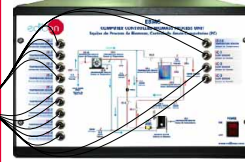


① Unit: EBMC. Biomass Process Unit

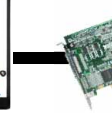
Always included in the supply:

Teaching Technique used

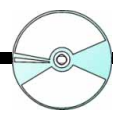
SCADA. EDIBON Computer Control System



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

www.edibon.com

- Products
- Products range
- Units
- 5.-Energy

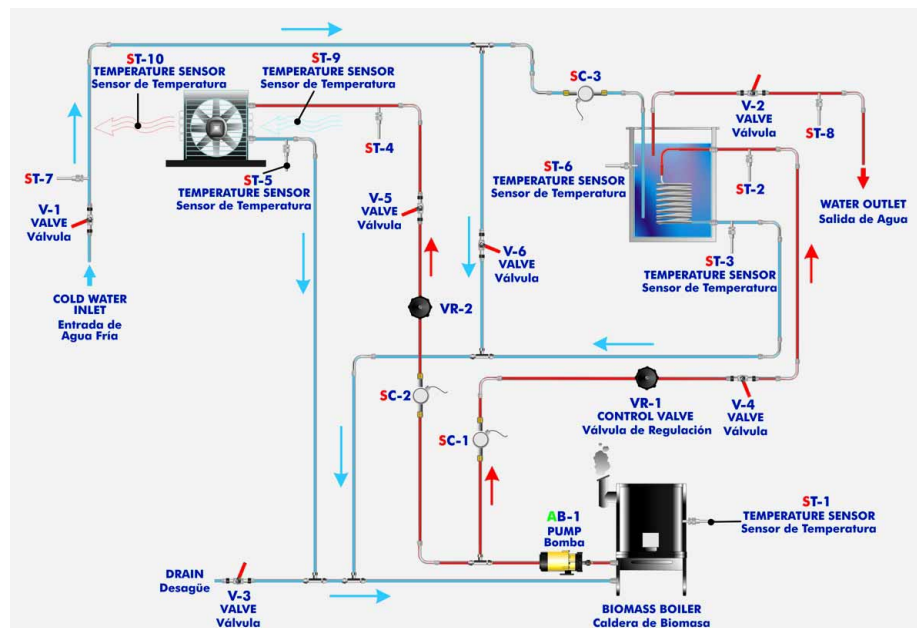
DESCRIPTION

The main objective of this unit is to study the biomass process for heating applications, using different types of biomass fuels such as pellets, wood chips, etc.

The unit is mainly composed of a biomass boiler, of a domestic hot water network, a network heating by unit heater.

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



OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL

Note:
ST= Temperature sensor.
SC= Flow sensor.
V= Valve.
VR= Control valve.



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

①EBMC. Unit:

Anodized aluminium structure and panels in painted steel (epoxy paint).

Main metallic elements in stainless steel.

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

Biomass boiler, computer controlled; as heating element, of 8 kW of thermal power, regulated from 100% to 30%, with the following characteristics:

Automatic electronic ignition.

Self cleaning system of ashes.

Compact heating circuit control.

Combustion chamber in stainless steel.

Boiler water capacity: 40 l.

Water temperature: 70° to 90° C.

Flue gas temperature: 120° C.

The boiler can work with pellets or other biomass fuels.

Hydraulic system formed by two circuits:

First circuit:

The hot water obtained in the boiler is used to heat a cold water stream with a heat exchanger, which can be used for a domestic hot water network.

Second circuit:

The hot water of the boiler is used to heat an air stream driven through a radiator by a fan.

Circulating pump, computer controlled, to feed the water in both circuits.

Water tank.

Fan, computer controlled.

Sensors:

Temperature sensors in different points of the unit:

In the boiler. Inlet cold water. Outlet hot water. Air stream. Outlet of domestic water. Etc.

Three flow sensors:

In the first water circuit. In the second water circuit. In the cold water stream.

Two regulation valves to control the water flow.

②EBMC/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 pins 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.

Simultaneously 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 placed in only one computer screen.

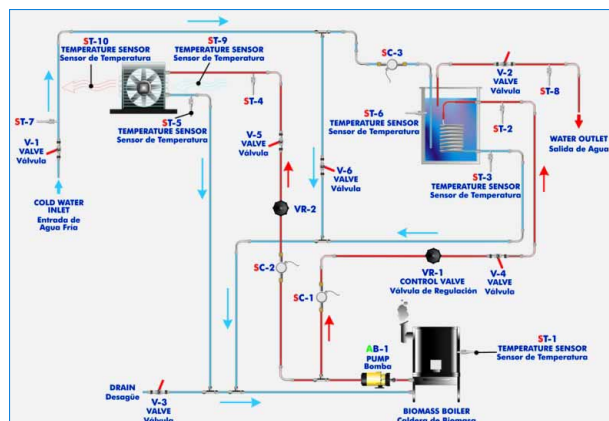
Shield and filtered signals to avoid external interferences.

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. 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).

Open control allowing modifications, at any time and in a real time, of parameters involved in the process simultaneously.

Possibility of automatization of the actuators involved in the process.

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



EBMC. Unit



EBMC/CIB

Continue...

Items supplied as standard (continuation)**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)= ± 10 V.

Data transfers=DMA, interrupts, programmed I/O.

DMA channels=6.

Analog output:

Number of **Channels**=2.

Resolution= 16 bits, 1 in 65536.

Max. output rate up to: 833 KS/s.

Output range(V)= ± 10 V.

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.



DAB

④ EBMC/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 simultaneously way.

Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

Analog and digital PID control.

Menu for PID and set point selection required in the whole work range.

Management, processing, comparison and storage of data.

Sampling velocity up to 250,000 data per second guaranteed.

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 at different work levels.

This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.



EBMC/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: EBMC + EBMC/CIB + DAB + EBMC/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 μ sec. for a basic instruction.

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

Free input AC voltage(100 to 240 V AC).

DC input: 16 (24 VDC).

Relay output: 14 (250 VA AC/2 A).

High-speed counter.

Multi-point PID control.

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

Communication RS232 wire, to computer (PC).

⑧ EBMC/PLC-SOF. PLC Control Software:

For this particular unit, always included with PLC supply.



PLC-PI

Items available on request

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

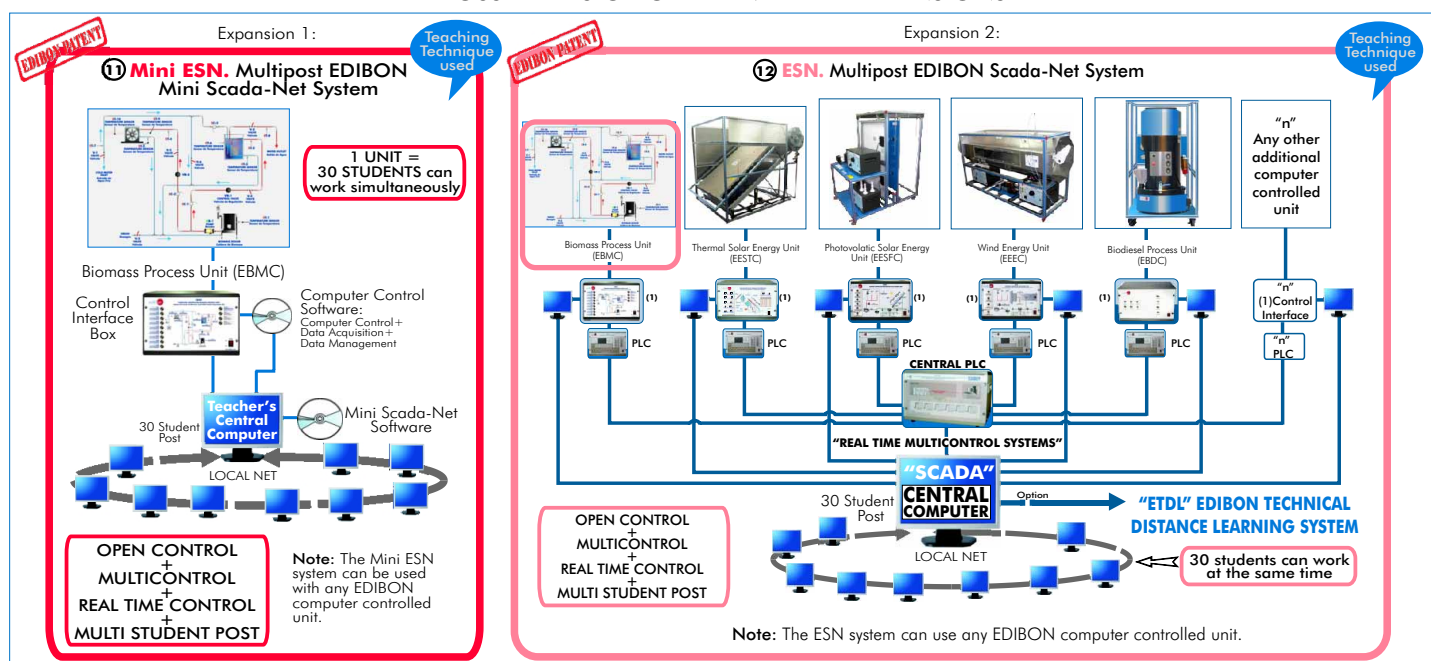
⑩ EBMC/FSS. Faults Simulation System.

EXERCISES AND PRACTICAL POSSIBILITIES

Some Practical Possibilities of the Unit:

- 1.- Starting up of the unit.
 - 2.- Adjustment of parameters.
 - 3.- Preventive maintenance.
 - 4.- Safety procedures.
 - 5.- Water treatment of the boiler.
 - 6.- Measurement of flow, pressure and temperature.
 - 7.- Measurement of the emissions.
 - 8.- Measurement of the thermal transfer from the fuel to the water tank.
 - 9.- Measurement of the unit efficiency with different type of biomass fuels.
 - 10.- Study the influence of different air flows in the efficiency of the unit.
 - 11.- Study of the influence of varying the cold water flow in the heat transfer.
 - 12.- Study of the influence of varying the hot water flow at the tank inlet.
 - 13.- Study of the influence of varying the hot water flow before the radiator.
- Other possible practices:
- 14.- Sensors calibration.
- Practices to be done by PLC Module (PLC-PI) + PLC Control Software:
- 15.- Control of the EBMC unit process through the control interface box without the computer.
 - 16.- Visualization of all the sensors values used in the EBMC unit process.
 - 17.- Calibration of all sensors included in the EBMC unit process.
 - 18.- Hand on of all the actuators involved in the EBMC unit process.
 - 19.- Realization of different experiments, in automatic way, without having in front the unit. (This experiment can be decided previously).
 - 20.- 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).
 - 21.- PLC hardware general use and manipulation.
 - 22.- PLC process application for EBMC unit.
 - 23.- PLC structure.
 - 24.- PLC inputs and outputs configuration.
 - 25.- PLC configuration possibilities.
 - 26.- PLC program languages.
 - 27.- PLC different programming standard languages.
 - 28.- New configuration and development of new process.
 - 29.- Hand on an established process.
 - 30.- To visualize and see the results and to make comparisons with the EBMC unit process.
 - 31.- Possibility of creating new process in relation with the EBMC unit.
 - 32.- PLC Programming Exercises.
 - 33.- Own PLC applications in accordance with teacher and student requirements.

POSSIBILITIES OF OTHER AVAILABLE EXPANSIONS



ORDER INFORMATION

Items supplied as standard:

Minimum configuration for normal operation includes:

- ① Unit: EBMC. Biomass Process Unit.
- ② EBMC/CIB. Control Interface Box.
- ③ DAB. Data Acquisition Board.
- ④ EBMC/CCSOF. Computer Control + Data Acquisition + Data Management Software.
- ⑤ Cables and Accessories, for normal operation.
- ⑥ Manuals.

*** IMPORTANT: Under EBMC 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 EBMC/PLC-SOF. PLC Control Software.
- ⑨ EBMC/CAL. Computer Aided Learning Software (Results Calculation and Analysis). (Available on request).
- ⑩ EBMC/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./50 Hz. or 110 V./60 Hz.
- Water supply and drainage.
- Computer (PC).
- Exhaust gases external exit.

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



C/ Del Agua, 14. Polígono Industrial San José de Valderas.
28918 LEGANÉS. (Madrid). SPAIN.
Phone: 34-91-6199363 FAX: 34-91-6198647
E-mail: edibon@edibon.com WEB site: www.edibon.com

REPRESENTATIVE: