PROCESS CONTROL SYSTEM BATCHXPERT

The BatchXpert system is a control system for batch-oriented processes, and includes management and reporting for small and medium applications. It is able to manage, control and monitor batch production of products for the food and beverage industry.

It provides tools for creating, managing and executing recipes and automatically creates production reports based on the executed processes. This guide will present small overview of the Systems functionality.

More information is available by Info@MLogics-Automation.com or www.MLogics-Automation.com.

Recipe Management and Configuration

The system allows you to create an unlimited number of recipes for various plant processes. To edit the recipes, the system incorporates powerful tools for viewing, editing and printing all the recipes efficiently.

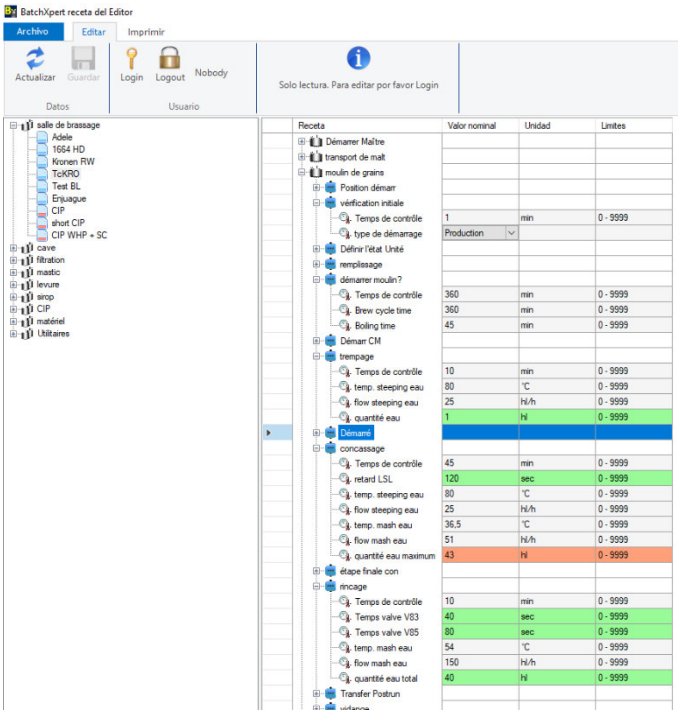


Figure 1 Recipe editor for easy view and optimization of all Recipes

The Configuration tools allow the Project Engineer and Plant operators to efficiently and effortlessly model the Production equipment of the plant in a Hierarchical definition, that allows for easy and efficient configuration adjustments.

The Editors allow you to copy values, steps and complete recipes by "Drag and Drop" from any existing prescription. Importing and exporting full or partial configurations is supported.

The Configuration allows for Color coding of Runtime Values, that allows certain parameters to be highlighted for the operators. The Parameters support different Type of configurations, such as: Timers, Setpoints, Enumerations or Materials.

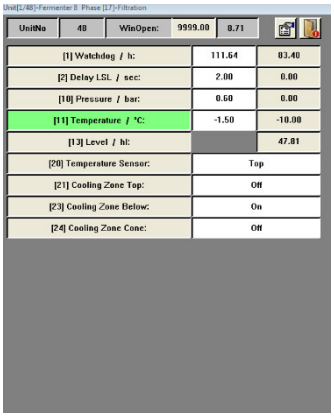


Figure 2 During Execution, the Parameters will be presented color-coded to ease operation

The configuration allows for the creation of the various supported Control modules. These configurations can effortlessly be imported and exported into the system. Each Control module models and physically connected device of the System (such as Valves, Motors, sensors…), and are fully Vendor and Fieldbus agnostic.

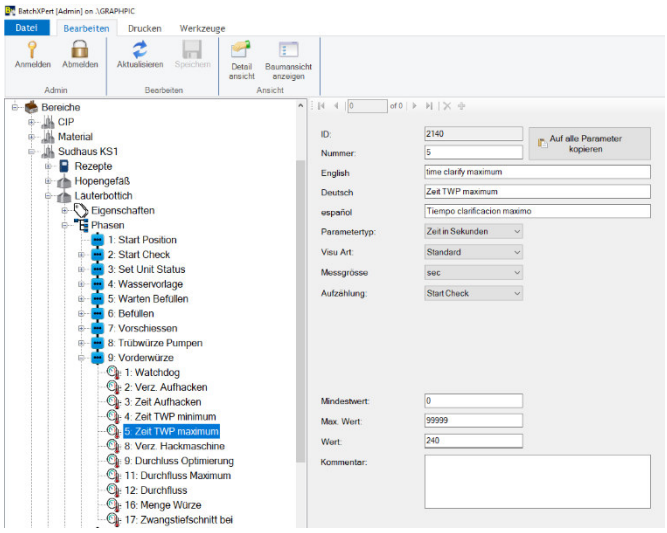


Figure 3 Batch Configuration tool allows for modelling of the Production Hierarchy

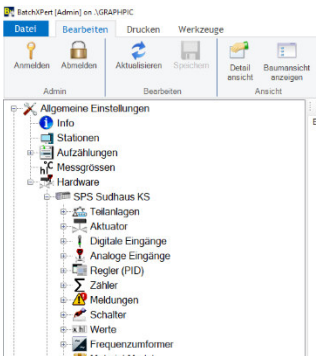


Figure 4 Configuration of different Control Modules

Display

The system incorporates a graphics viewer process, which allow you to view all the elements integrated into the field and perform manual operations and device configurations.

As display system, the BatchXpert uses SCADA "VisXpert" system developed in house and originally developed by the company "Gefasoft München AG". This system has application in a variety of industries such as, Pharmaceutical, Logistics, Food and Breweries.

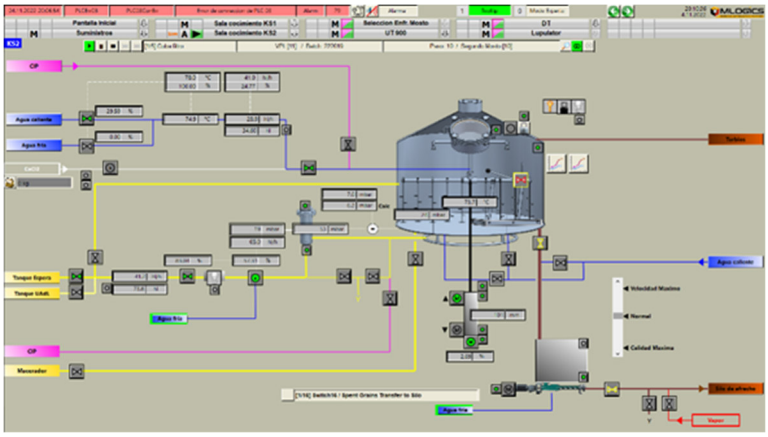


Figure 5 Typical Process image of a Mash tun

The menu system supports a Hierarchical system with status indicators for all underlying units, that summarize the production areas overall status. This allows the operators to quickly and efficiently locate abnormal system statuses such as alarms, simulations or manual interventions.

The System also supports an array of Touch Panels optimized Scada systems based on the “MoViCon” from “Progea” or the “WinCC” from “Siemens”. This allows for the easy integration of the field stations into the system

Figure 7 Hierarchical Menu structure with status indictors

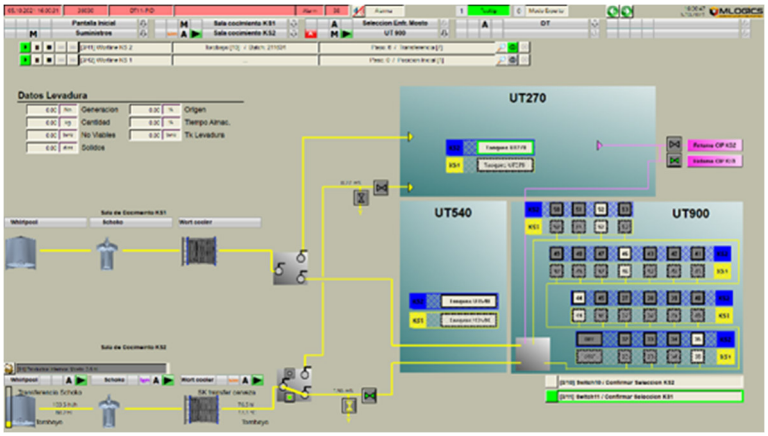


Figure 6 Preselection transfer and Green Beer Filtration

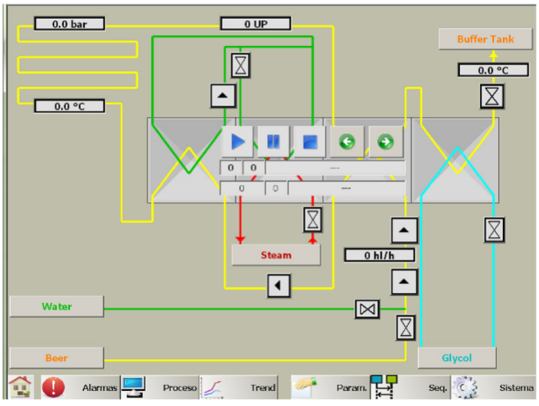


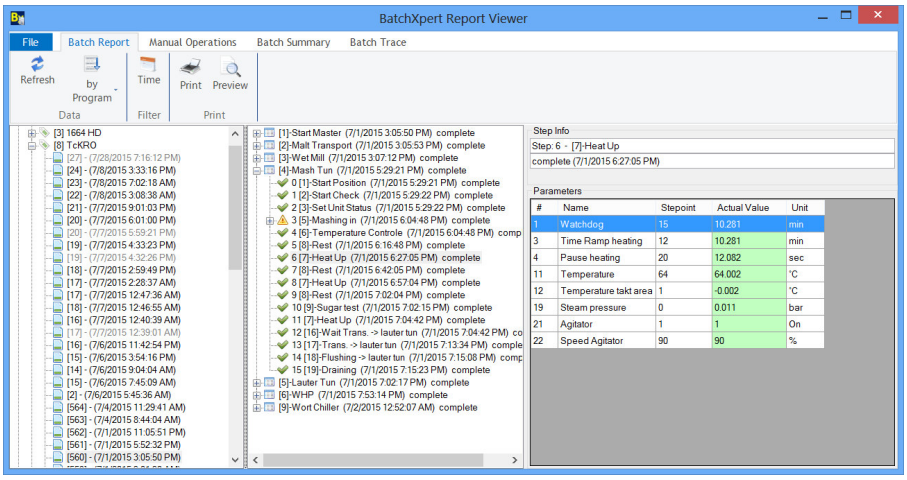
Figure 8 Process Screen, optimized for Touh Operation

Historical records of the processes

The BatchXpert incorporates a wide array of Reporting and Analytics tools, that enable the Plant operators and supervisors to efficiently analyze the data of any Process that was executed in the system. All different tools are combined in the “BatchXpert Report Viewer”, which also allows the creation of custom Reports. The system supports reports created in “Microsoft Word” or “Microsoft Excel”.

Complete production record for fault analysis.

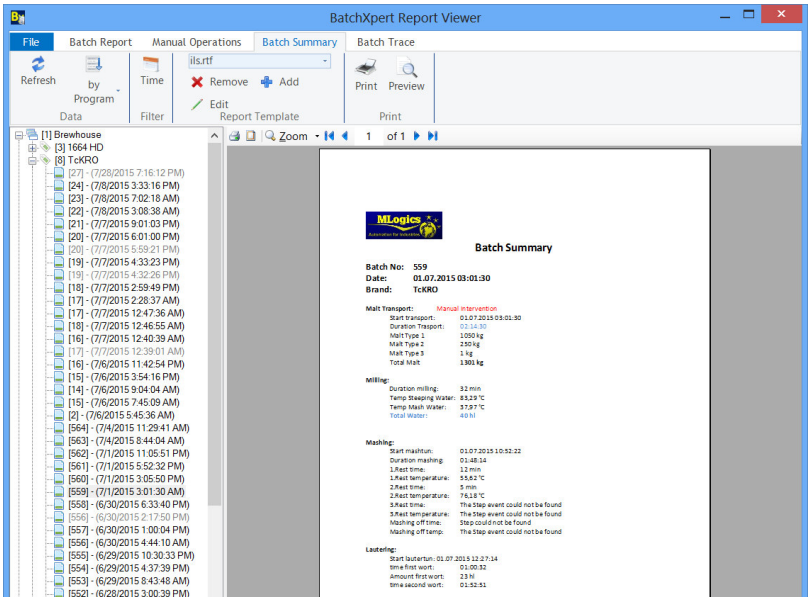
Indicates all steps executed with nominal and actual values. It also indicates whether the step automatically ended or was aborted manually. It provides a detailed view of all events within a Batch executed. It also lists any manual operation performed during the execution of the batch to any control module corresponding to the selected batch.



1 full report with all data of a Lot

The print format is completely configurable. Logos can be changed, Fuentes colors. Etc.

Summary report production



2 Viewer "Summary" in the Word format

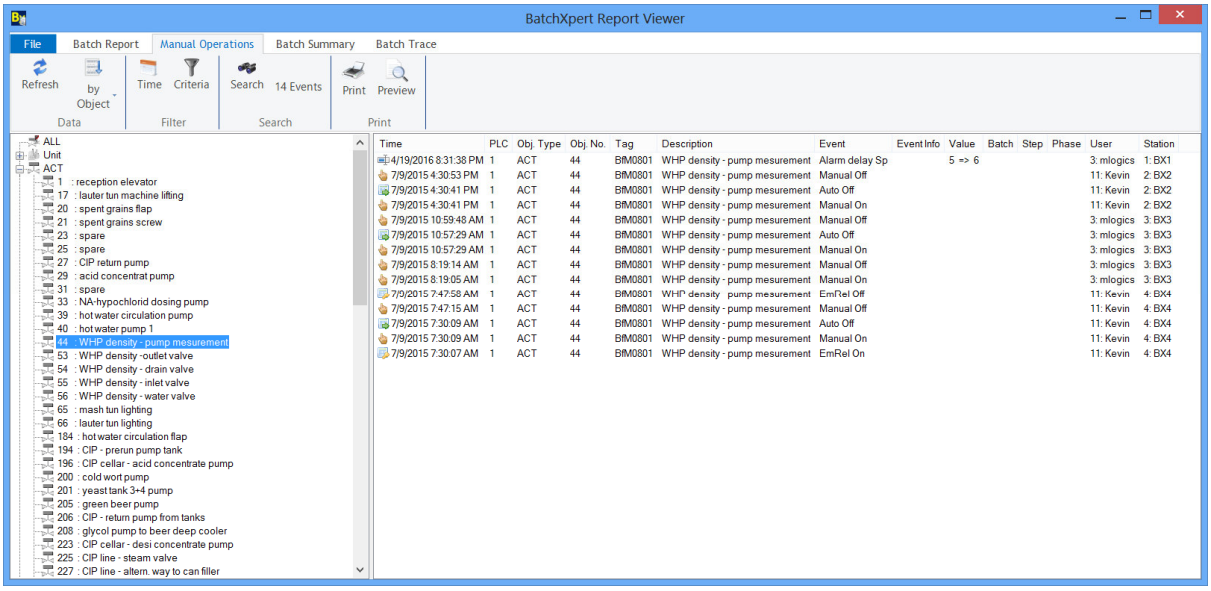
To replace the "Sudblatt" or "Brew Sheet", the system incorporates a type of report that can summarize the most important values and events in a process in one or more pages.

This report (Batch Summary) is completely flexible and can be adapted as required by the process’s operator. There are reports for Microsoft Word and Microsoft Excel (with this you can perform complex calculations on data)

Manual operations

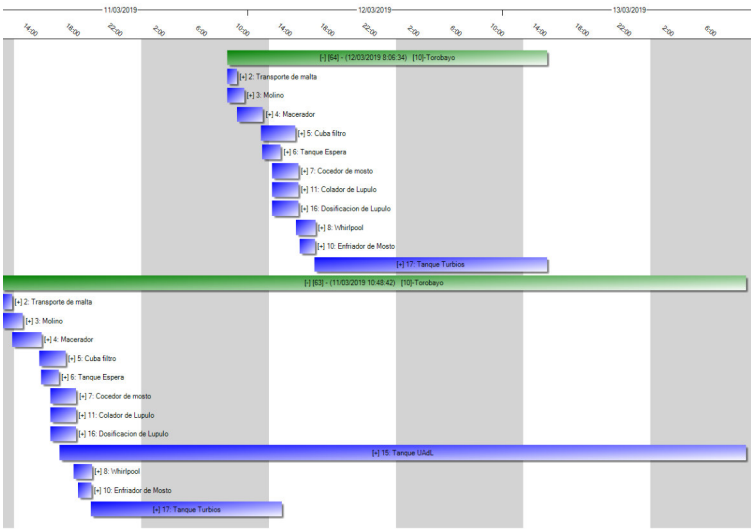
The BatchXpert system records all the operations and manual interventions performed in any part of the system, and are presented as "Manual Operations Report". There are many possibilities to filter and sort the data, so it is very easy to find the searched event. All operator operations are recorded, such as:

- manual valve openings
- Changes in parameters such as arrears of alarms, PID settings, ...
- Changes in nominal values recipes
- Material modifications and dosages
- .....



3 Manual Operations viewer with adjustable filters

Timeline Analysis



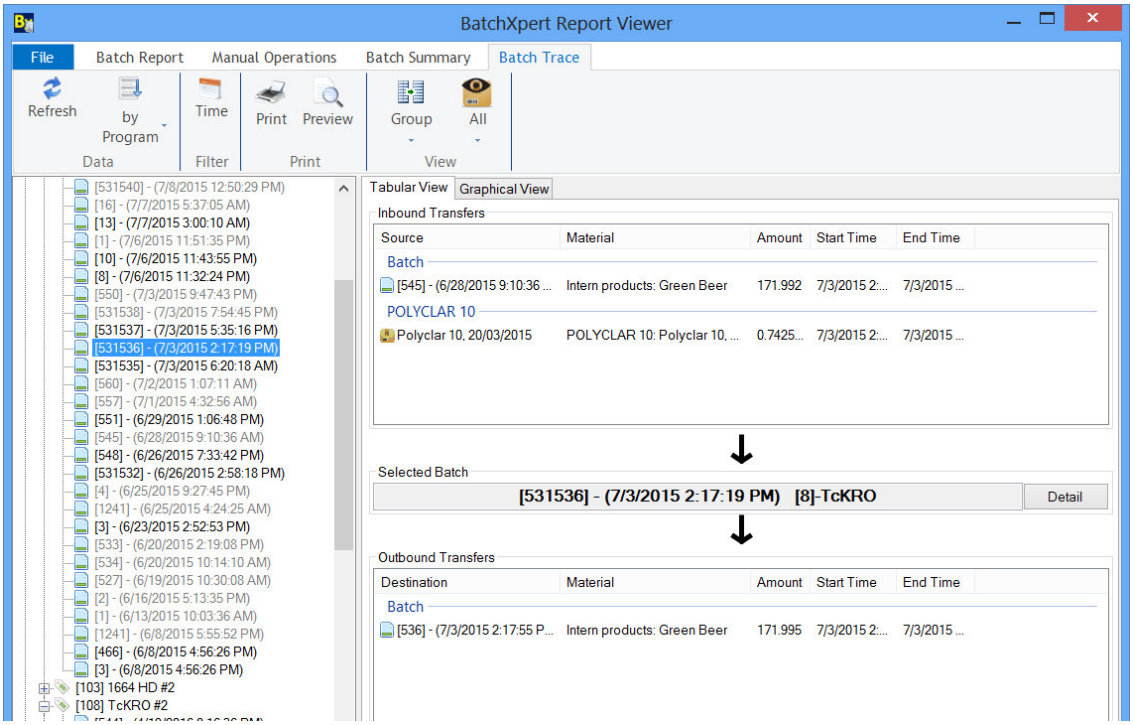
The BatchXpert system includes an report that lets the user review the execution of teach process unit and process phase in an “Gantt-Chart” style report. This allows for the easy identification of eventual “Bottlenecks” and also allows for the optimization of the plant’s efficiency.

Batch traceability

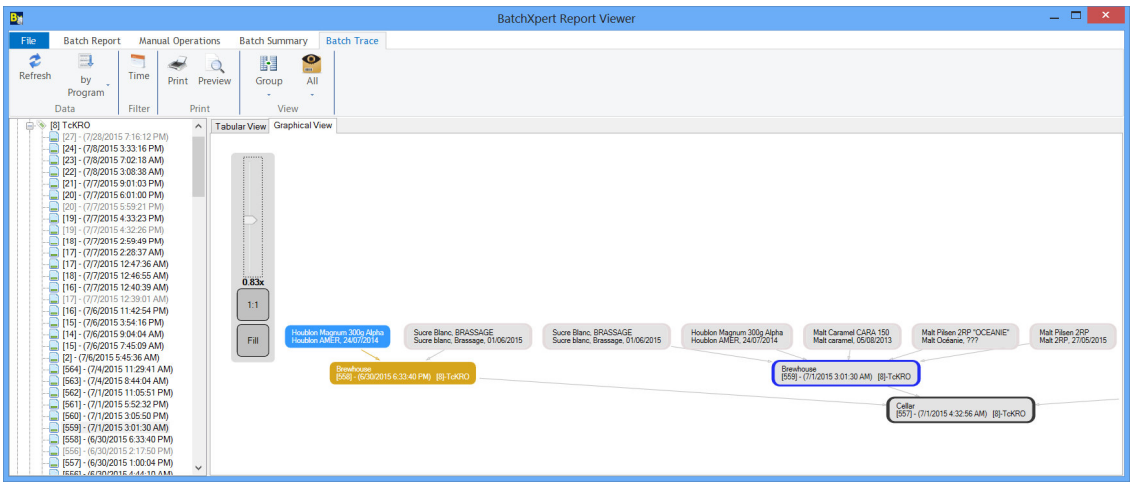
The BatchXpert includes tools to list consumed and produced products, automatically or manually dosed materials, and transfers between batches. All transfers between different batch and all materials consumed, produced or dosed manually are being recorded.

This report allows to evaluate product transfers in a very easy and intuitive way. The report allows for example to answer the following question: To which brews have received yeast that was harvested from a tank X.

The Graphical Representation allows to quickly visualize complex transfers between many different batches and all the materials involved.

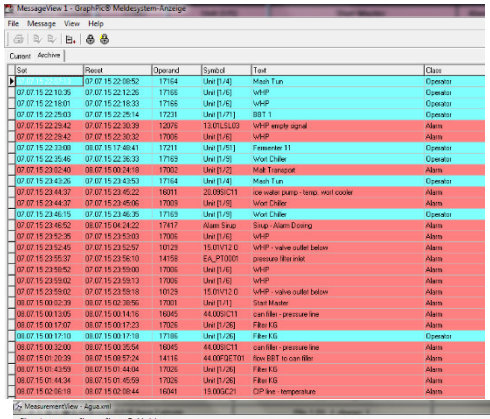


4 Tabular display with amounts transferred from one batch to another



5 Graphic display Transfer of a Lot

Trends and Alarms



Like all control systems, BatchXpert incorporates a sophisticated alarm log and Trends. The system records alarms for each control module and trends for each analog value, which can be assessed by its built-in tools.

In addition, there is the possibility (optional) to send emails if certain alarms are registered in the system for different periods of time.

6 Alarm Viewer

7 Viewer Trends

Redundancy

The BatchXpert system is developed in such a way to reduce the critical points that can fail and stop the process. In the BatchXpert there is no central server, all the configuration data are stored redundantly completely at each operating station of system.

Each station operation contains all configuration and historical data, and is able to take control of the entire plant. Thus, each operating station can perform all system functions without limitation. This provides redundancy at each operating station, and while there is at least one operating station, the system can operate without limitation or loss of data.

For synchronization of configuration data (recipes, alarms ...) the system uses an internal mechanism, which synchronizes all data between stations, and thus keeps them updated. thus, no data is lost, even batch historical data when a computer is not turned on for a period of time.

Compatibility

The BatchXpert system is being constantly updated and improved to enhance system security and compatibility with modern systems. As of 22/5/2017 the system supports the following operating systems:

- **Windows 11 (Recommended)**
- Windows 10

As a database, the system uses "Microsoft SQL Server". The BatchXpert system does not require a "standard" version or "Enterprise" SQL server, but is designed to work with the "Microsoft SQL Server Express" versions which can imply huge savings on licensing costs. However, BatchXpert can use a "Microsoft SQL Server Standard or Enterprise" server, if required. As of 22/5/2017 the system supports the following databases:

- **Microsoft SQL Server 2022 (Express or better) (Recommended)**
- Microsoft SQL Server 2019 (Express or better)
- Microsoft SQL Server 2016 (Express or better)
- Microsoft SQL Server 2014 (Express or better)
- Microsoft SQL Server 2012 (Express or better)
- Microsoft SQL Server 2008R2 (Express or better)
- Microsoft SQL Server 2008 (Express or better)

Security

The BatchXpert system was designed thinking one maximum security configuration data and historical. BatchXpert incorporates extensive user management system, with individual privileges, which can be adjusted according to the need of the plant.

BatchXpert also supports a variety of "Anti-Virus" programs which reduces the surface where a virus can enter the system (Internet, USB, ...).

Licensing Model

License model BatchXpert system is separated into two parts. One license is the BatchXpert system and the other is the operating station license. All licenses are "one cost" and do not require any monthly or yearly maintenance cost.

Each plant requires one “Batch license”, throughout the factory and one license for each operating station being added to the system. A typical installation with two operating stations requires one license for "Batch" and two licenses of "operating station", one for each station.

The Batch license is unlimited, and there is no need to add a new license in the event that the system size is increased, or when incorporating new PLC system or equipment. Only one license "operating station" for each station is required to add is required.

There also exists an “Compact” License which allows for the creation of only a limited amount of “Process-Units” at a reduced licensing fee. This license can be upgraded at any time.

Logic Controller (PLC)

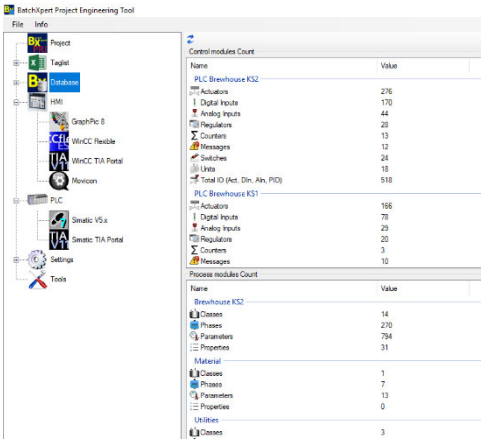


Figure 9 Project engineering tool

The BatchXpert is developed to use the "Simatic S7" platform developed by Siemens and support a large number of compatible CPU’s, such as "Siemens S7-300" or "Vipa Speed7-300" or other types of controllers compatible with standard S7.
The Controller software is very optimized and generally allows for very efficient applications. This allows the selection of “smaller” and more cost-effective Controller hardware.

To further reduce Project cost, the system includes an “Project Engineering” tool, which assists the project engineers during the application development process. It allows for the automation of many repetitive task in the system. Additionally, the system comes with many pro configured functions in the PLC, that further reduce the engineering cost.

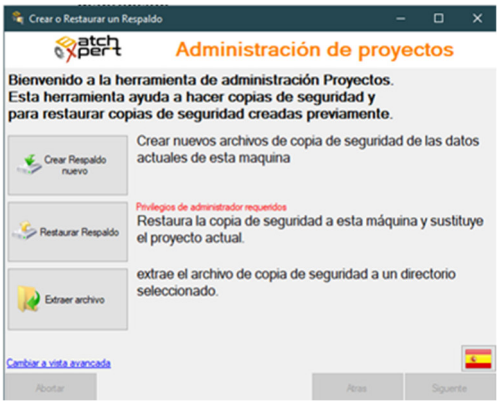


Figure 10 Automatic Backup tools that run periodic or manual backups

The supported HMI systems include an “ready to use” object library that can be adapted to any project. Project templates and import-export functionalities exist.

Furthermore, the installation and configuration of the system is assisted by several tools, which allow even users to restore backups or full system installations.

Figure 11 System Installation is guided by Installation tools

Development and Service

The system is being developed and constantly updated by the company "Mlogics" process control experts, together with the company "Gefasoft München AG" visualization, database and reporting systems experts.