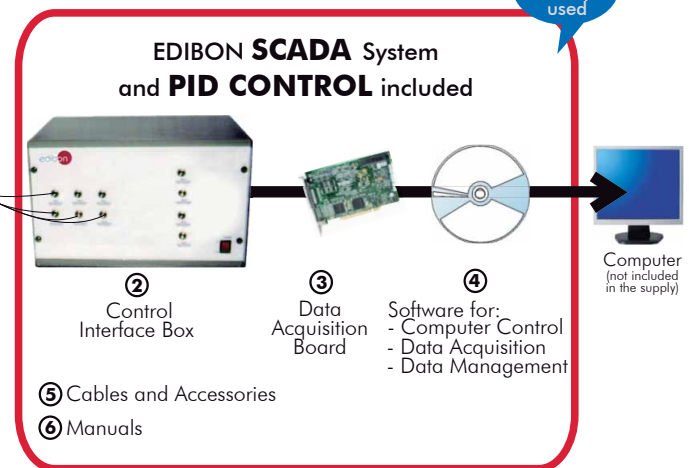


① Unit: TFDC. Teaching Frigorific Tank



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

Key features:

- ▶ **Advanced Real-Time SCADA and PID Control.**
- ▶ **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**

For more information about Key Features, click here:



ISO 9000: Quality Management
(for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate
(total safety)



Certificates ISO 14000 and ECO-Management and Audit Scheme
(environmental management)



Worlddidac Quality Charter Certificate
(Worlddidac Member)



Items supplied as standard

① TFDC. Unit:

- Diagram in the front panel with similar distribution to the elements in the real unit.
- Tank, covers and lining built in stainless steel. Also all the surfaces in contact with the milk are made of stainless steel, with a degree of refined appropriate polishing.
- Printed bottom with evaporator that assures the maximum efficiency and minimum consumption (1,5 Kw/100 L 1 , 8 Kw/100L)
- Effective isolation by means of injected polyurethane to increase, increments of temperature in the milk.
- Inclination of the bottom to achieve a quick casting.
- Started anti-air the milk to archive the volume measurement, in the tank.
- Automatic operation of the cooling group and the stirrer to assure a good homogenization of the milk.
- Coolant.
- Adjustable legs.
- Volume measurement of the milk.
- Compensated hinge.
- Frame of stainless steel.
- Single-phase 220V.
- Temperature sensors.
- Level sensor.

② TFDC/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 PID control with flexibility of modifications from the computer keyboard of the PID parameters, at any moment during the process.
- Real time PID and on/off control for pumps, compressors, resistances, control valves, etc.
- Real time PID control for parameters involved in the process simultaneously.
- Open control allowing modifications, at any moment and in real time , of parameters involved in the process simultaneously.
- Proportional control, integral control and derivative control, based on the real PID mathematical formula, by changing the values, at any time, of the three control constants (proportional, integral and derivative constants).
- Possibility of automatization of the actuators involved in the process.
- Three safety levels, one mechanical in the unit, other electronic in the control interface and the third one in the control software.

③ DAB. Data Acquisition Board:

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

Analog input:

- Number of 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/O. Number of DMA channels=6.

Analog output:

- Number of channels=2.
- Resolution= 16 bits, 1 in 65536.
- Maximum output rate up to: 833 KS/s.
- Output range(V)=±10V.
- Data transfers=DMA, interrupts, programmed I/O.

Digital Input/Output:

- Number of channels=24 inputs/outputs.
- D0 or DI Sample Clock frequency: 0 to 1 MHz.

Timing:

- Counter/timers=2.
- Resolution: Counter/timers: 32 bits.

④ TFDC/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.
- Analog and digital PID control. Menu for PID and set point selection required in the whole work range.
- 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.

⑤ Cables and Accessories.

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

Continue...

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 VAC).

DC input: 16 (24 VDC).

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 TFDC/PLC-SOF. PLC Control Software:

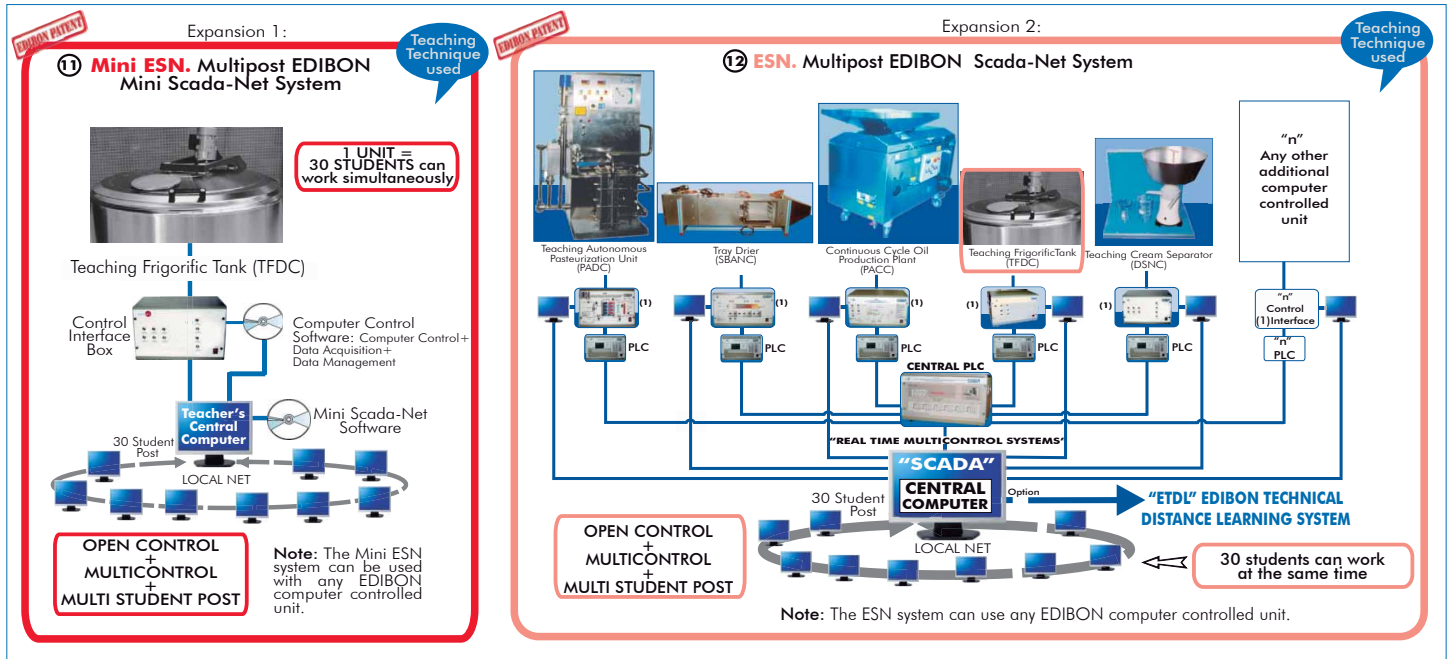
For this particular unit, always included with PLC supply.

Items available on request

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

⑩ TFDC/FSS. Faults Simulation System.

POSSIBILITIES OF OTHER AVAILABLE EXPANSIONS



ORDER INFORMATION

Items supplied as standard

Minimum configuration for normal operation includes:

- ① Unit: TFDC. Teaching Frigorific Tank.
- ② TFDC/CIB. Control Interface Box.
- ③ DAB. Data Acquisition Board.
- ④ TFDC/CCSOF. Computer Control + Data Acquisition + Data Management Software.
- ⑤ Cables and Accessories.
- ⑥ Manuals.

* IMPORTANT: Under TFDC 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 TFDC/PLC-SOF. PLC Control Software.
- ⑨ TFDC/CAL. Computer Aided Learning Software (Results Calculation and Analysis). (Available on request)
- ⑩ TFDC/FSS. Faults Simulation System. (Available on request).

Expansions

- ⑪ Mini ESN. Multipost EDIBON Mini Scada-Net System.
- ⑫ ESN. Multipost EDIBON Scada-Net System.

REQUIRED SERVICES

- Electrical supply: single-phase, 220 V/50Hz or 110 V/60 Hz.
- Computer (PC).

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



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