



Mini-Plant Malt/Beer/Soda Production Plant



LT-PPB-01

Production Process

Learn all the necessary to produce malt/beer/soda and then try your product.

A laboratory and training system that you will never forget.

An educational experience truly original.



General.

This mini-plant is one of the first real processes. It was developed to provide training, with a better and practical approach to the automation or control of industrial processes, for all type of disciplines such us: electrical, electronics, mechanics, mechatronics, control, automation, industrial, chemical, food and beverages, environmental and production.

You can make lab practices on feedback, PID, multivariable and robust control. Several techniques such as classical, modern, and advanced control can be

applied. All of them in real context. For technical, engineering, master or doctorate studies.

This system is both: educational and real. The whole process is instrumented according to your needs to produce small batches of Malta, Beer or Soda.

One of the advantages is the modularity of the complete system which includes separate workstations to help the trainer in serving more students simultaneously. For example, three groups can work on level or pressure without interfering among them.



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- ✓ The modules include several sensors and sensing technologies, all of them accessible through special connectors.
- ✓ The plant is **fully open technology** so you can connect to any control system or PLC no matter the brand.
- ✓ Level Control: discrete and continuous sensing with and without contact.
- ✓ Flow Control: With usage of proportional valves
- ✓ Pressure Control: re-circulating systems and pump control.
- ✓ Temperature Control: For high (heating) and low (Cooling) temperature.
- ✓ PH Control: In-line measurement of process signals.
- ✓ Assembly, construction and design in stainless Steel under sanitary specifications.
- ✓ All the system for sensing, control, refrigeration and monitoring.

- ✓ The students learn gradually all the process parameters until they can prepare a REAL production batch and then TASTE their own products.
- ✓ Enhance student's creativity and learning through the real control or our mini-process.
- ✓ Empower your students with entrepreneurship.
- ✓ The different groups of students can work simultaneously designing their own control algorithms.
- ✓ Safety system to protect persons and equipment.
- ✓ Work with small batches.



Control Interface





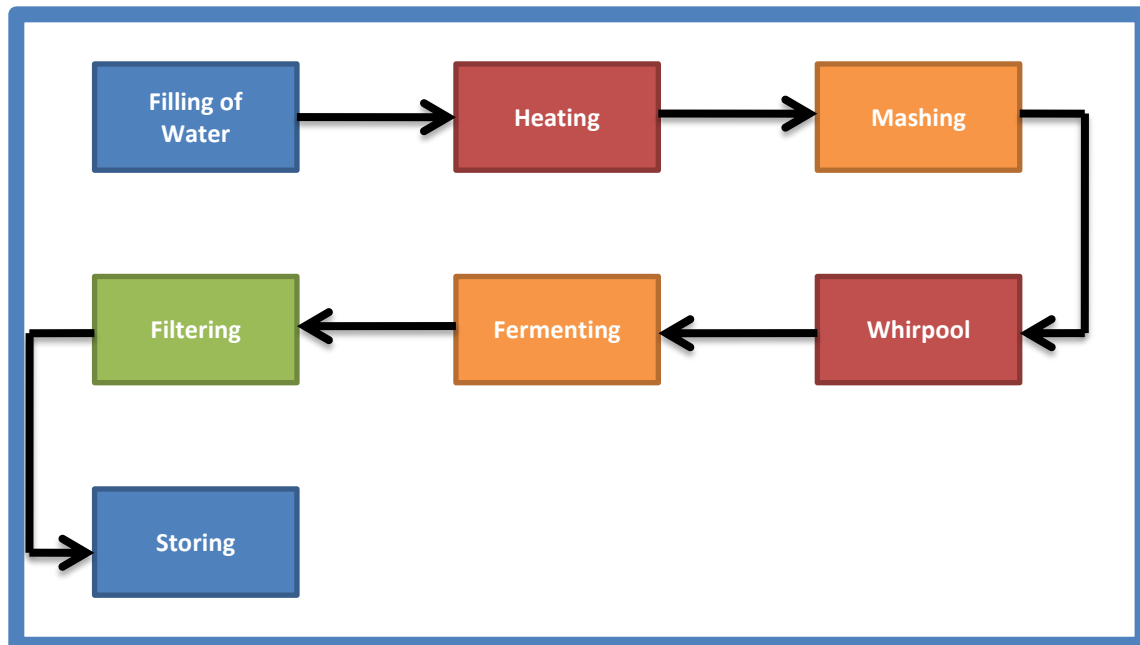
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Fundamentals on the Process

The malt as raw material is ground and then mixed with water in the first tank. A temperature profile is applied to the resultant product to generate different properties on the enzymatic activation. The second stage is boiling and the second tank is used at some part of the process where you add the hops. All the liquid is stirred. After some specific time the product must be cooled using the plate heat exchanger. The final product is stored for fermentation when yeast is added.

When the product is fermented you can drink it as beer, add water and sweet solution to dilute it on Malta or without the heating and fermenting to produce soda.





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¿How can you order this plant?

1. Like a pilot plant.

In this kind of plant a control panel allows you to manage all the involved processes or intervention of the whole operation. Through a touch screen interface you can make manual or automatic operation of the whole process, observe the variable during the production cycle, diagnose or stop the production process.

A pilot plant is offered to those research or educational professionals who prefer to focus on the process rather than the individual knowledge of every device used. A very easy, safe and reliable operation is guaranteed.



2. Like a set of work stations.

The plant is designed not like an integrated process, but like a group of separate sub-processes which can be individually operated. All the signals coming from sensors and actuators are connected to different panels where the students can make connections to our PTS F1616 or any other control device or PLC.

In every work station, a group of students can develop their own control algorithms, with either manual, remote, Stand alone or PC control. Operation can be achieved.

This is a very powerful tool for courses on control, automation, mechatronics and electronics.

One of the big advantages is that every workstation doesn't affect the others. This consideration is useful to simultaneously attend several students. At the end of the course, the entire group can be coordinated to make a complete production run.





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Technical Specifications

Supplies:

Power: 220VAC. 3Φ (Three Phase)
Amperage: 10 KW

Services:

Water, Electricity, Oxygen, CO₂ and disinfectant.

Size (Approximate):

Plant Footprint: 7m X 6m X 3m
(Modifiable).
Control Module: 60cm X 40cm X 40cm (5
Units).
Distance: 15m.
Weight: 600 Kg.

Physical Elements Specs:

Tanks Material: Stainless Steel.
Steel Type: AISI 304 2B
Polishing: External.
Norm: NTC 3554.

Sensors:

Type: Industrial.
Signal: Standard.
Power Supply: 24V DC.
Outputs: Voltage: 0-10V DC.
Current: 4-20mA.
Cable: Shields.

Valves:

Type: Manual and Electrical.
Activation: Electric/Pneumatic.
Work: Continuous.

Sensing Elements and Activators.

Pressure: 4 – 20 mA transmitters for water
CO₂ and Oxygen.

Flow: 4-20mA
Level: level rod and ultrasonic level
detector.

Temperature: 2 Thermocouples K type. 4 – 20
mA transmitters and 2 RTD in
tanks and refrigeration system.

What is included:

- Operation tanks 40 Lt or more according to available space (user definition)
- Plate heat exchanger.
- Connecting pipes
- Pumps
- heating element (User definable)
- Polypropylene filter system
- ON – OFF Control Valves
- K Thermocouples transmitters with sensing head.
- 2 RTD.
- 2 Pressure transducer
- 2 Control levels
- 2 SS electrodes
- 2 Ultrasonic sensing transmitter
- Proportional valve
- Rotameter
- PID control
- PH control
- Operator Manual and training for users.

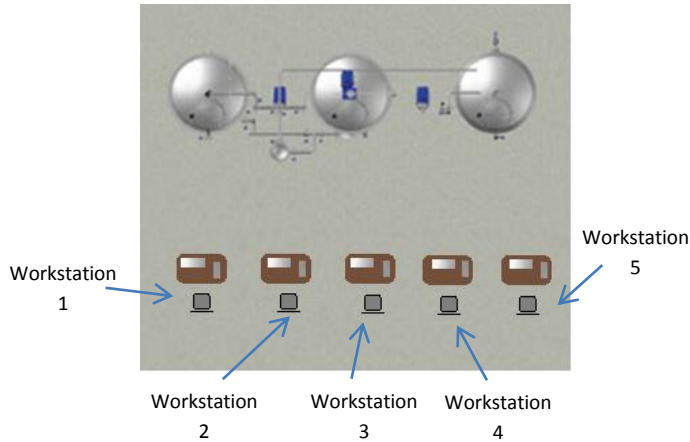




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Lab Practices.



Every work stations collect same process variables

On every Workstation it's possible:

- ✓ Analog Reading of all the variables.
- ✓ Designing of control algorithms.
- ✓ SCADA visualization and control.
- ✓ Curve, trends and data analysis.
- ✓ Integrate with others workstation.
- ✓ Use PLC controllers of any brand.

Optional:

- More PTS F1616 training stations.
- More recirculating pumps.
- Computers with SCADA and PLC controllers.
- Oxygen tank.
- CO₂ tank.
- Propane Gas tank.
- PH measuring system.
- Water preheating system
- Proportional valves.
- I/P Converter.
- PID system
- Others variables can be added to fit particular interests.



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**Discover and new experience in
 education and research.
 More realistic lab practices.**

Others Products

- Climate chamber Fitotrón.
- Algae Biofuel Pilot Plant.
- Bioethanol Plant.
- Inverter Pendulum.
- Speed, position and generation plant.
- PLC trainer (Generic, AB, Siemens, etc)
- Solar heating system.
- Hydrogen cells trainer.
- Solar and Eolic energy trainer.
- Water supply plant.
- Motor-generator plant.
- Drives.
- SCADA.
- Others didactic process (in preparation)
- Motor-generator.

