Computer Controlled **Teaching Cream Separator,** with SCADA

DSNC

edibon
Technical Teaching Equipment

EDIBON PATENT

Teaching Technique used

EDIBON **SCADA** System

② Control Interface Box

③ Data Acquisition Board

④ Software for:
- Computer Control
- Data Acquisition
- Data Management

Computer (not included in the supply)
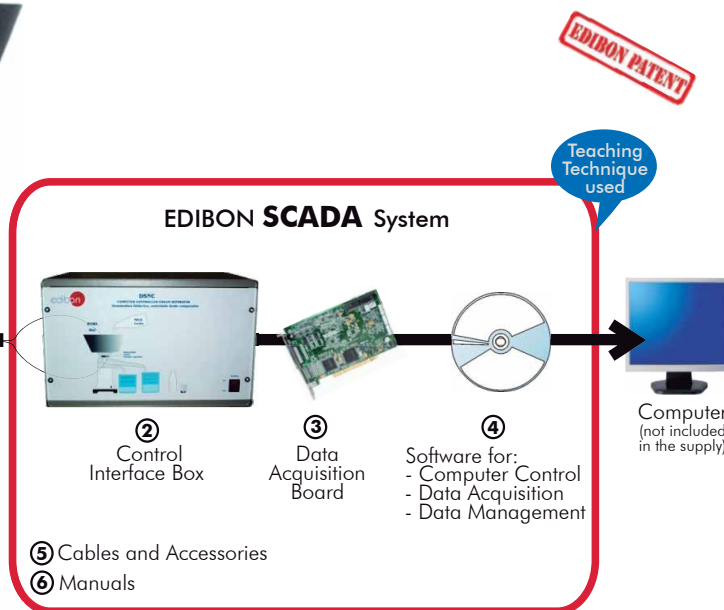
⑤ Cables and Accessories
⑥ Manuals

① Unit: DSNC. Teaching Cream Separator

*Minimum supply always includes: 1 + 2 + 3 + 4 + 5 + 6
(Computer not included in the supply)

Key features:

▶ **Advanced Real-Time SCADA.**

▶ **Open Control + Multicontrol + Real-Time Control.**

▶ **Specialized EDIBON Control Software based on Labview.**

▶ **National Instruments Data Acquisition board (250 KS/s , kilo samples per second).**

▶ **Calibration exercises, which are included, teach the user how to calibrate a sensor and the importance of checking the accuracy of the sensors before taking measurements.**

▶ **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**

▶ **Capable of doing applied research, real industrial simulation, training courses, etc.**

▶ **Remote operation and control by the user and remote control for EDIBON technical support, are always included.**

▶ **Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).**

▶ **Designed and manufactured under several quality standards.**

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

▶ **This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.**

**OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL**

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   ↳12.-Food & Water Technologies

For more information about Key Features, click here:

"DSNC" Computer Controlled Teaching Cream Separator is an unit designed to provide practical training in the techniques of separating the different phases existing in a liquid, in accordance with the different specific density of each of the parts.

We take, as an example, the separation of cream from milk, reaching an average efficiency of 125 l./h.

The system is mounted on a table base on which the integral elements of the unit are located.
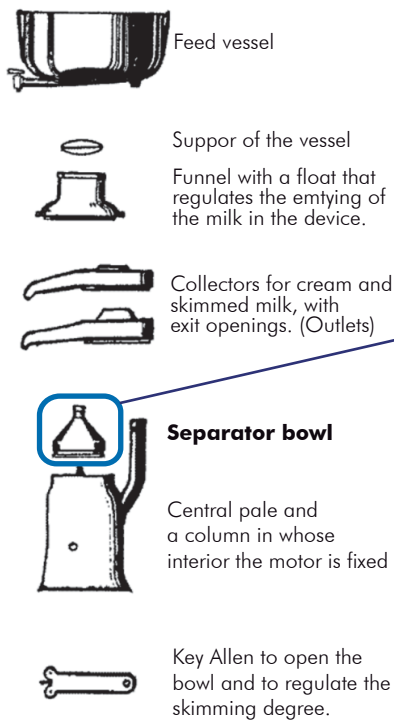
The group of the separation is constituted by discs (plates) surrounded by a carcass of a similar material, sealed by a rubber joint in order to avoid possible losses. All in a polypropylene container that incorporates two exit conduits one for the cream and another for the skimmed milk.

This Computer Controlled Unit is supplied with the EDIBON Computer Control System (SCADA), including: Control interface Box + Data Acquisition Board + Computer Control and Data Acquisition Software, for controlling the process and the parameters involved.
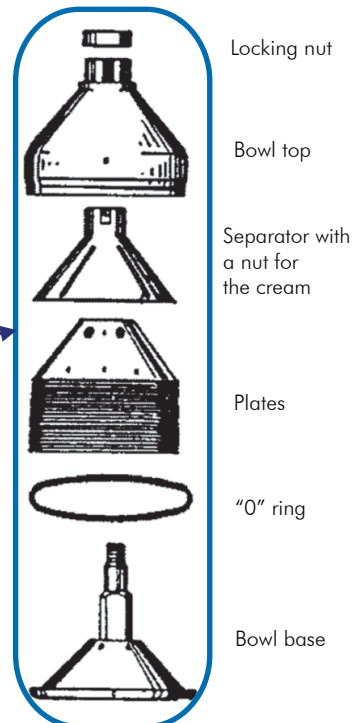
PROCESS DIAGRAM AND ELEMENTS ALLOCATION

BOWL
Bol

MILK
Leche

REGULATOR
FLOAT
Flotador regulador

SAMPLE
Muestra

SAMPLE
Muestra

OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL

Back panel of the
Control Interface Box

MOTOR
CONNECTOR
Conector del Motor

POWER SUPPLY
Fuente de
Alimentacion

FUSE 2A
Fusible 2A

SF-1
LOAD CELL
Celula de Carga

SCSI
CONNECTOR
Conector SCSI

Main elements:

Feed vessel

Suppor of the vessel

Funnel with a float that regulates the emtying of the milk in the device.

Collectors for cream and skimmed milk, with exit openings. (Outlets)

Separator bowl

Central pale and a column in whose interior the motor is fixed

Key Allen to open the bowl and to regulate the skimming degree.

Separator bowl: (in detail)

Locking nut

Bowl top

Separator with a nut for the cream

Plates

"0" ring

Bowl base

Items supplied as standard

① DSNC. Unit:

This unit is designed to provide a practical training in the technique of separation of the different phases present in a liquid, according to the density of each one of the parts.

We take the separation of the cream from the milk, reaching efficiency of 125 l./h.

Bench-top unit.

Anodized aluminium structure and panels in painted steel.

Main metallic elements in stainless steel.

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

Throughputs up to 125 litres per hour can be obtained depending on degree of separation.

Feed vessel of 10 l. capacity of anodized aluminium which can be replenished as necessary.

Collectors for cream and skimmed milk with exit openings (outlets).

Separator bowl incorporates 19 discs (plates).

Motor.

Speed control from the computer (PC).

Speed sensor. Force sensor.

Accessories includes:

Stop clock.

Glass graduated vessels (for product collecting).

Allen key.

Brushes.

The unit can be easily dismantled.

Materials in contact with the process fluid are anodised aluminium, stainless steel, rubber and polypropylene.

DSNC. Unit

② DSNC/CIB. Control Interface Box:

Control interface box with process diagram in the front panel and with the same distribution that the different elements located in the unit, for an easy understanding by the student.

All sensors, with their respective signals, are properly manipulated from -10V. to +10V. computer output.

Sensors connectors in the interface have different pines numbers (from 2 to 16), to avoid connection errors.

Single cable between the control interface box and computer.

The unit control elements are permanently computer controlled, without necessity of changes or connections during the whole process test procedure.

Simultaneous visualization in the computer of all parameters involved in the process.

Calibration of all sensors involved in the process.

Real time curves representation about system responses.

Storage of all the process data and results in a file.

Graphic representation, in real time, of all the process/system responses.

All the actuators' values can be changed at any time from the keyboard allowing the analysis about curves and responses of the whole process.

All the actuators and sensors values and their responses are displayed on only one screen in the computer.

Shield and filtered signals to avoid external interferences.

Real time computer control with flexibility of modifications from the computer keyboard of the parameters, at any moment during the process. Real time computer control for pumps, compressors, resistances, control valves, etc. **Open control** allowing modifications, at any moment and in real time, of parameters involved in the process simultaneously.

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

DSNC/CIB

③ DAB. Data Acquisition Board:

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

Analog input: **Channels= 16** single-ended or 8 differential. **Resolution=16 bits**, 1 in 65536.

Sampling rate up to: 250 KS/s (Kilo samples per second).

Input range (V)=±10V. Data transfers=DMA, interrupts, programmed I/0. DMA channels=6.

Analog output: **Channels=2.** **Resolution=16 bits**, 1 in 65536. Max. output rate up to: 833 KS/s.

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

Digital Input/Output: Channels=24 inputs/outputs. D0 or DI Sample Clock frequency: 0 to 1 MHz.

Timing: **Counter/timers=2.** Resolution: Counter/timers: 32 bits.

DAB

④ DSNC/CCSOF. Computer Control+Data Acquisition+Data Management Software:

Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen.

Compatible with the industry standards.

Registration and visualization of all process variables in an automatic and simultaneous way.

Flexible, 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 250,000 data per second.

Calibration system for the sensors involved in the process.

It allows the registration of the alarms state and the graphic representation in real time.

Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

Open software, allowing to the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.

This unit allows the 30 students of the classroom to visualize simultaneously all results and manipulation of the unit, during the process, by using a projector or an electronic whiteboard.

DSNC/CCSOF

⑤ Cables and Accessories, for normal operation.

⑥ Manuals: This 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 6: DSNC + DSNC/CIB + DAB + DSNC/CCSOF + Cables and Accessories + Manuals are included in the minimum supply, enabling a normal operation.**

Additional and optional items to the standard supply

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

⑦ **PLC-PI. PLC Module:**

Circuit diagram in the front panel.

Front panel:

Digital inputs(X) and Digital outputs (Y) block:

16 Digital inputs, activated by switches and 16 LEDs for confirmation (red).

14 Digital outputs (through SCSI connector) with 14 LEDs for message (green).

Analog inputs block:

16 Analog inputs (-10V. to + 10V.) (through SCSI connector).

Analog outputs block:

4 Analog outputs (-10V. to + 10V) (through SCSI connector).

Touch screen:

High visibility and multiple functions.

Display of a highly visible status.

Recipe function.

Bar graph function.

Flow display function.

Alarm list.

Multi language function.

True type fonts.

Back panel:

Power supply connector.

Fuse 2A.

RS-232 connector to PC.

USB 2.0 connector to PC.

Inside:

Power supply outputs: 24 Vdc, 12 Vdc, -12 Vdc, 12 Vdc variable.

Panasonic PLC:

High-speed scan of 0.32 μsec. for a basic instruction.

Program capacity of 32 Ksteps, with a sufficient comment area.

Power supply input (100 to 240 V AC).

DC input: 16 (24 V DC).

Relay output: 14.

High-speed counter.

Multi-point PID control.

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

Communication RS232 wire, to computer (PC).

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

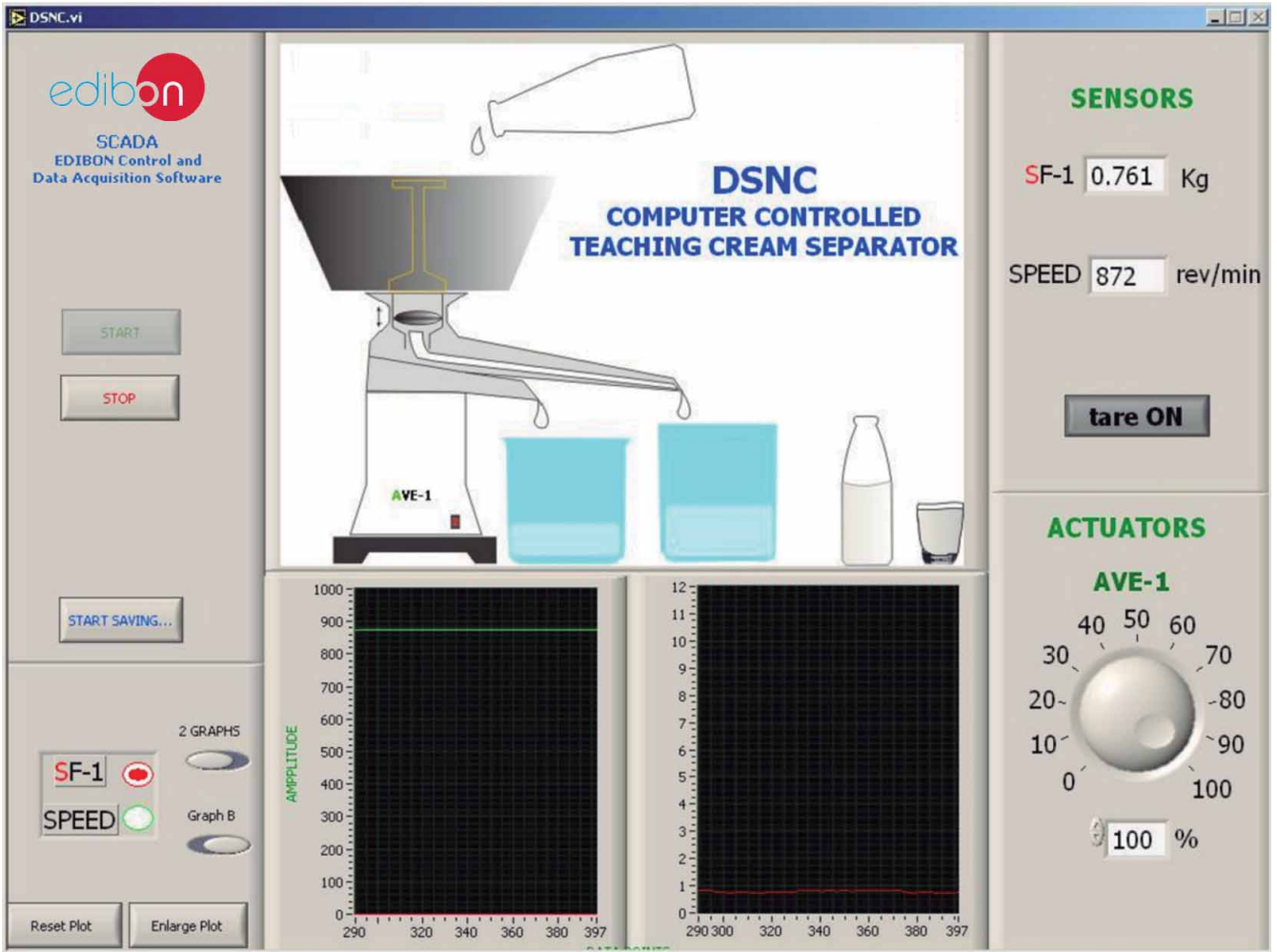For this particular unit, always included with PLC supply.

PLC-PI

Items available on request

⑨ **DSNC/CAL. Computer Aided Learning Software (Results Calculation and Analysis)**.

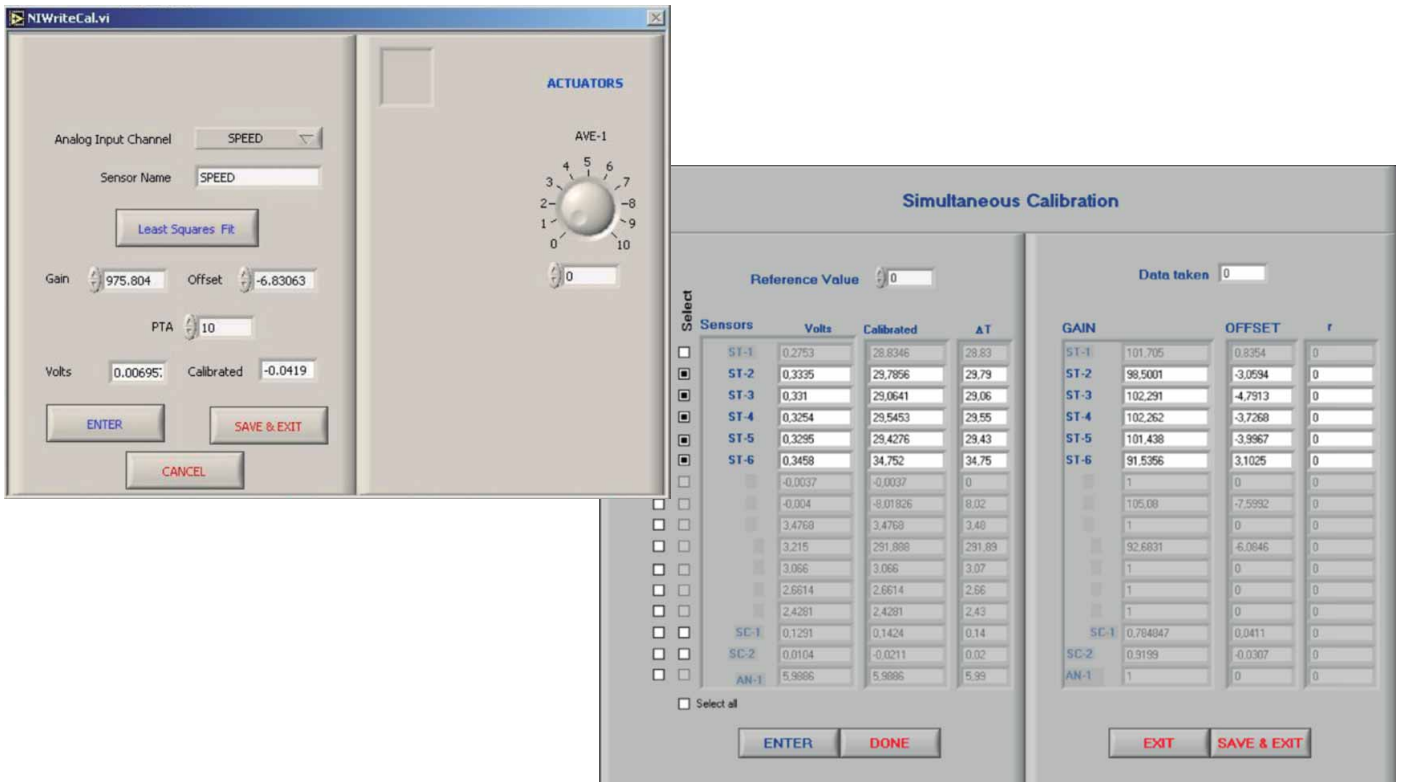⑩ **DSNC/FSS. Faults Simulation System.**

Software Main Screens

Main screen

Note: SF = Force sensor.   AVE-1= Speed control.
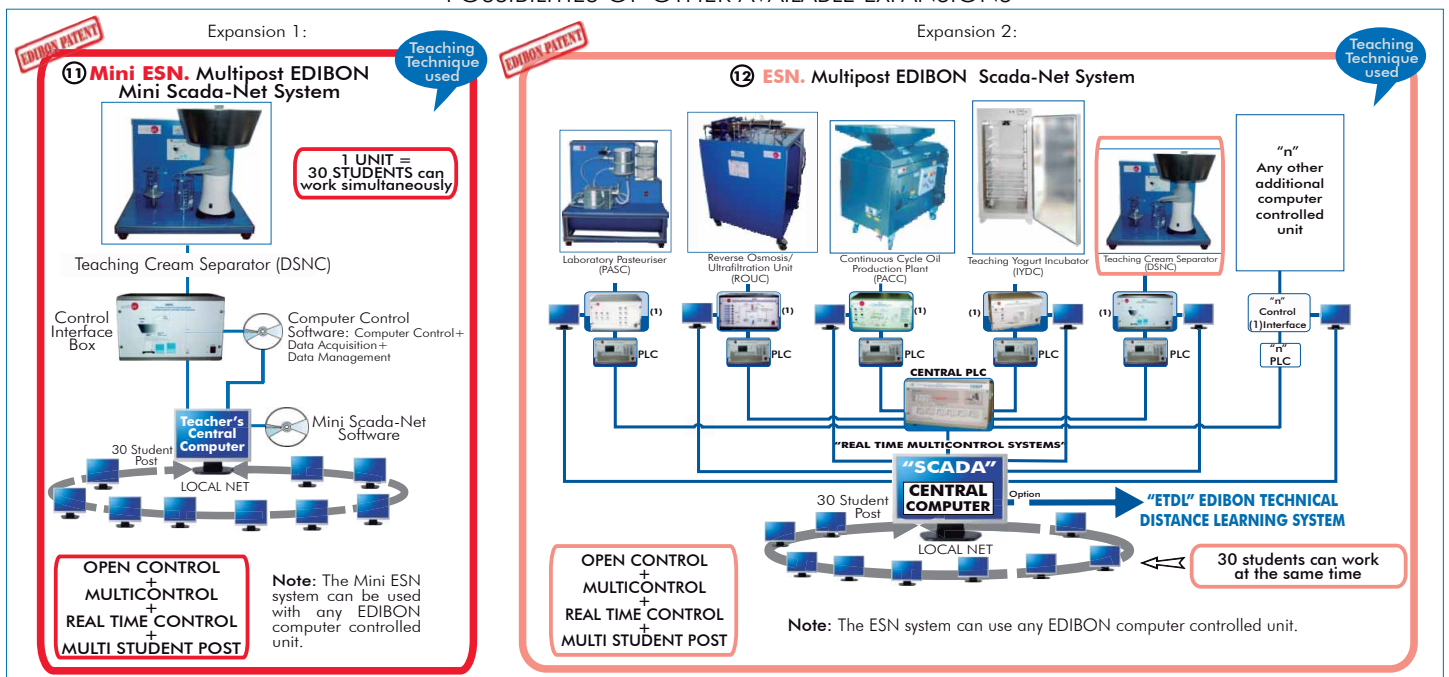
Examples of Sensors Calibration screens

EXERCISES AND PRACTICAL POSSIBILITIES

Some Practical Possibilities of the Unit:

1.- Contribution to a better understanding of the industrial process, by means of operating a scale system.

2.- Study of the separation of different density liquids.

3.- Production of different types of cream by using milks with different greasy matter contents, 11% to 55%.

4.- Production of a range of skimmed milks with different contents of greasy matter.

5.- To demonstrate the effect of the temperature and the speed in the separating process.

6.- To show the importance of cleanness and hygiene in food processing.

7.- Understanding the mode of operation of this type of centrifuge, using instructive diagrams and ease of strip down the component parts.

Other possible practices:

8.- Sensors calibration.

Practices to be done by PLC Module (PLC-PI)+PLC Control Software:

9.- Control of the DSNC unit process through the control interface box without the computer.

10.- Visualization of all the sensors values used in the DSNC unit process.

11.- Calibration of all sensors included in the DSNC unit process.

12.- Hand on of all the actuators involved in the DSNC unit process.

13.- Realization of different experiments, in automatic way, without having in front the unit. (This experiment can be decided previously).

14.- Simulation of outside actions, in the cases do not exist hardware elements. (Example: test of complementary tanks, complementary industrial environment to the process to be studied, etc).

15.- PLC hardware general use and manipulation.

16.- PLC process application for DSNC unit.

17.- PLC structure.

18.- PLC inputs and outputs configuration.

19.- PLC configuration possibilities.

20.- PLC program languages.

21.- PLC different programming standard languages (literal structured, graphic, etc.).

22.- New configuration and development of new process.

23.- Hand on an established process.

24.- To visualize and see the results and to make comparisons with the DSNC unit process.

25.- Possibility of creating new process in relation with the DSNC unit.

26.- PLC Programming Exercises.

27.- Own PLC applications in accordance with teacher and student requirements.

POSSIBILITIES OF OTHER AVAILABLE EXPANSIONS

Expansion 1:

EDIBON PATENT

⑪ **Mini ESN.** Multipost EDIBON Mini Scada-Net System

Teaching Technique used

1 UNIT = 30 STUDENTS can work simultaneously

Teaching Cream Separator (DSNC)

Control Interface Box

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

Teacher's Central Computer

Mini Scada-Net Software

30 Student Post

LOCAL NET

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

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

Expansion 2:

EDIBON PATENT

⑫ **ESN.** Multipost EDIBON Scada-Net System

Teaching Technique used

Laboratory Pasteuriser (PASC)

Reverse Osmosis/ Ultrafiltration Unit (ROUC)

Continuous Cycle Oil Production Plant (PACC)

Teaching Yogurt Incubator (IYDC)

Teaching Cream Separator (DSNC)

"n" Any other additional computer controlled unit

(1) PLC

(1) PLC

(1) PLC

(1) PLC

(1) PLC

"n" Control (1)Interface

"n" PLC

CENTRAL PLC

"REAL TIME MULTICONTROL SYSTEMS"

"SCADA" CENTRAL COMPUTER

Option

"ETDL" EDIBON TECHNICAL DISTANCE LEARNING SYSTEM

30 Student Post

LOCAL NET

30 students can work at the same time

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

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

ORDER INFORMATION

Items supplied as standard

Minimum configuration for normal operation includes:

① **Unit: DSNC. Teaching Cream Separator.**

② **DSNC/CIB. Control Interface Box.**

③ **DAB. Data Acquisition Board.**

④ **DSNC/CCSOF. Computer Control + Data Acquisition + Data Management Software.**

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

⑥ **Manuals.**

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

Additional and optional items to the standard supply

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

⑦ **PCL-PI.PLC Module.**

⑧ **DSNC/PLC-SOF. PLC Control Software.**

⑨ **DSNC/CAL. Computer Aided Learning Software (Results Calculation and Analysis).** (Available on request).

⑩ **DSNC/FSS. Faults Simulation System.** (Available on request).

Expansions

⑪ Mini ESN. Multipost EDIBON Mini Scada-Net System.

⑫ ESN. Multipost EDIBON Scada-Net System.

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-Electrical supply: single-phase 220V./50Hz or 110V./60Hz.

-Computer (PC).

DSNC Unit:	-Dimensions: 500 x 500 x 500 mm. approx.
	-Weight: 40 Kg. approx.
Control Interface Box:	-Dimensions: 490 x 330 x 310 mm. approx.
	-Weight: 10 Kg. approx.
PLC Module (PLC-PI):	-Dimensions: 490 x 330 x 310 mm. approx.
	-Weight: 30 Kg. approx.

AVAILABLE VERSIONS

<u>Offered in this catalogue:</u>

- DSNC.   Computer Controlled **Teaching Cream Separator.**

<u>Offered in other catalogue:</u>

- DSN.   **Teaching Cream Separator.**

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

REPRESENTATIVE: