuning).
16.- PID control of a second order system in closed- loop. (Experimental tuning).
17.- PID control of a second order system in closed- loop. (Ziegler-Nichols tuning).

CECI. **Industrial Controllers Trainer**

SPECIFICATIONS SUMMARY

Trainer for industrial process controllers. This trainer allows students the study and familiarisation with the function and operation of a industrial process controller.

Configurable digital controller:

2 inputs, 1 output. Configurable as P, PI or PID controller. Proportional gain X_p: 0 -999.9%. Integral action time T_n: 0-3600s. Derivative time T_v: 0-1200s. RS232 interface for configuration on computer (PC).

Digital voltmeter: 0 -20V.

Signal generator with potentiometer. Reference variables generator: 2 voltages selectable. Output voltage: 0-10V.

Controlled system simulator:

Controlled system type: First order lag. Time constant: 20s.

All variables accessible as analog signals at lab jacks .

Possibility of connection of external instruments via lab jacks (for example: line recorder, plotter, oscilloscope...).

Configuration software CD. Interface cable. Set of lab cables.

Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.)= 490 x 330 x 310 mm. Weight: 8 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/automationcontrol/CECI.pdf

PRACTICAL POSSIBILITIES

To study methods and terminology of process control:

1.- Closed loop control.
2.- Static and dynamic transfer function.
3.- To study the step response.
4.- Reference variable step.

To learn and to familiarise with a process controller:

5.- Configuration level.
6.- Parameter level.
7.- Operation control levels.

Control parameters:

8.- Setting input channels.
9.- Setting output channels.
10.- To use computer (PC)-based configuration tools.
11.- Scaling displays.

CRCI. **Industrial Controllers Networking**

SPECIFICATIONS SUMMARY

This trainer enables to take the first steps in process automation using field buses. This trainer demonstrates the operation of a process control system based on a simple application. This trainer allows student the familiarisation with the function and operation of an industrial process controller.

2 Digital process controllers, with field bus interface:

Configurable as P, PI or PID controller. Proportional gain X_p: 0-999.9%. Integral action time T_n: 0-3600s. Derivative time T_v: 0- 1200s. Controller parameter setting via field bus system.

2 Signal generators: 0-10V. Profibus DP interface card for computer (PC).

Process variables as analog signals: 0-10V. All variables accessible as analog signals at lab jacks.

Software CD with driver software, OPC server and process control software.

Possibility of connection of external instruments via lab jacks (for example: line recorder, oscilloscope, etc). Set of cables.

Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.)=490 x 330 x 310 mm. Weight: 12 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/automationcontrol/CRCI.pdf

PRACTICAL POSSIBILITIES

1.- Function of a digital industrial controller.
2.- Layout of a field bus system.

To learn and to familiarise with the operation and structure of a process control system under Profibus DP:

3.- Controller parameter setting via field bus system.
4.- Profibus DP field bus system.
5.- OPC (OLE for Process Control) server function.
6.- Online controller parameters setting.
7.- Master / slave assignment.
8.- To configure and display alarms.
9.- Reading control variables and displaying them online.
10.- Scaling displays.
11.- Bus configuration.

CEAB. **Trainer for Field Bus Application**

SPECIFICATIONS SUMMARY

This Trainer is used to teach the initial or first steps in field bus tecnology based on Profibus DP. The field bus permits networking terminal devices (controllers, actuators or sensors) in the plant system (field level) with the control room (control level).

Several devices (slaves) are activated and read by a computer (PC) with a Profibus DP interface (master).

Different subjects or topics can be covered and studied: bus topology, system configurator with Device Master File "DMF", communication protocols, tags, OPC server, output and input process data, etc.

Digital process controller, with Profibus DP interface:

Configurable as P, PI or PID controller. Proportional gain X_p:0-999.9%. Derivative time T_v:0-1200s. Integral action time T_n: 0-3600s.

Signal generators: 0-10V. Digital voltmeter: 0-20V.

Digital Profibus DP I module. Digital Profibus DP O module. Four digital inputs. Four digital outputs.

Analog Profibus DP I module. Analog Profibus DP O module. Four analog inputs: 0-10V. Two analog outputs: 0-10V.

Profibus DP interface card for computer (PC).

Process variables as analog signals at lab jacks: 0-10V.

Software CD with driver software, system configurator, OPC server and process control software.

Possibility of connection of external instruments via lab jacks (for example: chart recorder, oscilloscope, etc). Set of cables.

Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.)= 490 x 330 x 310 mm. Weight: 12 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/automationcontrol/CEAB.pdf

PRACTICAL POSSIBILITIES

1.- Operation and function of a digital industrial controller.
2.- Function of an analog input/outputs module.
3.- Function of a digital input/output module.
4.- Layout of a field bus system.
5.- Familiarisation with the field bus stations.
6.- Defining the bus technology with the stations.
7.- Reading out and in, and online displaying of analog and digital process variables.
8.- Communication protocols.
9.- To define tags.
10.- Familiarisation with the device master file "DMF".
11.- OPC server.
12.- Access to the OPC database from the process control program.

CEAC. **Controller Tuning Trainer**

SPECIFICATIONS SUMMARY

Trainer for controller tuning. This unit permits the interaction between controller and controlled system. The objective is that the closed control loop, formed by the controller and the controlled system, to show the desired optimum response.

With a simulation software the setting of controller parameters can be practised safely. Closed and open loop control, step response, stability, disturbance and control response are demonstrated.

This trainer no needs real controlled systems, the controlled system is simulated on a computer (PC) by the simulation program. In this program the most important types of controlled systems can be selected.

The process controller used can be easily configured from the computer (PC). The controller and the computer (PC) are connected by a data acquisition card with AD and DA converters.

Configurable digital process controller, with interface:

Configurable as P, PI or PID controller. Proportional gain X_p: 0-999.9%. Integral action time T_n: 0-3600s. Derivative time T_v: 0-1200s.

Interface for computer (PC). Data acquisition card for computer (PC).

Simulation Software for controlled system models, such as 1st and 2nd order lags, time-delayed systems etc. Controlled system simulation models with proportional, integral, 1st order lag, 2nd order lag, time-delayed response, non-linearity and limitation.

Configuration software for process controller. Recording and evaluation of time response on computer (PC). Set of cables.

Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.) = 490 x 330 x 310 mm. Weight: 8 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/automationcontrol/CEAC.pdf

PRACTICAL POSSIBILITIES

1.- To use commonly applied tuning rules, such as Ziegler-Nichols.
2.- To study the difference between open and closed loop control.
3.- Control loop comprising controller and controlled system.
4.- To determine the system parameters.
5.- Closed-loop control system response.
6.- Choice of optimum controller parameters.
7.- Stability, steady state and transient response.
8.- Study and investigation of control and disturbance response.
9.- Study of the stability of the closed control loop.
10.- Learning methods and terminology involved in process control.
11.- To adapt the process controller to different controlled systems.
12.- Use and practices with the simulation software.

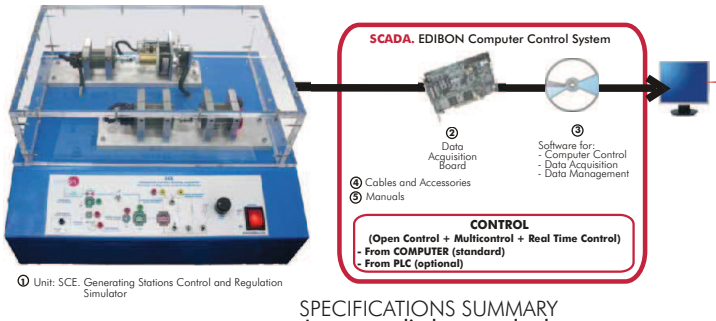
EPID-T. **Industrial Regulation Trainer, PID type (Temperature)**

SPECIFICATIONS SUMMARY

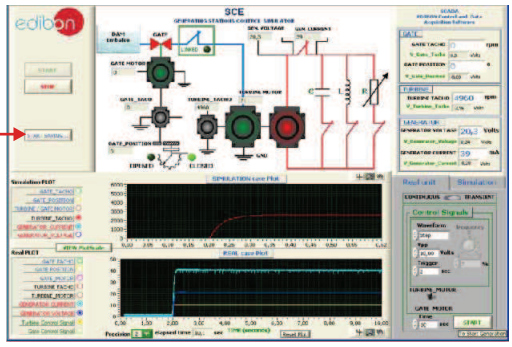
Steel box with handles for an easy transport.
Diagram in the front panel.
The processes regulator is integrated on the unit itself, as well as the universal converter to measure the temperature.
Terminals for an easy and quick connection.
High accurecy temperature controller: PID control with +/- 0.2 scale background.
Possibility of 18 types of analog inputs (thermocouples: K, J, R, S, B, E, T, etc.; inputs in current, inputs in voltage, RTD), connected to terminal connections
2 digital inputs, connected to some terminal connections, with input for a 4 wires thermoresistance.
3 digital outputs. 3 different types of outputs: relay output, output in voltage and output in current 4-20mA DC.
Auto tuning for PID automatic setting.
An alarm in case of heater breakdown is available.
2nd. optional output for the heat-cold control, ON/OFF control of double actuation.
Communication functions: RS485 ASCII / Modbus.
Double display for visualization of the actual value and of the set point control.
Programing software.
Programing and visualization from computer (PC).
Cables and Accessories for normal operation.
Manuals: This unit is supplied with 8 manuals
Dimensions(approx.): 310mm x 220mm x 145mm. Weight: 5 Kg. approx.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/automationcontrol/EPID-T.pdf

SCE. Computer Controlled **Generating Stations Control and Regulation Simulator**



① Unit: SCE. Generating Stations Control and Regulation Simulator



SPECIFICATIONS SUMMARY

Items supplied as standard

① SCE. Unit:

Unit designed to simulate the regulation behaviour of a hydroelectric generating station ,as a didactic application with different aspects of regulation, control and simulation.

Anodized aluminum structure. Diagram in the front panel with similar distribution to the of the elements in the real unit.

It is possible to work with this unit in 2 ways:

- REAL mode (continuous or transient analysis).
- SIMULATED mode.

The unit consists mainly of an interface for the conditioning of input and output signals.

For its part, this one will be connected to the computer and to the two subsystems that we try to control: Gate subsystem and turbine-generator subsystem.

The unit has (in the interface) some switches to establish different loads to the generator output and different conditions of the real system.

Gate subsystem: It consists of a motor that controls the gate opening, and some mechanisms that emulate it.

Turbine-generator system: This subsystem will be analyzed separately or linked up with the previous one, achieving that the motor that simulates the turbine turns according to the gate opening percentage. This turbine is connected with a generator system and with a system that simulates different loads (inductive, capacitive or resistive). Three loads in parallel are connected at the generator output, that simulate the consumption of the energy distribution system: Variable resistance, capacitance and inductance.

Control interface.

② DAB. Data Acquisition Board:

PCI Data acquisition board (National Instruments) to be placed in a computer slot. 16 Analog inputs. Sampling rate up to: 250 KS/s. 2 Analog outputs. 24 Digital Inputs/Outputs.

③ SCE/CCSOF. Computer Control + Data Acquisition + Data Management Software:

Flexible, open and multicontrol software. Management, processing, comparison and storage of data. Sampling velocity up to 250,000 data per second guaranteed. It allows the registration of the alarms state and the graphic representation in real time.

This Software has got 2 operating modes: REAL mode: through motors, actuators and sensors that the unit includes (Continuous, transient). SIMULATED mode: through the mathematical modelization of the motors, previously mentioned.

④ Cables and Accessories, for normal operation.

⑤ Manuals: This unit is supplied with 8 manuals.

Dimensions (approx.) = Unit: 405 x 350 x 250 mm. Weight: 15 Kg.

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/systems/SCE.pdf

PRACTICAL POSSIBILITIES

1.- Modelization of the motor as a standard motor.

2.- Modelization of the motor with the constants corrections of the mathematical model.

3.- Calculation of the dynamos speed constant.

4.- Obtaining of the transient responses of the gate motor.

5.- Obtaining of the transient response of the turbine motor.

6.- Obtaining of the transient response of the gate simulated motor.

7.- Obtaining of the transient response of the turbine simulated motor.

8.- Comparative analysis of the transient response of the turbine real motor vs the transient response of the simulated motor for resistive load.

9.- Comparative analysis of the transient response of the turbine real motor vs the transient response of the simulated motor for capacitive load.

10.- Comparative analysis of the transient response of the turbine real motor vs the transient response of the simulated motor for inductive load.

11.- Comparative analysis of the response of the gate real motor vs the response of the gate simulated motor for continuous (manually from the computer) control signals.

12.- Comparative analysis of the response of the gate real motor vs the response of the gate simulated motor for sinusoidal control signals.

13.- Comparative analysis of the response of the gate real motor vs the response of the gate simulated motor for square control signals.

14.- Comparative analysis of the response of the gate real motor vs the response of the gate simulated motor for triangular control signals.

15.- Comparative analysis of step response between real motor and simulated motor (gate or turbine).

SBB. **Ball and Beam System**

SPECIFICATIONS SUMMARY

Unit for the study of the stabilization of a naturally unstable system, and control of the position of the ball.

The system allows to place a ball moving along a guide, oscillating from the central point, at any desired point of the guide.

Self-contained unit with direct connection to the main, and with interface with other systems through terminals, to connect the inputs and outputs.

All power and electronics measurements inside de unit.

Possibility to use an analogical or digital controller.

The unit includes:

DC motor with gear box, and armature controlled, that alllows the oscillating movement of the guide adjusted to the motor axis.

Rod with guide for ball displacement and Ball.

Ball position sensor in the guide, rod inclination angle (potentiometer) and motor speed (tachometric dynamo).

More information in: www.edibon.com/products/catalogues/en/units/automationsystems/systems/SBB.pdf

CPVM. **DC Motor Position and Speed Control**