



LE00

Computer Controlled and Touch Screen Pilot Plants for the Production of Dairy Products



12.- FOOD & WATER TECHNOLOGY



(Example of some available units in this catalog)

- Research units, modular and expandable.
- Custom designs and own manufacture.
- Food grade materials.
- Possibility of production for commercialization.

EXPANSIONS

The main reference could be expanded adding:



ESN
EDIBON Scada-Net
Systems



ECL
EDIBON Cloud
Learning

INNOVATE SYSTEMS

- Advanced Real-Time SCADA and PID Control.
- Open Control + Multicontrol + Real-Time Control.
- Specialized EDIBON Control Software based on LabVIEW.
- Calibration exercises, which are included, teach the user how to calibrate a sensor and the importance of checking the accuracy of the sensors before taking measurements.
- Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.
- Capable of doing applied research, real industrial simulation, training courses, etc.
- Remote operation and control by the user and remote control for EDIBON technical support, are always included.
- Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).
- Designed and manufactured under several quality standards.
- This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.

WARRANTIES



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INTRODUCTION

Milk and dairy products are one of the elemental foods in many countries around the world, which also have great nutritional characteristics regarding other food groups thanks to the great variety and density of nutrients they contain, highlighting that it is the main source of calcium in our diet.

Raw milk, that is, it is directly milked from the animal, is not suitable for marketing. It is necessary to subject the milk to a series of processes in order to control its microbial load and promote its conservation.

On the other hand, milk is the raw material for the production of many other products that share or even improve their nutritional properties in certain aspects. The production of dairy products can be carried out by means of different processes: The process of skimming is used to obtain milk with a lower fat content, the fermentation processes can be used to obtain yogurt or cheese, and mechanical processes cream or butter.

GENERAL DESCRIPTION

The Computer Controlled and Touch Screen Pilot Plants for the Production of Dairy Products "LE00" is a pilot plant capable of demonstrating, for further research and study, the main processes involved in the dairy treatment industry. That is, from the treatment of raw milk for its commercialization and conservation, to the production of dairy products such as cream, butter, cheese, cottage cheese and yogurt.

This pilot plant is further subdivided into different pilot plants with which we try to cover and give a detailed solution to the industries involved in the treatment of milk and therefore give a complete solution to each of the industries that deal with dairy products (from its production until consumption):

- **LE00/PM. Pilot Plant for the Production of Pasteurized Milk.** With this pilot plant, designed by EDIBON, we cover the first phase of fresh milk treatment to obtain pasteurized milk, following the following stages:

A homogenization treatment is previously done to decrease the size of the milk fat globules.

Subsequently, the pasteurization process is carried out by a heat treatment of the food fluid (in this case milk) is performed to eliminate the existing bacteria without reducing the quality or properties of the milk.

A refrigerated tank is also included for the storage of the milk used during the process.

Finally, the pasteurized milk obtained is suitably bottled.

- **LE00/CC. Pilot Plant for the Production of Cheese and Cottage.** With this pilot plant, designed by EDIBON, we will obtain cottage cheese and cheese from pasteurized milk in the following way:

First of all, from pasteurized milk we pass through a Didactic Curdling Vat.

From the vat, we can follow two different lines to obtain one product or another.

For cottage cheese production:

On the one hand, to obtain cottage cheese, after passing through the vat, milk, bacteria culture and other additives are added to the Didactic Curdling Vat and by increasing its temperature we achieve the precipitation of milk proteins and cottage cheese is produced.

For cheese production:

From the rennet obtained in the vat, the milk is passed to a cheese making dam using blades (liras).

Subsequently, the whey is drained and placed in a mold so that the whey drains completely. The mass is pressed to further drain the whey.

To achieve a correct maturation and conservation, the product is salted so that the rind is formed and to prevent the microorganisms from coming out of the cheese. During this point we enhance the flavor and aroma.

Finally, we place the cheese in the ripening chamber.

- **LE00/Y. Pilot Plant for the Production of Yogurt.** With this pilot plant, designed by EDIBON, from pasteurized milk, we obtain and make the yogurt manufacturing process:

Through a multiprocess tank, we add the necessary ingredients for yogurt manufacturing.

Subsequently, we introduce the previously made mixture into the fermenter to obtain the yogurt.

- **LE00/CBI. Pilot Plant for the Production of Cream, Butter and Ice Cream.** With this pilot plant, designed by EDIBON, we will obtain skimmed milk, cream, butter and ice cream following the following process:

Firstly, pasteurized milk, goes through a skimmer. This allows us to obtain skimmed milk on the one hand and cream on the other hand, which will be used in the following processes.

Once the cream is obtained, we go through a butter maker and an ice cream machine which will give us butter and ice cream respectively.

- **LE00/MP. Pilot Plant for the Production of Milk Powder.** With this pilot plant, designed by EDIBON, from pasteurized milk, powdered milk is obtained by dehydration and following the following process:

Through the rising film evaporator and the steam generator, the water is removed.

Along with the spray dryer and the step previously performed, we obtain powdered milk.

INCLUDED UNITS

PILOT PLANTS FOR THE PRODUCTION OF DAIRY PRODUCTS

- OPEN CONTROL +
- MULTICONTROL +
- REAL TIME CONTROL

LE00/PM. Pilot Plant for the Production of Pasteurized Milk



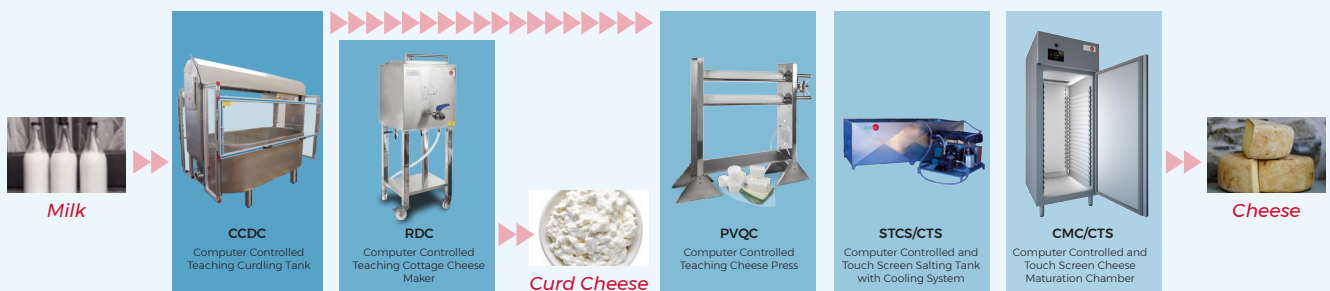
LE00/Y. Pilot Plant for the Production of Yogurt



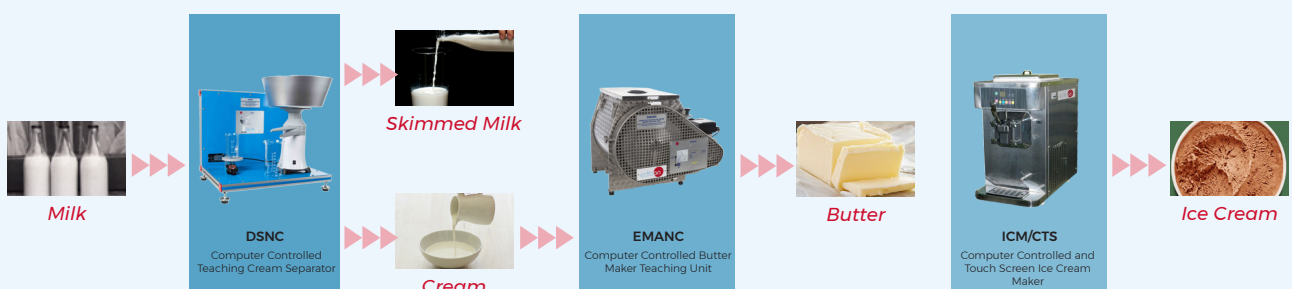
LE00/MP. Pilot Plant for the Production of Milk Powder



LE00/CC. Pilot Plant for the Production of Cheese and Cottage



LE00/CBI. Pilot Plant for the Production of Cream, Butter and Ice Cream



EXERCISES AND PRACTICAL POSSIBILITIES

Guided practical exercises included in this pilot plant:

- 1.- Production of pasteurized milk.
- 2.- Cream production.
- 3.- Skimmed milk production.
- 4.- Butter production.
- 5.- Yogurt production.
- 6.- Cheese production.
- 7.- Cottage cheese production.
- 8.- Ice cream production.
- 9.- Production of evaporated milk and condensed milk.
- 10.- Powdered milk production.
- 11.- Analysis of all phases of the product transformation, from reception to packaging.
- 12.- Qualitative evaluation of the finished product as function of the productive operations performed.
- 13.- Experimentation on the efficiency of the different chemical products used for the preservation process.
- 14.- Organization of procedures for continuous quality control of the production operations.
- 15.- Execution of procedures for disinfection and sanification of the units.
- 16.- Evaluation of technical, legal and administrative aspects concerning food adulteration.
- 17.- Manual and computer control operation.

Additional practical possibilities:

- 18.- Sensors calibration.

Other possibilities to be done with this pilot plant:

- 19.- Many students view results simultaneously.

To view all results in real time in the classroom by means of a projector or an electronic whiteboard.

- 20.- Open Control, Multicontrol and Real Time Control.

Each unit allows intrinsically and/or extrinsically to change the span, gains; proportional, integral, derivative parameters, etc. in real time.

- 21.- The Computer Control System with SCADA and PID Control allow a real industrial simulation.
- 22.- Each unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.
- 23.- Each unit can be used for doing applied research.
- 24.- Each unit can be used for giving training courses to Industries even to other Technical Education Institutions.
- 25.- Visualization of all the sensors values used in the LE00 pilot plant process.

Additional practical possibilities with the expansions:



ESN. EDIBON Scada-Net Systems

- 26.- Control any unit from any post located in the laboratory.
- 27.- Supervise different experiments about data acquisition and representation, from the units, in real time.
- 28.- Visualize any experiment from any laboratory post.
- 29.- Supervise as many experiments as desired, performed in different units at the same time.
- 30.- Generate reports with the results obtained with the units.
- 31.- Perform different experiments at the same time.
- 32.- Show to the laboratory members the appropriate manual or automatic operations to perform with each laboratory unit.
- 33.- Create more elaborate practical exercises using more than one unit from the laboratory.
- 34.- Suggest multidisciplinary experiments, in other words, mix in the same experiment units from different study fields.
- 35.- Modify any parameter of any unit included in the system from any workstation in the laboratory.
- 36.- Cause an abnormal functioning in a unit for the students to practice fault finding exercises.
- 37.- Assess the knowledge of a student or group of students about a particular unit (any unit included in the "ESN" system).
- 38.- Develop guided practical exercises for a better understanding of each unit.

- 39.-** Individual training practical exercises.
- 40.-** Group exams or practical exercises.
- 41.-** Perform interactive exercises (using the chat between manager-users).
- 42.-** Exchange of obtained results among the members of the “ESN” system.
- 43.-** Any exercise directly related to the SCADA software of each unit.
- 44.-** Some of the practical possibilities may be done only with the “ESN” complete system.

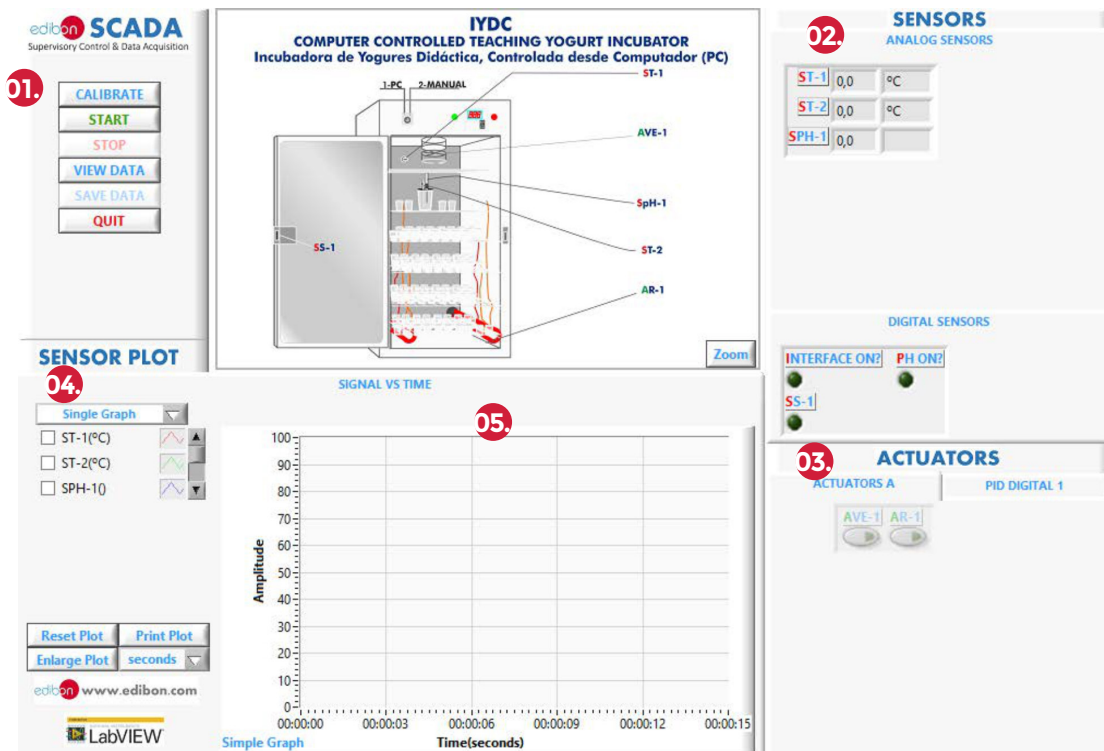


ECL. EDIBON Cloud Learning

**Ask us for information about the practices that you could perform remotely with each of our units.*

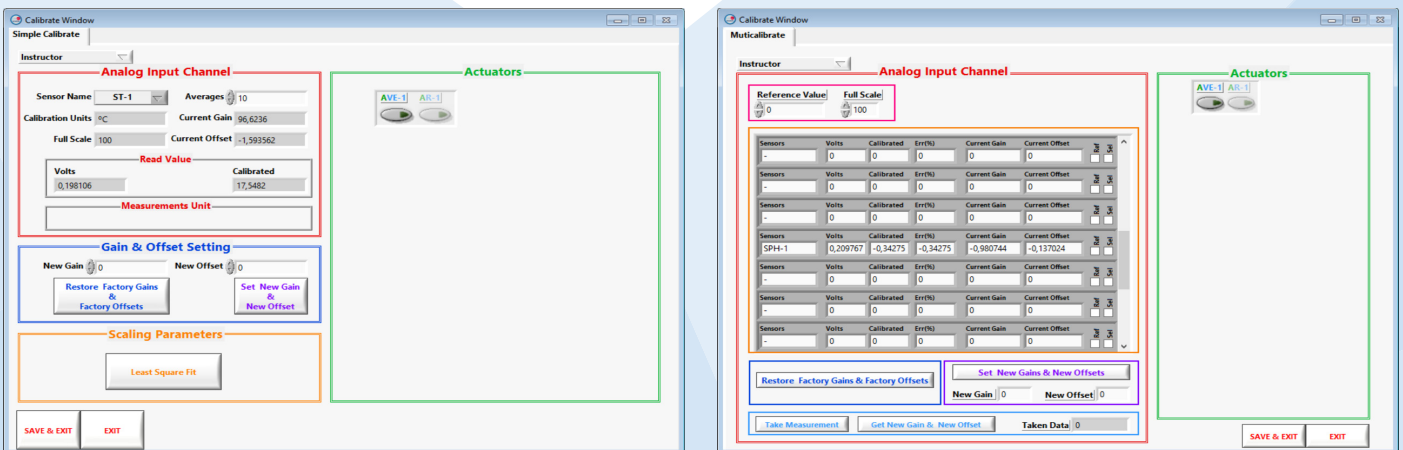
RESULTS

SOFTWARE MAIN SCREEN (Example of one of the unit belonging to LE00)



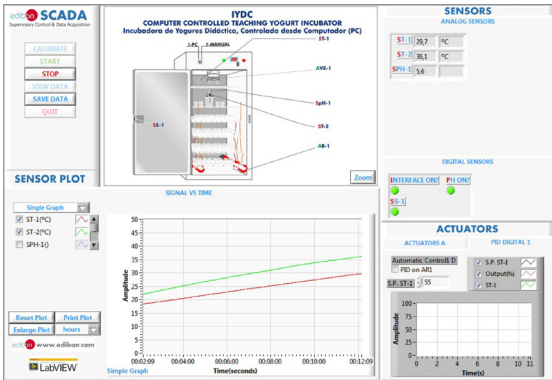
1. Main software operation possibilities.
2. Sensors displays, real time values, and extra output parameters. Sensors: ST=Temperature sensor. SPH=pH sensor.
3. Actuators controls. Actuators: AR=Heating element. AVE=Fan.
4. Channel selection and other plot parameters.
5. Real time graphics displays.

SOFTWARE FOR SENSORS CALIBRATION (Example of screens)



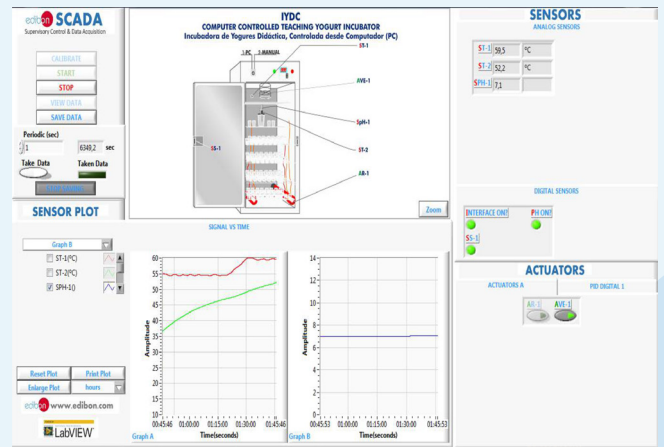
The researcher, the teacher and the students can calibrate the unit with a password provided by EDIBON. Factory calibration can be restored at any time.

RESULTS:



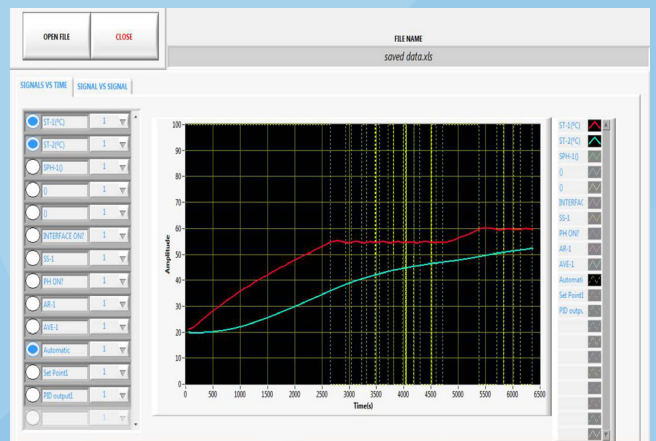
Representation in real time of the measured magnitudes. Graph with temperature measures visualization.

Representation in real time of the measured magnitudes. Graphs with pH and temperature measures visualization.



Heating temperature control is done through a PID control. When the target temperature is reached at the temperature sensor (ST-1), the heating element is turned off.

Visualization and representation of saved data.



COMPLETE TECHNICAL SPECIFICATIONS

LE00 Pilot Plants:

- All components are made of food grade materials.
- Real unit used in the production of dairy industry.
- Possibility of producing the main dairy products:
 - Pasteurized milk.
 - Yogurt.
 - Cheese and cottage cheese.
 - Ice cream.
 - Butter and cream.
 - Powdered milk and evaporated milk.
- Sensors and actuators which allows the study and understanding of the different processes of dairy products production.
- Modular layout to allow adaptation to different spaces.



Production of *Pasteurized Milk*

1. LE00/PM. Pilot Plant for the Production of Pasteurized Milk:

DMH/CTS. Computer Controlled and Touch Screen Milk Homogenizer.

- Working pressure: 100 - 300 bar.
- Working flow rate: 50 - 300 l/h.
- Pumping pistons with special coating.
- Valve groups with interchangeable seats.
- Highly efficient homogenizing valves thanks to the design made to obtain the maximum stability / alignment of the movable element (shock head) and to the installation of an oleo-dynamic thrust unit, made to avoid any incidence of vibrations during the operation.
- Sanitary execution safety valve.
- Transmission with double reduction stage: pulleys and parallel shaft V-belts.
- Four-pole alternating current motor.
- Lubrication of internal organs in oil bath with level sight glass.
- Dimensions: 540 x 440 x 810 mm approx.
- Weight: 135 kg approx.



TFDC. Computer Controlled Teaching Frigorific Tank.

- Capacity: 300 l.
- Power: 365 W.
- Refrigeration cycle with R404A refrigerant regulated by expansion valve.
- Electronic regulator.
- Dimensions: 1000 x 1000 x 500 mm approx.
- Weight: 60 kg approx.



PADC. Computer Controlled Teaching Autonomous Pasteurization Unit.

- Maximum flow rate: 250 l/h.
- Thermal cycle: 4°C - 75°C - 30°C.
- Power: 12 kW.
- Stainless steel AISI 304-316.
- Centrifugal milk pump.
- AISI 316 steel plate heat exchanger.
- Electro-pneumatic valve for diverting pasteurized milk.
- Control panel with main switch, process - cleaning switch, probes and milk and water thermostats, thermograph and pilots.
- Closed heating circuit with water pump, automatic bleeder, expansion tank, and electrical resistance and safety circuit breakers.
- Dimensions: 1000 x 650 x 1450 mm approx.
- Weight: 95 kg approx.



EDLC. Computer Controlled Liquid Packaging Teaching Unit.

- Liquid and semi-dense products dosing machine based on dose delivery through a pneumatically-operated cylinder:
 - Two cylinders with dosing nozzles with anti-drip system.
 - Compressed air pressure: 6 - 8 bar.
 - Dosing accuracy: $\leq 2\%$.
 - Dose range: 100 - 1000 ml.
 - Air consumption: 370 l/min.
 - Approximate production: ≤ 29 dose per minute. (*) The production will be influenced by the product, the selected dose, the configuration of the machine, etc.
- Air flow regulators to modify the lowering/lifting speed of the dosing nozzles.
- Air flow regulators to modify the closing/opening speed of each dosing nozzle.
- Dose adjusting handle.
- Air flow regulators to modify the speed of each cylinder.
- Supply tank, capacity: 20 l.
- Compressed air filter and regulator.
- Compressed air manometer.
- Eight limit switches.
- Three displacement sensors.
- Manual (with a pedal) or automatic operation mode.
- Safety pushbutton.
- Dimensions: 1200 x 450 x 900 mm approx.
- Weight: 50 kg approx.



Production of *Yogurt*

2. LE00/Y. Pilot Plant for the Production of Yogurt:

VPMC. Computer Controlled Multipurpose Processing Vessel.

- Stainless steel jacketed process vessel, capacity: 30 l.
- Batch sizes, range: 5 - 30 l (depending on the mixture being processed).
- Maximum vessel contents temperature: 85 ° C.
- Minimum vessel contents temperature: 1° C.
- Computer controlled heating element, of 3000 W.
- Emulsifier/Mixer unit of high speed, with DC motor. This emulsifier is computer controlled; speed range: 0 - 8000 rpm.
- Emulsifier/mixer head adjustable in height.
- Four different emulsifier/mixer heads are supplied:
 - General purpose.
 - Disintegrating and emulsifying.
 - High shear.
 - Axial flow.
- Chilled water circulation system: chilling unit (500 W) and water recirculating centrifugal pump, computer controlled.
- Surfaces which may come into contact with the process fluid are constructed from food grade materials.
- PID control of the temperature of the product into the process vessel.
- Four temperature sensors “K” type, to measure:
 - Products temperature in the vessel.
 - Temperatures for controlling the water temperature.
- Flow rate of cold or chilled water is controlled, flow sensor: 0.25 - 6.5 l/min.
- Level switch in the process vessel to protect the heating element.
- Dimensions: 800 x 800 x 1250 mm approx.
- Weight: 150 kg approx.



IYDC. Computer Controlled Teaching Yogurt Incubator.

- Capacity: 300 jars (60 - 80 l depending on the size of the jars).
- Heat output: 600 W.
- Cooling power: 800 W.
- Internal and external bodywork in stainless steel AISI 304.
- Working range from 0 to 60 °C.
- Uniformly adjustable temperature by ventilation.
- Separate thermostats for hot and cold.
- Adjustable timing of the heating time to make the switch to cold automatically.
- Dimensions: 600 x 520 x 870 mm approx.
- Weight: 90 kg approx.



Production of *Milk Powder*

3. LE00/MP. Pilot Plant for the Production of Milk Powder:

EPAC. Computer Controlled Rising Film Evaporator.

- Evaporation double jacket column, with a heating surface of 0.122 m², 30 mm of internal diameter, 60 mm of external diameter and 1300 mm of length.
- Membrane dosing pump, computer controlled, maximum flow 15 l/h, with flow control.
- Single effect vacuum pump, computer controlled, maximum flow 3 m³/h and maximum vacuum of 150 microns.
- Three tanks, capacity: 10 l (for feeding, concentrated and evaporated).
- Two graduated vessels for the storage of concentrated and evaporated product, capacity: 500 ml.
- Computer controlled heating element, range: 300 W. Included a safety temperature sensor with internal temperature controller.
- Automatic temperature control.
- Coil coolant with length of 400 mm.
- High safety pressure cut out for pressure control in the column.
- Ten temperature sensors, type "J".
- Flow sensor, range: 0.2 - 6.5 l/min.
- Three force sensors, one in each of the three tanks (for feeding, concentrated and evaporated), for measuring the amount of substance.
- Two pressure sensors, range: 0 - 2 bar.
- Solenoid valve, computer controlled.
- Dimensions: 1000 x 800 x 2300 mm approx.
- Weight: 135 kg approx.



TGV. Steam Generator (3 kW).

- Stainless steel water tank (volume: 40 l). It has one water inlet, one water outlet and two vapour outlets.
- Temperature PID control, set point max.: 120° C.
- Temperature sensor, type "J".
- Pressure working range: 0 - 0.9 bar.
- Electric heating element: 3 kW.
- Polycarbonate heat-resisting protection screens.
- Safety pressure switch (2 bar).
- Safety level switch (the heating element will be switched off if there is not enough level).
- Electronic console.
- Dimensions: 680 x 430 x 750 mm approx.
- Weight: 50 kg approx.



SSPC. Computer Controlled Spray Drier.

- Bench mounted spray drier for processing aqueous emulsions, solutions, suspensions and colloids. This unit is suitable for aqueous solutions only.
- Downward co-current operation (a fine jet of the product is brought into contact with a hot air stream).
- Characteristics:
 - Maximum drying capacity: 1000 ml/h approx.
 - Temperature range: 40 - 200°C (temperature at inlet).
 - Dry air volume range: 0.2 - 0.65 m³/min.
 - Spray air pressure range: 0.5 - 2.5 kg/cm².
 - Feed pump volume range: 102 - 1800 ml/h approx.
 - Maximum air pressure: 70 mbar.
- The chemically resistant powder coated housing includes the fan and heating element (resistance).
- All clamps and fittings are designed to allow assembly and removal of the glass elements rapidly and easily.
- Fan, computer controlled:
 - Power: 0.4 kW.
 - Velocity: 3000 rpm.
 - Drying air throughflow: 70 m³/h (fixed).
- Heating element (resistance) of 3 kW, computer controlled.
- Temperature sensor type "J", located at the inlet of the drying chamber, works with the PID controller to maintain the desired air temperature at the inlet of the drying chamber.
- Drying chamber:
 - Material: borosilicate glass.
 - It includes a spray nozzle, diameter: 0.5 mm.
 - The spray assembly incorporates a manual de-blocking device that prevents the jet nozzle from becoming blocked.
- Feed pump: peristaltic pump, with variable speed, computer controlled.
- Sample collection bottle:
 - Material: hard glass.
 - Volume: 500 ml.
- Exhaust tube:
 - Outer diameter: 50 mm.
 - It includes a diaphragm with an orifice plate.
- Filter/air regulator located between the compressor (not included) and the unit to ensure that the drying air does not include contaminants.
- Temperature sensor type "J" to measure:
 - Environmental temperature.
 - Air inlet temperature in the drying chamber.
 - Exhaust air temperature.
 - Feeding temperature.
- Differential pressure sensor to measure, together with the diaphragm with orifice plate, the flow of exhaust air, range: 0 - 1 psi (0 - 100 m³/h).
- Pressure sensor at the compressed air inlet, range: 0 - 6 bar.
- Glass vessel, volume: 1 l.
- Dimensions: 500 x 500 x 1200 mm approx.
- Weight: 80 kg approx.



Production of *Cheese and Cottage*

4. LE00/CC. Pilot Plant for the Production of Cheese and Cottage:

CCDC. Computer Controlled Teaching Curdling Tank.

- Curdling tank, dutch model, rectangular with semicircular ends. Material: stainless steel, capacity: 500 l. It includes:
 - Bridge with shifter-gearmotor group for automatic curd cutting and stirring.
 - Water jacket with stainless steel coil to heat water in the jacket using water or steam in a closed circuit.
 - Two temperature sensors to measure the water and milk temperature.
 - Filling/draining inlet for the water in the jacket and outlet valve for the whey.
 - Overflow.
- Curd knives and stirrer and rising and prepressing plates attachable to the mechanized bridge.
- Two transparent guards with safety interlock protect students and allow the visibility of the practical exercises and components of the unit.
- Dimensions: 2100 x 800 x 1900 mm approx.
- Weight: 500 kg approx.



PVQC. Computer Controlled Teaching Cheese Press.

- Pneumatic press horizontal system.
- Built in stainless steel, except for pneumatic components.
- Set of filtraje composed of valve, filter, pressure gauge, and pressure regulator.
- Capacity 30 to 36 molds depending on size.
- Dimensions: 1600 x 350 x 1500 mm approx.
- Weight: 50 kg approx.



STCS/CTS. Computer Controlled and Touch Screen Salting Tank with Cooling System.

- Capacity: 500 l.
- Power: 375 W.
- Refrigeration unit for brine recirculation and maintenance with hermetic compressor and three-phase board.
- Stainless steel tank. AISI 316 special anti-salt.
- Brine recirculation pump.
- Thermostat for regulating the temperature.
- Dimensions: 650 x 500 x 120 mm approx.
- Weight: 100 kg approx.



CMC/CTS. Computer Controlled and Touch Screen Cheese Maturation Chamber.

- Temperature control system with heating and cooling capacity.
- Temperature range: -18 °C to +35° C.
- Capacity: 785 l.
- Total power: 2012 W
 Heating power: 750 W.
 Cooling power: 1105 W (at -30° C).
- Made of stainless steel AISI 304.
- Coolant: R-452 A.
- Dimensions: 756 x 960 x 2130 mm.
- Weight: 100 kg approx.



RDC. Computer Controlled Teaching Cottage Cheese Maker.

- Stainless steel tank:
 Capacity: 50 l approx.
 Material: AISI 304.
 It includes a cover at the top and a water jacket. The function of the jacket is the increment of the temperature for the production of curd and the refrigeration of the unit.
 Insulating wall made of stone wool.
 Working temperature: 30 - 80 °C.
- Heating element with thermostat, computer controlled. Power: 4.5 kW.
- Automatic control (PID) of the temperature.
- Three ball valves:
 Two valves situated in the water jacket for the water inlet and outlet to fill and empty the jacket with water.
 One valve situated in the lower side of the tank to drain the whey and curd.
- A drain pipe and air outlet to remove air and steam from the water jacket.
- Level switch to guarantee a specific level inside of the water jacket.
- Sensors:
 pH sensor situated in the tank cover to measure the pH of the whey and curd inside of the tank, range: 0 - 14.
 Two "J" type temperature sensors to measure the temperature of the whey and curd inside of the tank and the jacket water temperature.
- Dimensions: 700 x 700 x 1700 mm approx.
- Weight: 30 kg approx.



Production of Cream, Butter and Ice Cream

5. LE00/CBI. Pilot Plant for the Production of Cream, Butter and Ice Cream:

DSNC. Computer Controlled Teaching Cream Separator.

- Flow rate: 125 l/h.
- Power: 65 W.
- Body made of cast aluminum.
- Cream and milk outlets made of stainless steel.
- 10 liters stainless steel launcher tank.
- Rubber feet for better stability.
- Dimensions: 500 x 500 x 500 mm approx.
- Weight: 20 kg approx.



EMANC. Computer Controlled Butter Maker Teaching Unit.

- Capacity: 12 l.
- Power: 370 W.
- Built in stainless steel.
- Minimum working volume of cream 4 liters.
- Tank capacity 29 l.
- Agitator with 4 stainless steel blades.
- Stirring speed 230 v per minute.
- Safety system in case of lid opening.
- Anti-glue interior treatment.
- Dimensions: 550 x 470 x 410 mm approx.
- Weight: 40 kg approx.



ICM/CTS. Computer Controlled Butter Maker Teaching Unit.

- Production: 20 - 25 l/h.
- Tank capacity: 6.5 l.
- Power: 1.38 kW.
- Dimensions: 650 x 400 x 700 mm approx.
- Weight: 100 kg approx.



ADDITIONAL RECOMMENDED ELEMENTS (Not included)

For LE00/PM, LE00/Y, LE00/MP, LE00/CC and LE00/CBI:

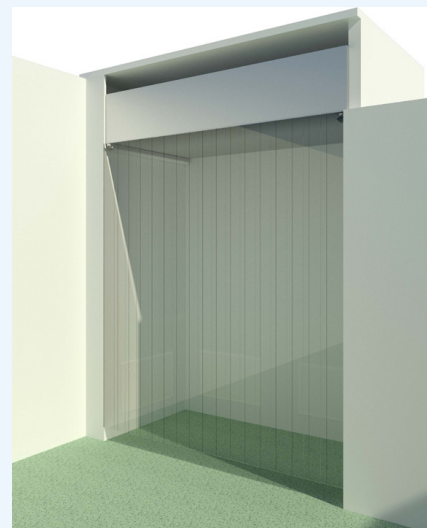
WTD. Work Table with Wheels for Draining.

- AISI-304 stainless steel construction.
- Double tray and holes for drainage with high inclination to avoid the accumulation of any type of substance.
- Mounted on four wheels, two of them with brakes.
- Dimensions: 1800 x 650 x 900 mm.



CRCA. Clean Room Cabinet.

- AISI 304 stainless steel sheet metal cabinet.
- Low-level return louvres in anodised extruded aluminium sheeting.
- Curtain made of 2 mm thick transparent PVC slats, overlapping each other, at the access.
- Filters and filter holders on the low-level return line.
High efficiency filters located on the discharge (minimum 4 filtration units).
- Flow rate of the filtration unit: 4800 m³/h.
- High efficiency centrifugal fans.
- Air diffusion in unidirectional flow by means of a diffuser sheet (veil).
- LED bar.
- Particle size: ≥0.5 µm.
- Dimensions: 2500 x 4200 x 2200 mm.



ASCD. Air Shower Cabin for Decontamination.

- Compact and self-supporting module.
- AISI 304 stainless steel.
- Doors with perimeter gasket to improve the tightness of the whole unit.
- Sight glass with integral vision.
Status signalling and emergency push button.
- Hygienic and bacteriostatic PVC floor, suitable for clean areas.
- Integrated stainless steel nozzles with fixed orientation arranged in vertical columns (minimum 12 nozzles).
- Large air return surface, which increases the speed and efficiency of the cycle.
- Flow rate: 30 m/s.
- Air filtered through H14 filters.
- Cycle control by means of a small PLC, which allows programming modifications.
- Dimensions: 1200 x 1000 x 2000 mm.



The complete pilot plant includes as well:

- **Advanced Real-Time SCADA and PID Control.**
- **Open Control + Multicontrol + Real-Time Control.**
- **Specialized EDIBON Control Software based on LabVIEW.**
- **Calibration exercises, which are included, teach the user how to calibrate a sensor and the importance of checking the accuracy of the sensors before taking measurements.**
- **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**
- **Capable of doing applied research, real industrial simulation, training courses, etc.**
- **Remote operation and control by the user and remote control for EDIBON technical support, are always included.**
- **Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).**
- **Designed and manufactured under several quality standards.**
- **This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.**

6. PLCHMI. IIoT Local/Remote Control and Monitoring with HMI (included):

- The expansion for PLC and HMI, "PLCHMI", is a system composed of an interface that includes PLC modules such as CPU, digital I/O module, analog I/O module, communications module, etc. and a control box with HMI display.

• PLC interface:

PLC controller:

Panasonic FP7 CPS31E CPU.

Digital I/O modules:

16 digital inputs; input range 0 V to 24 V.

16 digital outputs; relay output.

Analogue I/O modules:

16 analog inputs; 16-bit resolution. Input range -10 V to +10 V.

4 analog outputs; 16-bit resolution. Output range -10 V to +10 V.

Connectors and Communication Ports:

2-Port Ethernet Switch.

SCSI connector.

USB, DB-9 Series or DB-25 (if required).

• HMI control box and display:

HMI display:

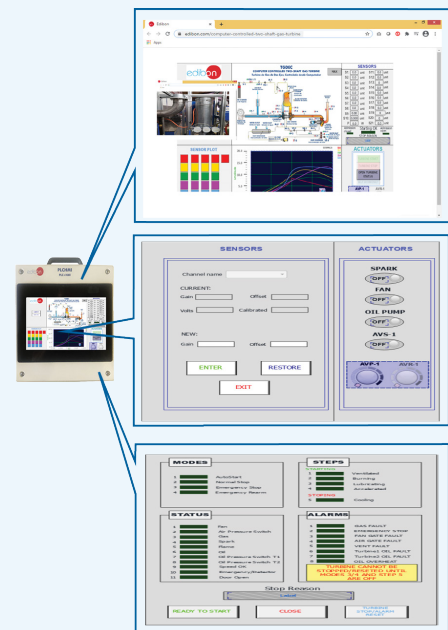
Touch Screen: Analog Resistive.

Size: 10" 16:9 TFT.

Resolution: 1024 x 600, WVGA.

Colors: 64 K.

Ethernet port.



7. LE00/CCSOF. Supervision Software + Control Software + Data Acquisition Software + Data Management Software:

SCADA System is composed of four Software Package with the following features:

- **The Supervision Software** is in charge of monitoring in real time start and stop elements, unexpected conditions and process evolution. In case of being necessary, it actuates on the system and notifies the user the incorrect operations.
- **The Control Software** allows to manage multiple process and variables in real time either a manual way or automatic way. Several type of algorithms of control such PID CONTROL are implemented depending on the field of study.
- **The Data Acquisition Software** focus on measuring and processing signals from the process with very high accuracy getting a synchronized and fast response of the system. A calibration system is part of this software to adjust the sensor measurements.
- **The Data Management Software** stores and represents, alarms, variables and process evolution in real time both in a graphic format and in a numeric format such time charts or process diagram. Printable reports can be generated or historian data can be loaded to study the experiments in detail.

The Software is open and flexible architecture that facilities to access different work levels both instructors and students. It is supported by current Windows operating system and industrial standards. The graphical user interface is intuitive and user- friendly.

8. Cables and Accessories, for normal operation.

9. Manuals:

Each unit is supplied with 8 manuals: Required Services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices Manuals.

References 1 to 9 are always included in the minimum supply (according to choice):

- LE00/PM: DMH/CTS, PADC, TFDC and EDLC.
- LE00/Y: IYDC and VPMC.
- LE00/MP: EPAC, TGV and SSPC.
- LE00/CC: CCDC, PVQC, RDC, STCS/CTS and CMC/CTS.
- LE00/CBI: DSNC, EMANC and ICM/CTS.
- PLCHMI.
- LE00/CCSOF.
- Cables and Accessories.
- 8 Manuals for enabling normal and full operation.

REQUIRED SERVICES

- Electrical supply:
 - Single-phase 200 VAC – 240 VAC/50 Hz or 110 VAC – 127 VAC/60 Hz.
 - Three-phase, 380 VAC – 400 VAC/50 Hz or 190 VAC – 240 VAC/60 Hz, 1 kW.
- Computer.

CONSUMABLES

- **Required (not included)**
 - Milk.

ELEMENTS

- **Additional recommended (not included)**
 For LE00/PM, LE00/Y, LE00/MP, LE00/CC and LE00/CBI:
 - WTD. Work Table with Wheels for Draining.
 - CRCA. Clean Room Cabinet.
 - ASCD. Air Shower Cabin for Decontamination.

SIMILAR UNITS AVAILABLE

Offered in this catalog:

- LE00. Computer Controlled and Touch Screen Pilot Plants for the Production of Dairy Products.

Offered in other catalogs:

- CE00. Computer Controlled and Touch Screen Pilot Plants for the Production of Cereals.
- AC00. Computer Controlled and Touch Screen Pilot Plant for the Production of Oil.
- AS00. Computer Controlled and Touch Screen Pilot Plants for the Production of Seeds Oil.
- CI00. Computer Controlled and Touch Screen Pilot Plants for the Production of Citrus Fruits.
- FR00. Computer Controlled and Touch Screen Pilot Plants for the Production of Fruits.
- CA00. Computer Controlled and Touch Screen Pilot Plants for the Production of Meat.
- TO00. Computer Controlled and Touch Screen Pilot Plants for the Production of Tomatoes.
- UV00. Computer Controlled and Touch Screen Pilot Plant for the Grape Treatment.
- VE00. Computer Controlled and Touch Screen Pilot Plants for the Production of Vegetables.

Additionally to the main items (1 to 9) described, we can offer, as optional, other items form 10 to 11. All these items try to give more possibilities for:

ESN. EDIBON SCADA-Net System.
ECL. EDIBON Cloud Learning.

EXPANSIONS



10. ESN. EDIBON Scada-Net Systems

The EDIBON Scada-Net Systems, "ESN", consists on the integration of EDIBON computer controlled units into the SCADA system in a local network.

The main feature of this system is the remote control of any EDIBON unit belonging to it from any control station included in the local network. In addition, any of these units can be visualized from any workstation.

Consequently, the efficiency of a laboratory with the "ESN" system is higher than the efficiency of a conventional laboratory.

- Higher laboratory performance since several students can work simultaneously. Several users can operate various units at the same time.
- Possibility of dividing the classroom into workgroups.
- Several experiments can be performed at the same time.
- Collaborative experiments performance.
- There are different user levels (manager, basic, intermediate and advanced) with different permissions.
- The manager has the absolute control of the system.
- The manager/teacher can supervise from his/her computer the operations every user is performing in any unit of the laboratory.
- Users and manager are connected at all times.
- Real time display and control of the whole system from an interactive whiteboard (touchscreen).
- CENTRALIZED AND SECURE SYSTEM, it can be totally controlled from the central computer (manager).
- The "ESN" System is MODULAR, OPEN and EXPANDIBLE.
- A vision system for real time monitoring of experiments is supplied.
- Visualization of the changes in a unit from any computer of the laboratory.
- All units can work simultaneously.
- The system is made up of as many units as required.
- The required infrastructure, both hardware and software is provided.

For more information see ESN catalog. Click on the following link: www.edibon.com/en/edibon-scada-net



11. ECL. EDIBON Cloud Learning

EDIBON Cloud Learning expansion, "ECL", is a solution designed to control EDIBON Technology based laboratories remotely in a simple and easy way.

EDIBON Cloud Learning, "ECL", is divided in two platforms:

Users Online Platform:

The main advantages of the Users Online Platform are:

- The **administrators** have full control over their laboratories thanks to the powerful class-administrator tool that allows the users management, logs visualization and progression monitoring. It also enables to assign users permissions to let them control EDIBON units or just display them. Furthermore, the administrator can upload and download measurements, data and multimedia resources.
- The **users** can learn interactively in a flexible environment as if they were in the laboratory, accessing through the Remote App to work with EDIBON units. Several users can work with one unit or one user with several units. The users can also upload and download measurements, data and graphs, multimedia resources and reports.

Remote App Platform:

Thanks to the Remote App Platform, the users can control EDIBON units and EDIBON SCADA software as if they were in the laboratory and share their expertise with the users community.

For more information see ECR catalog. Click on the following link: www.edibon.com/en/edibon-cloud-learning

ORDER INFORMATION**LE00. Computer Controlled and Touch Screen Pilot Plants for the Production of Dairy Products:**

Main Items (EDIBON recommends the acquisition of all the units for a complete study of the process, although the following could be acquired):

1. LE00/PM. Pilot Plant for the Production of Pasteurized Milk:Units:

DMH/CTS. Computer Controlled and Touch Screen Milk Homogenizer.
PADC. Computer Controlled Teaching Autonomous Pasteurization Unit.
TFDC. Computer Controlled Teaching Frigorific Tank.
EDLC. Computer Controlled Liquid Packaging Teaching Unit.

2. LE00/Y. Pilot Plant for the Production of Yogurt:Units:

VPMC. Computer Controlled Multipurpose Processing Vessel.
IYDC. Computer Controlled Teaching Yogurt Incubator.

3. LE00/MP. Pilot Plant for the Production of Milk Powder:Units:

HK/CTS. Computer Controlled and Touch Screen Hot Kneeder.
MM/CTS. Computer Controlled and Touch Screen Meat Mincer.
BC/CTS. Computer Controlled and Touch Screen Blast Chiller.

4. LE00/CC. Pilot Plant for the Production of Cheese and Cottage:Units:

CCDC. Computer Controlled Teaching Curdling Tank.
PVQC. Computer Controlled Teaching Cheese Press.
RDC. Computer Controlled Teaching Cottage Cheese Maker.
STCS/CTS. Computer Controlled and Touch Screen Salting Tank with Cooling System.
CMC/CTS. Computer Controlled and Touch Screen Cheese Maturation Chamber.

5. LE00/CBI. Pilot Plant for the Production of Cream, Butter and Ice Cream:Units:

DSNC. Computer Controlled Teaching Cream Separator.
EMANC. Computer Controlled Butter Maker Teaching Unit.
ICM/CTS. Computer Controlled and Touch Screen Ice Cream Maker.

6. PLCHMI. IIoT local/remote Control and Monitoring with HMI.**7. LE00/CCSOF. PID Computer Control + Data Acquisition + Data Management Software.****8. Cables and Accessories**, for normal operation.**9. Manuals.**

*IMPORTANT: Under LE00 we always supply all the elements for immediate running as 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Optional items (supplied under specific order):

• **EXPANSIONS:**

- 10. ESN. EDIBON Scada-Net Systems.
- 11. ECL. EDIBON Cloud Learning.

• **ADDITIONAL RECOMMENDED ELEMENTS:**

For LE00/PM, LE00/Y, LE00/MP, LE00/CC and LE00/CBI:

- WTD. Work Table with Wheels for Draining.
- CRCA. Clean Room Cabinet.
- ASCD. Air Shower Cabin for Decontamination.

QUALITY CERTIFICATES



WARRANTIES



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REPRESENTATIVE: