

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

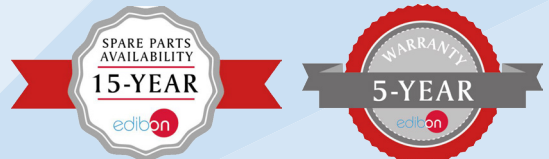


ECL  
EDIBON Cloud  
Learning

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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For detailed product information, visit:

www.edibon.com



## INTRODUCTION

Cereals have been one of the world's main sustenance for thousands of years, both for humans and animals. The main varieties of cereal are wheat, corn and rice, although barley, oats and rye are also widely consumed. This type of plant is cultivated due to its grain, a small thin-walled fruit with a high carbohydrate content in the form of starch. In addition, they have certain content in lipids, fiber and proteins (gluten).

The cereals with gluten, mainly the wheat, are used in the elaboration of bread and pasta. The presence of gluten and the fermentation allow the bread to acquire a volume and a spongy consistency after the baking. Due to these characteristics, these foods are used worldwide in the elaboration of hamburgers, sandwiches, pizzas, etc. Usually the grain is milled to obtain the flour, from which the different types of dough can be made.

In the world, 100 kg of wheat are produced annually per inhabitant, it is because of its great relevance in the feeding at global level, that its treatment and production must be known and transmitted.

## GENERAL DESCRIPTION

The Computer Controlled and Touch Screen Pilot Plants for the Production of Cereals, "CE00", is a pilot plant that is capable of carrying out the main processes present in the treatment of cereal grain, including grain milling, bread and pasta making, and cereal malting.

The "CE00" pilot plants consist of:

- **CE00/MF. Pilot Plant for Milling and Flour Production.** Main line starts from the cereal grain. This grain is fed to the milling stage where a stone mill is used. Later on, a sifter is used to separate the flour according to particle size.

Finally, a pneumatic system is used for the suction and transport of the flour, which includes a cyclone to facilitate its transport.

- **CE00/B. Pilot Plant for the Production of Bread.** The flour is fed to a dough mixer in which the dough is created by adding water and yeast. Afterwards, the division process is carried out so that the dough is split in identical pieces and then left to rest, in ambient conditions or in cameras in which the conditions are controlled. The next step is the shaping of the dough. Finally, the dough is placed on trays and baked.

There is the possibility that the forming process can be done mechanically.

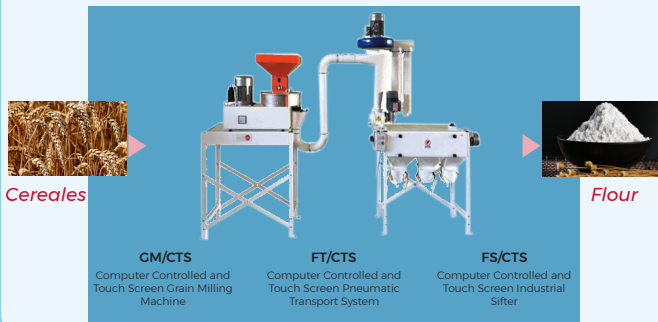
- **CE00/P. Pilot Plant for the Production of Pasta.** The other production line leads to the elaboration of dough using the flour that comes from the milling line. The flour is fed to the mixer to form the dough. Afterwards, the dough is extruded to aim the desired shape by passing it through different molds. Finally, it is possible to dry the fresh dough to promote its conservation and reduce its weight.
- **CE00/MA. Pilot Plant for Cereal Malting.** Is a pilot scale plant that includes all the industrial stages for malt production. This plant includes a steeping tank, a germinator, a dryer-roaster and a deculmer. In addition, it includes the auxiliary equipment necessary to carry out the operation in a comfortable and safe way.

**INCLUDED UNITS**

**PILOT PLANTS FOR THE PRODUCTION OF CEREALS**

- OPEN CONTROL +
- MULTICONTROL +
- REAL TIME CONTROL

**CE00/MF. Pilot Plant for Milling and Flour Production**



**CE00/P. Pilot Plant for the Production of Pasta**



**CE00/B. Pilot Plant for the Production of Bread**



**CE00/MA. Pilot Plant for Cereal Malting**



## EXERCISES AND PRACTICAL POSSIBILITIES

### Guided practical exercises included in this pilot plant:

- 1.- Study of the conditions of wheat milling.
- 2.- Study of the relation between the final size of the flour grain and the milling stones distance.
- 3.- Study of the milling of different types of cereals.
- 4.- Study of the separation of solids in a sifter.
- 5.- Study of the separation of the flour according to the type of cereal.
- 6.- Study of the separation speed as a function of the sieve rotation speed.
- 7.- Study of a pneumatic system for transporting solids.
- 8.- Study of the kneading process.
- 9.- Study of the influence of the flour-water-yeast ratio in bread making.
- 10.- Study of the influence of kneading time.
- 11.- Study of the time and conditions of fermentation in the elaboration of bread.
- 12.- Study of the process of weighting and forming.
- 13.- Calculation of the error produced in the division and weighing of the dough.
- 14.- Study of the influence of the time of fermentation in the dough.
- 15.- Study of the forming process in bread doughs.
- 16.- Making of bread loafs of different shapes.
- 17.- Influence of the separation of the lamination rolls.
- 18.- Influence of the baking temperature on the resulting bread.
- 19.- Influence of the baking time on the resulting bread.
- 20.- Influence of the heating ramp on the resulting bread.
- 21.- Variation of the baking conditions according to the type of bread.
- 22.- Study of the wheat pasta extrusion process.
- 23.- Study of the pressure in the extrusion process.
- 24.- Elaboration of fresh pasta with different molds.
- 25.- Differences between the elaboration of long and short fresh pasta.
- 26.- Study of the drying process of pastes.
- 27.- Determination of the drying time.
- 28.- Differences in the drying process between several types of pasta.
- 29.- Evolution of the temperature and the humidity in the drying process.
- 30.- Study of the barley steeping process.
- 31.- Influence of temperature on water absorption.
- 32.- Influence of the pH in the humidification process.
- 33.- Study of the production of CO<sub>2</sub> in the process of steeping and germination.
- 34.- Study of the influence of the aeration flow in the steeping process.
- 35.- Evolution of humidity during the steeping stage.
- 36.- Study of the operation of an auger transport system.
- 37.- Study of the influence of temperature on the germination process.
- 38.- Study the influence of humidity on the germination process.
- 39.- Study of the influence of the stirring in the process of germination.
- 40.- Study of the influence of the air flow on the germination process.
- 41.- Study of the operation of a heat pump.
- 42.- Study of the operation of a cereal dryer.
- 43.- Study of the drying and toasting times of malt.
- 44.- Study of the temperature evolution in the drying process.
- 45.- Study of the influence of temperature on the malt during the roasting phase. Production of pale, roasted and dark malts.
- 46.- Study of the influence of gas recirculation in the dryer.
- 47.- Study of the deculmer process.
- 48.- Calculation of the percentage of culm in the malt.

### Additional practical possibilities:

- 49.- Sensors calibration.

**Other possibilities to be done with this pilot plant:**

**50.-** Many students view results simultaneously.

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

**51.-** 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.

**52.-** The Computer Control System with SCADA and PID Control allow a real industrial simulation.

**53.-** Each unit is totally safe as uses mechanical, electrical/electronic, and software safety devices.

**54.-** Each unit can be used for doing applied research.

**55.-** Each unit can be used for giving training courses to Industries even to other Technical Education Institutions.

**56.-** Visualization of all the sensors values used in the CE00 pilot plant process.

**Additional practical possibilities with the expansions:****ESN. EDIBON Scada-Net Systems**

**57.-** Control any unit from any post located in the laboratory.

**58.-** Supervise different experiments about data acquisition and representation, from the units, in real time.

**59.-** Visualize any experiment from any laboratory post.

**60.-** Supervise as many experiments as desired, performed in different units at the same time.

**61.-** Generate reports with the results obtained with the units.

**62.-** Perform different experiments at the same time.

**63.-** Show to the laboratory members the appropriate manual or automatic operations to perform with each laboratory unit.

**64.-** Create more elaborate practical exercises using more than one unit from the laboratory.

**65.-** Suggest multidisciplinary experiments, in other words, mix in the same experiment units from different study fields.

**66.-** Modify any parameter of any unit included in the system from any workstation in the laboratory.

**67.-** Cause an abnormal functioning in a unit for the students to practice fault finding exercises.

**68.-** Assess the knowledge of a student or group of students about a particular unit (any unit included in the "ESN" system).

**69.-** Develop guided practical exercises for a better understanding of each unit.

**70.-** Individual training practical exercises.

**71.-** Group exams or practical exercises.

**72.-** Perform interactive exercises (using the chat between manager-users).

**73.-** Exchange of obtained results among the members of the "ESN" system.

**74.-** Any exercise directly related to the SCADA software of each unit.

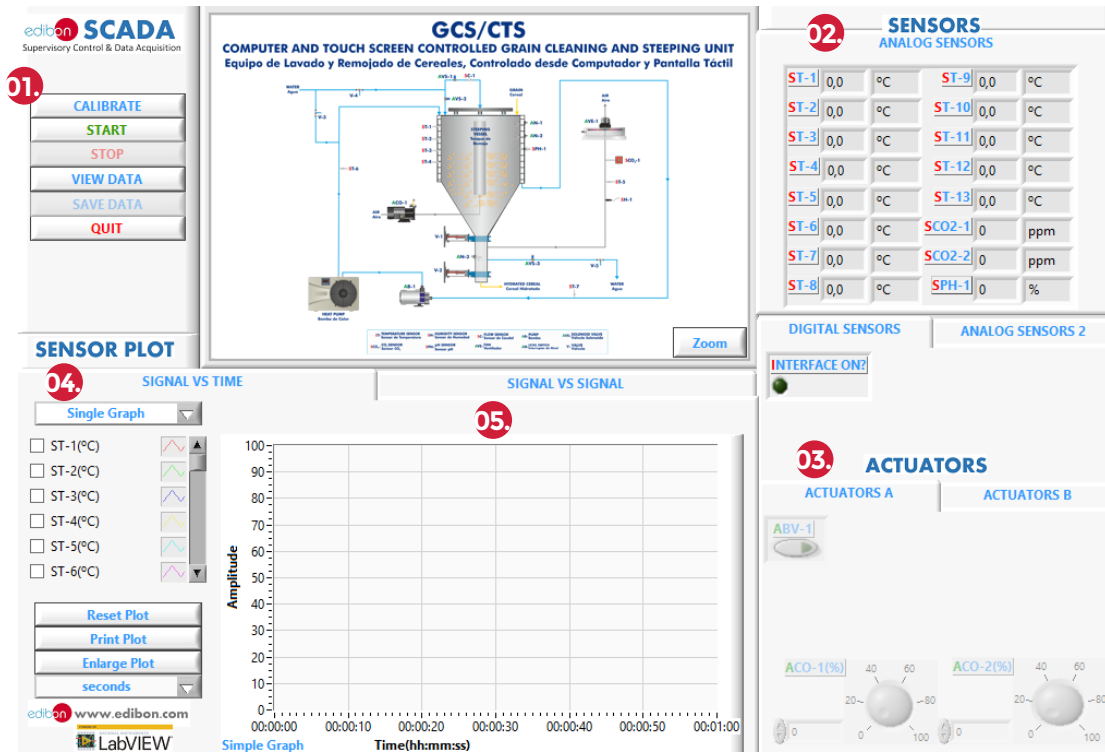
**75.-** Some of the practical possibilities may be done only with the "ESN" complete system.

**ECL. EDIBON Cloud Learning**

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

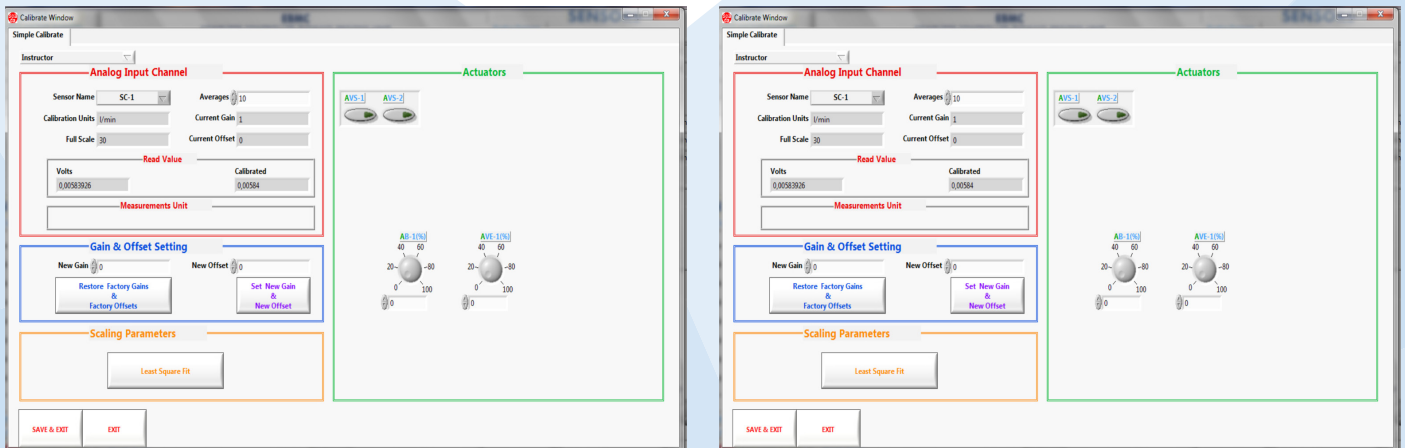
## RESULTS

### SOFTWARE MAIN SCREEN (Example of one of the unit belonging to CE00)



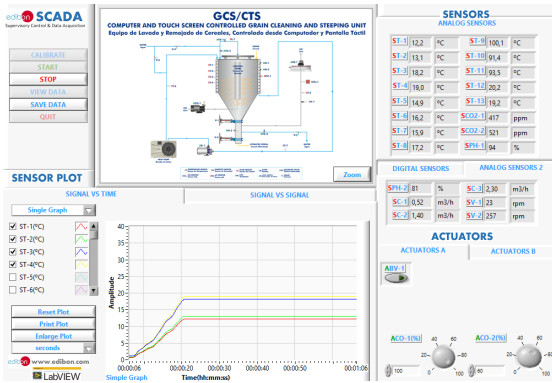
1. Main software operation possibilities.
2. Sensors displays, real time values, and extra output parameters. Sensors: ST=Temperature sensor. SC=Flow sensor. SH= Humidity sensor. SCO<sub>2</sub>= CO<sub>2</sub> sensor. SPH= pH sensor.
3. Actuators controls. Actuators: AB=Pump. ABV=Vacuum pump. AVE=Fan. AVS=Solenoid valve. AM=Motor. AR=Heating element. ACO=Compressor.
4. Channel selection and other plot parameters.
5. Real time graphics displays.

### SOFTWARE FOR SENSORS CALIBRATION (Example of screens)

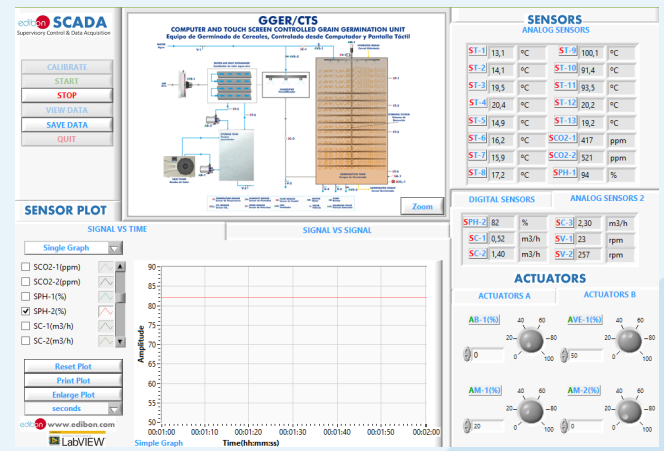


The researcher, the teacher and the students can calibrate the unit with a password provided by EDIBON. Factory calibration can be restored at any time.

RESULTS:

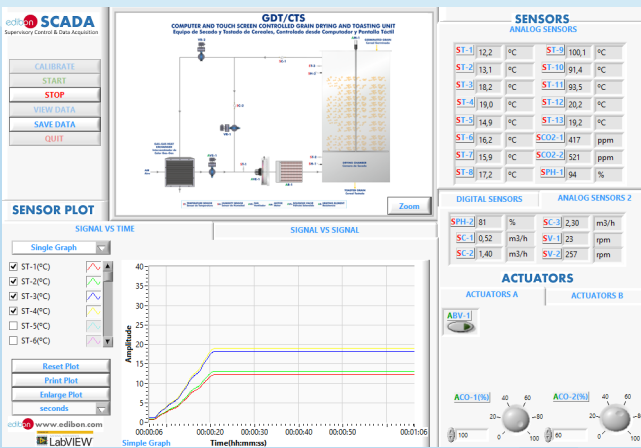


Real time representation of any measured variable of the GCS/CTS unit.

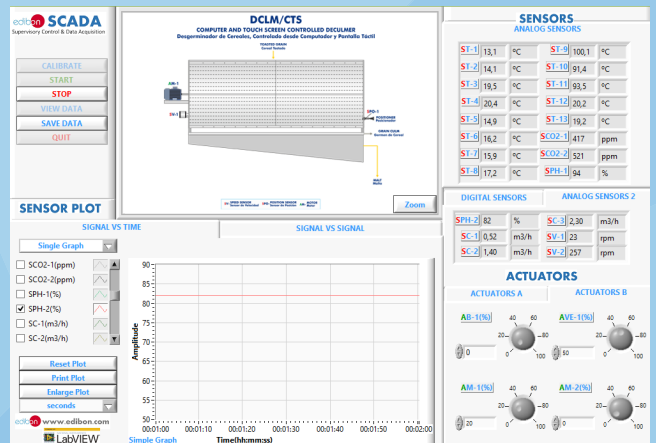


Real time representation of any measured variable of the GGER/CTS unit.

Real time representation of any measured variable of the GDT/CTS unit.



Real time representation of any measured variable of the DCLM/CTS unit.



## COMPLETE TECHNICAL SPECIFICATIONS

### CE00 Pilot Plants:

- Four complete production lines for the elaboration of the main products derived from wheat.
- Real units used in flour, bread and pasta industry.
- Sensors actuators which allows the study and understanding of the different process of the cereal industry.
- Modular layout to allow adaptation to different spaces.



## Milling and Flour Production

### 1. CE00/MF. Pilot Plant for Milling and Flour Production:



#### GM/CTS. Computer Controlled and Touch Screen Grain Milling Machine.

- Mill with stone crusher
- Hourly production: 50 kg.
- Power: 1.8 kW.
- Grinding wheel diameter: 250 mm.
- Feeding hopper with 15 kg capacity.
- Manually adjustable degree of fineness.
- Oven-painted steel support structure.
  - Adjustable height.
  - Flour cone for visibility and touch.

#### FT/CTS. Computer Controlled and Touch Screen Pneumatic Transport System.

- Decanting cyclone.
- Cast iron star valve.
  - Helical gear motor.
  - Power: 0.18 kW.
- Centrifugal fan.
  - Power: 0.75 kW.
- Exhaust air filter sleeves.

#### FS/CTS. Computer Controlled and Touch Screen Industrial Sifter.

- Magnetic pulse rotor.
  - Power: 0.15 kW.
  - Anti-dust ball bearings.
- Interchangeable sieves.
- Three ejection ramps.
  - Diameter: 150 mm.
- Magnetic grid for the separation of metallic impurities.



## Production of Bread

### 2. CE00/B. Pilot Plant for the Production of Bread:

#### DK/CTS. Computer Controlled and Touch Screen Dough Kneader Unit.

- Blades and dough-holder pan in stainless steel, the rest of the elements in high quality steel.
- Provides up to 30 equal divisions of portions up to 150 g.
- Tabletop unit.



#### WCO. Water Cooler.

- Temperature range: 3 - 5 °C.
- Capacity: 175 l.
- Production: 70 l/h.
- Power: 0.9 kW.
- Injected polystyrene tank and AISI 430 stainless steel frame.
- Electric agitator.
- Injected polyurethane insulation.
- Stainless steel coil.
- Water level control.



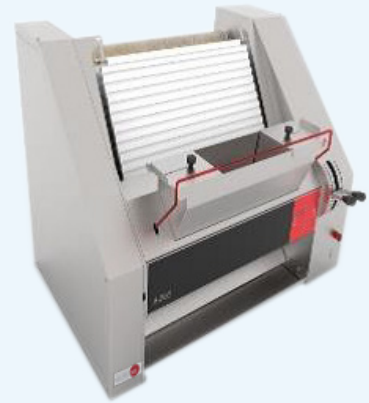
#### DD/CTS. Computer Controlled and Touch Screen Dough Division Unit.

- Arm kneader for bread production.
- Capacity: 40 kg of dough.
- Power: 1.2 kW.
- Solid construction.
  - Painted cast iron chassis.
  - Trough and arms in stainless steel.
- Kneading by means of arms that imitate the manual work of the baker.
- Plastic hood that avoids the flour in suspension.
- Aluminum legs with silentblock to avoid vibrations and give stability to the machine.
- Capacity: 40 kg of dough.
- Power: 1.2 kW.
- Masses admitted with a minimum of 55% water.
- Machine mounted on wheels with stabilizing feet.
- 2 speeds: a first for mixing and a second for kneading.



### BM. Baguette Maker Unit.

- Power: 0.55 kW.
- Production up to 2700 pieces/hour.
- Outer covers made of stainless steel.
- Bands in non-hygroscopic fabric.
- Solid acetal rollers.
- Belt carrying rollers with conical ends that ensure the centering of the belts.
- Exit of baguettes on a fixed table of 200 mm.
- Manufacture of bars up to 700 mm long.



### CBO/CTS. Computer Controlled and Touch Screen Convection Bread Oven.

- Electric oven for baking bread by forced air.
- Reversible turning turbine.
- Electronic control of temperature and baking time.
- Adjustable steam time at the beginning of the baking.
- Motorized steam output.
- Built entirely in stainless steel.
- COOL TOUCH cold door.
- Capacity for five trays of 600 x 400 mm.  
Separation between trays. 76 mm.
- Power: 7.5 kW.



## ADDITIONAL RECOMMENDED ELEMENTS (Not included)

### For CE00/B:

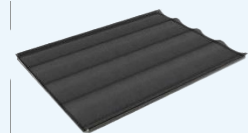
#### AWD/CTS. Computer Controlled and Touch Screen Automatic Water Dosing Device.

- It can work automatically or manually.
- Connection to network or water cooler.
- Electronic selector and luminous screen.
- A siphon system increases its precision.



#### TTO. Trolley and Set of Trays for Oven.

- Four wheels of double turn for easy movement.
- Capacity for 22 trays of 600 x 400 mm.
- 20 perforated and corrugated aluminium trays:  
With non-stick bi-layer silicone rubber.  
Four longitudinal channels.  
Dimensions: 600 x 400 mm.



#### CV. Vapour Condenser.

- Prepared for use in places where there is no possibility of evacuating cooking vapours to the outside.
- Water cooling.
- Condensation of the vapours and evacuation by drainage.
- Power: 30 W.



## Production of *Pasta*

### 3. CE00/P. Pilot Plant for the Production of Pasta:

#### PEK/CTS. Computer Controlled and Touch Screen Extruder and Kneader.

- Production: 25 - 30 kg/h.
- 12 kg feeding hopper.
- Worm screw feeder in stainless steel.
- Removable mixing arm.
- Pre-drying fan.
- Water cooling device.
- Electronic knife for cutting short pasta.
- Four standard matrixes included.



#### SPD/CTS. Computer Controlled and Touch Screen Static Drying Unit.

- Capacity: 100 kg.
- Trolley with 25 wooden and aluminium trays.
- Electrical resistors.
- Polyurethane foam insulation.
- Two motorized fans with reverse flow.
- Two extractors with electronic valves.
- Power: 5.3 kW.
- Microprocessor-based cycle management:
  - Programmed cycles.
  - Possibility of programming new cycles.



## Cereal Malting

### 4. CE00/MA. Pilot Plant for Cereal Malting:

#### GCS/CTS. Computer and Touch Screen Controlled Grain Cleaning and Steeping Unit.

- Built in AISI 304 and AISI 316 stainless steel.
- Truncated-conical tank with drain in the lower part that allows the tank to be completely emptied.
  - Volume: 800 l.
  - Water jacket for internal temperature control.
  - External insulation.
- Gate and grid system in the lower part that allows draining the water inside the tank and retaining the grain.
- This allows wet and dry periods during drainage.
- Aeration system by means of compressor:
  - Power: 300 W.
- CO<sub>2</sub> aspiration system in dry periods by means of centrifugal fan:
  - Power: 90 W.
  - Maximum flow: 265 m<sup>3</sup>/h.
  - Maximum pressure: 600 Pa.
- Overflow that allows the cleaning of the grain and elimination of impurities.
- Surface spray nozzles to maintain humidity during dry periods.
- Temperature control system:
  - Heat pump (allows cooling and heating):
    - Electrical power: 1.5 kW.
    - COP: 5.32.
    - R32 refrigerant.
  - Circulation pump:
    - Power: 370 W.
- Control by touch PLC:
  - Control and programming of wet and dry periods.
  - Temperature control.
  - Monitoring of process variables.
- Instrumentation:
  - Six temperature sensors.
  - CO<sub>2</sub> concentration, humidity and temperature sensor in the suction stream.
  - pH sensor.
  - Three level switches.
  - Three solenoid valves.



**GGER/CTS. Computer and Touch Screen Controlled Grain Germination Unit.**

- Built in AISI 304 and AISI 316 stainless steel.
- Germination tank:
  - Surface area: 1.5 m<sup>2</sup>.
  - Perforated plate bottom that allows the homogeneous distribution of the inlet air.
  - Two cleaning doors.
  - Door for emptying system.
  - External insulation.
- Stirring system for removing and turning the grain:
  - Power: 1.1 kW.
  - Includes frequency inverter.
- Aeration and humidification system.
  - Centrifugal fan:
    - Power: 1.1 kW.
    - Built in stainless steel AISI 304.
    - Includes frequency inverter.
    - Maximum flow: 650 m<sup>3</sup>/h.
    - Maximum pressure: 3000 Pa.
  - Air temperature control system:
    - Heat pump:
      - Electrical power: 1.5 kW.
      - COP: 5.32.
      - R32 refrigerant.
    - Two water circulation pumps:
      - Power: 370 W.
      - One of them includes frequency inverter.
    - Heat exchangers with finned tubes.
    - Accumulator tank:
      - Built in stainless steel AISI 316.
      - Volume: 100 l.
    - Nozzle system for air humidification.
  - Control by touch PLC:
    - Control and regulation of operating temperature and humidity.
    - Control of the stirring speed.
    - Monitoring of process variables.
  - Instrumentation:
    - Six temperature sensors.
    - CO<sub>2</sub> concentration, humidity and temperature sensor inside the germination tank.
    - pH sensor.
    - Level switch.
    - Three solenoid valves.
    - Slot sensor for measuring the speed of rotation of the blades system.



### GDT/CTS. Computer and Touch Screen Controlled Grain Drying and Toasting Unit.

- Constructed entirely of AISI 304 and AISI 316 stainless steel.
- Drying cylinder:
  - Volume: 1000 l.
  - Perforated plate bottom for correct distribution of hot air.
  - External insulation.
  - Cleaning door.
  - Emptying door.
- Centrifugal fan:
  - Power: 3 kW.
  - Includes frequency inverter.
  - Manufactured in AISI 304.
  - Allows working temperatures up to 250 °C.
  - Maximum flow: 3000 m<sup>3</sup>/h.
  - Maximum pressure: 3500 Pa.
- Heating resistor block for air heating:
  - Power: 22.5 kW
  - Possibility of increasing or decreasing power.
  - Consult us for more information.
- Air-air heat exchanger that allows to recover part of the heat from the exhaust gas:
  - Made of stainless steel AISI 316.
- Temperature range: 50-150 °C.
  - Allows brewing of all types of malts: pale, roasted and black.
- Recirculation system:
  - Butterfly valve for external air inlet control.
  - Two butterfly valves with pneumatic control to regulate the circulation rate.
  - Two flow meters by Pitot tube.
- Paddle system for emptying the dryer:
  - Power: 250 W.
- Control by touch PLC:
  - Control and regulation of temperature, air flow and recirculation ratio.
  - Monitoring of process variables.
- Instrumentation:
  - Temperature sensor.
  - Two humidity and temperature sensors before and after the bed.
  - Two flow meters.
  - Pneumatic positioners and actuators for recirculation rate control.



**DCLM/CTS. Computer and Touch Screen Controlled Deculmer.**

- Rotating drum built in AISI 304 stainless steel:
  - Volume: 400 l.
  - Two loading and unloading doors.
- Geared motor:
  - Power: 1.5 kW.
  - Includes frequency inverter.
- Germ collection tray.
- Hopper for cereal unloading.
- Positioner for drum blocking. Includes limit switch system.
- Slot sensor for rotation speed measurement.
- Control by touch PLC:
  - Rotation speed regulation.
  - Monitoring of process variables.

**RCB. Rising Conveyor Belt.**

- Allows the transport of grain between the different stages of the malting plant.
- Adjustable discharge height.
- Mobile structure mounted on wheels.
- Geared motor:
  - Power: 1.1 kW.
- Start and stop system.
- Emergency stop system.
- Easy cleaning system.

**SCH. Horizontal Screw Conveyor.**

- Allows the cereal to be emptied from the germinator and dryer, and feed the RCB.
- Mobile structure mounted on wheels.
- Geared motor:
  - Power: 750 W.
- Start and stop system.
- Emergency stop system.



The complete pilot plant includes as well:

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- **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.**

**5. 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:

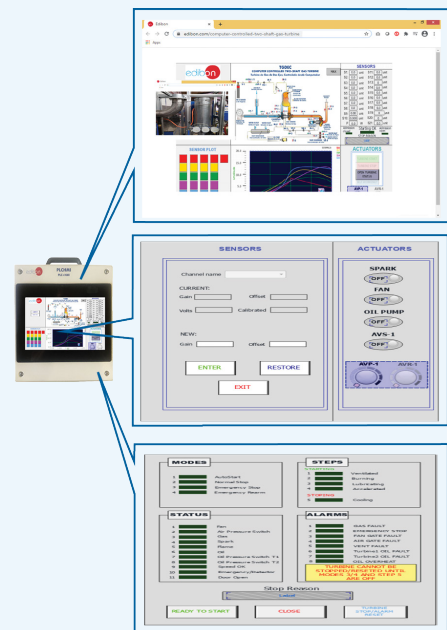
Touch Screen: Analog Resistive.

Size: 10” 16:9 TFT.

Resolution: 1024 x 600, WVGA.

Colors: 64 K.

Ethernet port.



**6. CE00/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.



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

**8. 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 8 are always included in the minimum supply (according to choice):**

- CE00/MF: GM/CTS, FT/CTS and FS/CTS.
- CE00/B: DK/CTS, WCO, DD/CTS, BM and CBO/CTS.
- CE00/P: PEK/CTS and SPD/CTS.
- CE00/MA: GCS/CTS, CGER/CTS, GDT/CTS, DCLM/CTS, SCH and RCB.
- PLCHMI.
- CE00/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.
- Water supply (5 bar) and drain.
- Compressed air supply (6 bar).
- Computer.

**CONSUMABLES**

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

**ELEMENTS**
**● Additional recommended (not included)**

For CE00/B:

- AWD/CTS. Computer Controlled and Touch Screen Automatic Water Dosing Device.
- TTO. Trolley and Set of Trays for Oven.
- CV. Vapour Condenser.

**SIMILAR UNITS AVAILABLE**
**Offered in this catalog:**

- CE00. Computer Controlled and Touch Screen Pilot Plants for the Production of Cereals.

**Offered in other catalogs:**

- CA00. Computer Controlled and Touch Screen Pilot Plants for the Production of Meat.
- 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.
- LE00. Computer Controlled and Touch Screen Pilot Plants for the Production of Dairy Products.
- 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 8) described, we can offer, as optional, other items from 9 to 10. All these items try to give more possibilities for:

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

## EXPANSIONS



### 9. 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](http://www.edibon.com/en/edibon-scada-net)



### 10. 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](http://www.edibon.com/en/edibon-cloud-learning)

**ORDER INFORMATION****CE00. Computer Controlled and Touch Screen Pilot Plants for the Production of Cereals:**

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

**1. CE00/MF. Pilot Plant for Milling and Flour Production:**Units:

GM/CTS. Computer Controlled and Touch Screen Grain Milling Machine.  
FT/CTS. Computer Controlled and Touch Screen Pneumatic Transport System.  
FS/CTS. Computer Controlled and Touch Screen Industrial Sifter.

**2. CE00/B. Pilot Plant for the Production of Bread:**Units:

DK/CTS. Computer Controlled and Touch Screen Dough Kneader Unit.  
WCO. Water Cooler.  
DD/CTS. Computer Controlled and Touch Screen Dough Division Unit.  
BM. Baguette Maker Unit.  
CBO/CTS. Computer Controlled and Touch Screen Convection Bread Oven.

**3. CE00/P. Pilot Plant for the Production of Pasta:**Units:

PEK/CTS. Computer Controlled and Touch Screen Extruder and Kneader.  
SPD/CTS. Computer Controlled and Touch Screen Static Drying Unit.

**4. CE00/MA. Pilot Plant for Cereal Malting:**Units:

GCS/CTS. Computer and Touch Screen Controlled Grain Cleaning and Steeping Unit.  
GGER/CTS. Computer and Touch Screen Controlled Grain Germination Unit.  
GDT/CTS. Computer and Touch Screen Controlled Grain Drying and Toasting Unit.  
DCLM/CTS. Computer and Touch Screen Controlled Deculmer.  
SCH. Horizontal Screw Conveyor.  
RCB. Rising Conveyor Belt.

**5. PLCHMI. IIoT local/remote Control and Monitoring with HMI.****6. CE00/CCSOF. PID Computer Control + Data Acquisition + Data Management Software.****7. Cables and Accessories**, for normal operation.**8. Manuals.**

\*IMPORTANT: Under CE00 we always supply all the elements for immediate running as 1, 2, 3, 4, 5, 6, 7 and 8.

**Optional items** (supplied under specific order):

• **EXPANSIONS:**

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

• **ADDITIONAL RECOMMENDED ELEMENTS:**

*For CE00/B:*

- AWD/CTS. Computer Controlled and Touch Screen Automatic Water Dosing Device.
- TTO. Trolley and Set of Trays for Oven.
- CV. Vapour Condenser.

**QUALITY CERTIFICATES**



**WARRANTIES**



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REPRESENTATIVE: