



BATCHXPRT

English V1.2

Basic operation

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1 General

This manual attempts to explain the basic operation of the process management system "BatchXpert" and its compact system "BatchXpert Compact". The difference between the two systems is basically that the "BatchXpert Compact" system does not include all process management features and does not incorporate advanced historical records. These chapters can be omitted for "BatchXpert Compact" systems.

BatchXpert process management system that incorporates standardized modules that are used throughout its processes. These modules incorporate specialized features that are available to the user. The modules and their functions will be described later in the document.

The "BatchXpert" system also includes a system configuration and processes management features with their respective historical data. The configuration editor and historical data viewer are described in the respective manuals. This manual focuses on the overall management of the HMI, the images of process and control modules

For more information on the work system "BatchXpert®" see page www.Mlogics-Automation.com

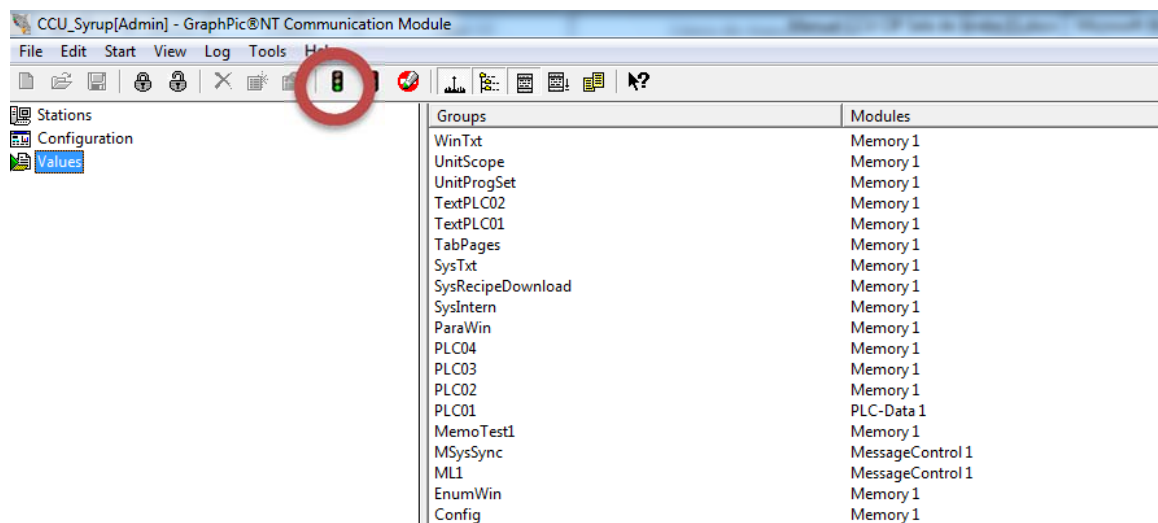
2 Startup

When the Computer and Windows start, you can start the BatchXpert system with the Icon on the Desktop.



Normally the system is installed so that the BatchXpert system automatically starts after windows has fully started up but if this does not occur, you can start the system by clicking this icon.

That opens the "GraphPic" program where you can start the system by clicking the green traffic light button in the toolbar.



When the main system screen appears, the system is fully initiated.

3 Operations and general control

3.1 Login



This shows the user that is currently logged into the system, and also allows you to change the user logged into the system.

Clicking the key button, the "Login"- window appears, where the user must enter their name and password. After this authentication the user can use the system within the privileges that are set by the system administrator.



The button "Lock" performs a "Logout" for the system, and leaves everything locked. To use the system again, the new user is prompted for credentials by clicking on the "key"-button.

3.2 Alarm bar



The alarm bar always displays the most recent alarm in the system. The data shown are (left to right):

1. Alarm Time
2. Number of alarm
3. Alarm tag
4. Alarm Description
5. Alarm class
6. Total number of alarms in the list

Clicking the alarm list or the "MeldeSys" button, the Alarm viewer opens. In this viewer, one can monitor all active and historical alarms. For more information please consult the respective manual.

Since each alarm in the system also activates an acoustic signal "Horn", you can turn off the audible alarm and confirm by clicking the "Horn" button.

3.3 Main Menu Bar



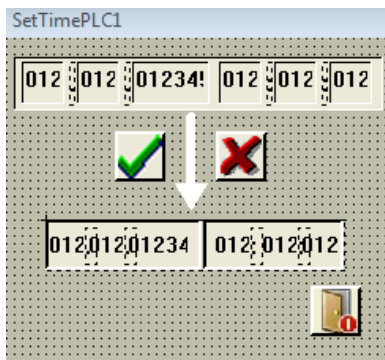
This menu allows you to turn off the system, open the Configurator and open the historical process data viewer. For more information about these applications, please see the respective manuals.

3.4 Watch PLC and connection status



On the right side of the menu bar system is able to observe the clock connected PLC, this shows the current time that is currently set in the PLC. This clock should always be set to the current time.

Clicking on the Clock, the "PLC Clock settings window" is opened. At the top of this window you can set the time that the operator wants to adjust to the PLC by clicking the arrow on confirmation, the adjusted value is sent to the PLC.



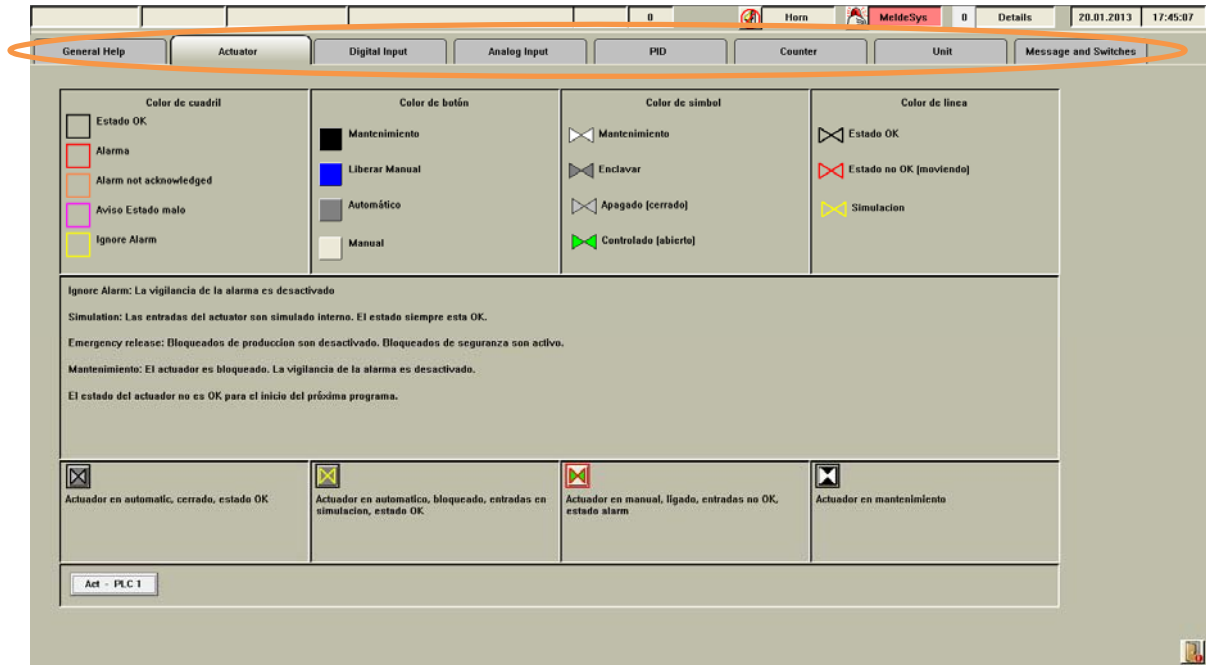
The time is also important to verify proper operation of the communication link between the PC and PLC. If the communication is established correctly, the PLC time must always actualize at least once per second. If this value has not continuously update, the communication link is broken, or the PLC is not in the "Run"-Mode. The small hook next to the clock also indicates this state. If this arrow does not detect the PLC, it will show communication failure indicating with a red cross.

3.5 Help Menu

The help menu explains the general meaning of symbols and colors. This menu is integrated into the project and is accessible in the menu bar at the bottom of the HMI.



This opens the help menu, where at the top, one can select a module type for more information. These details explain the colors and the different states of the modules.



4 General operation of the process images

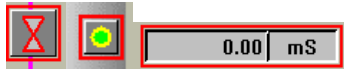
4.1 Symbols in the process image

All modules are represented by symbols in the process image. These symbols indicate the current state of the module with different colors. While some modules have certain states that are represented by special colors in the images, all the symbols follow a basic pattern.

The basic color scheme for symbols is:

- **Active Alarm (Red)**

An active alarm is indicated by a red frame of the symbol.



- **No active alarm (Orange)**

A not confirmed alarm is indicated by an orange frame of the symbol.



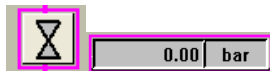
- **Simulation and ignore (Yellow)**

Simulation mode and ignore mode is indicated by yellow background and frame colors of the symbols



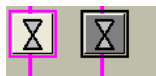
- **Warning Status (Pink)**

Situation that require the attention of the operators, but are not directly errors or faults, are shown by a "Pink" frame of the Symbol. These situations can be warnings, statements,



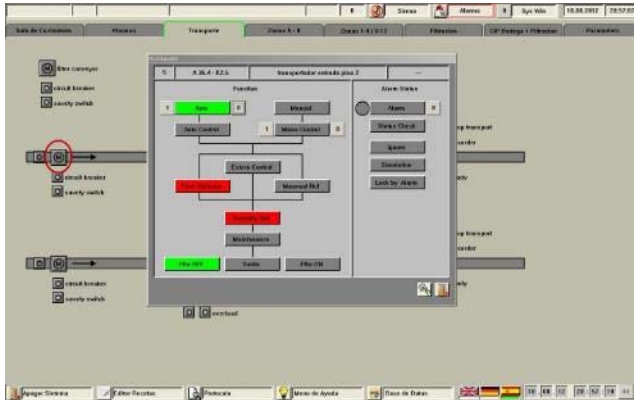
- **State Automatic or manual (Grey / Dark Grey)**

If a module is in manual or automatic, is represented with different background color of the modules

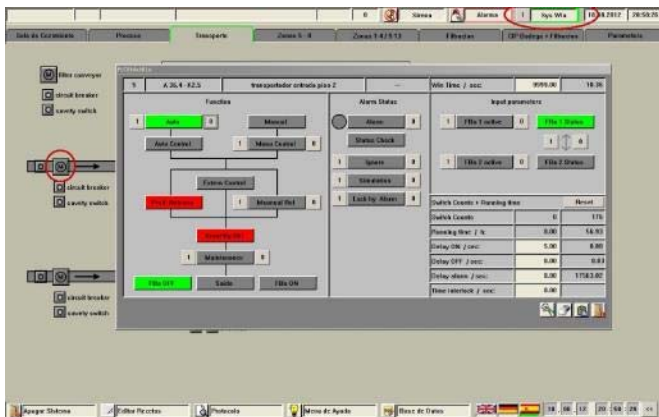


4.2 General

Each type of control module has two windows with details about the respective module. A window with general details and advanced details. To open the detail window you just have to click with the right mouse button on the module you want to observe. A window with details about the selected module opens.



In the top menu bar, there is an "Expert" option to open the advanced details of these modules. When the mode of "Expert" is on (green), and a right click is done, the advanced detail window is opened, rather the basic parameter window.



Advanced Details window is for administrators and system maintenance personal. To open these advanced details, special user privileges are required, that are generally not assigned to operators.

Advanced Details window lets you adjust general settings, limits and special functions, depending on the type of module.

The Modules, their detail windows and functions will be described in the next chapters.

4.3 Input values

Each numerical value that can be set by the operator is entered through numeric input boxes



Generally the nominal values (the values that can be adjusted) is represented by a color of white or very bright background. the actual values (which can not be adjusted, representing some system value) in exchange are represented by darker background color, so that the nominal values of the current values can be distinguished more easily.

If a nominal value is manipulated, its value changes to red, indicating that it has been changed. At this point the value is still NOT! Active in the PLC. With the "Enter" key all the values that are manipulated (red) are sent to the PLC and activated. With the "ESC" this action is aborted and all nominal values return the value they had before the manipulation. You can manipulate multiple nominal values at the same time to be activated by the "Enter" key.

The below image shows two values (red) that are manipulated to zero, a value that is edited (marked with blue) and a value that is not manipulation (black).


0.00	0.00
0.00	0.00

5 Modules

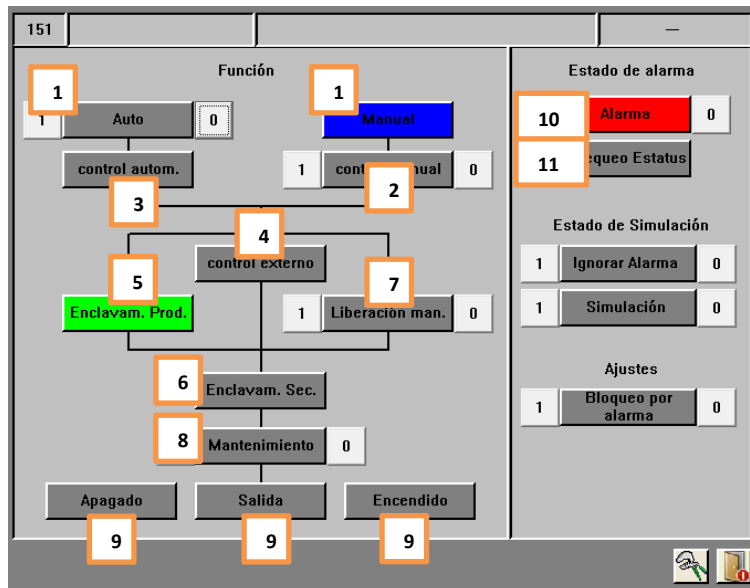
5.1 Actuators

Actuators represent all digital elements that can be controlled from the System on the field. Usually this includes valves, motors, pumps, lamps, etc...

The actuators have several different representations in the process image, usually representing valves, motors, pumps and the like.

Here are some examples: 

5.1.1 General details



This window shows the current state of an actuator. Control over the various functions is only available if the user has sufficient rights to perform this action.

1. Auto / Manual (Green / Blue)

This displays the actuator control mode. In "Auto" mode, the actuator only reacts to "Automatic Control"-Signal from the PLC. In "Manual" mode, the operator can activate the "Manual control" so as to control the actuator manually.

2. Manual Control (Blue / Grey)

The status signal to control the actuator in "Manual" mode. This signal only has effect in "Manual" Mode of the actuators. In "Auto" mode this signal has no effect. The operator can manipulate this signal in order to manipulate the actuator by manual.

3. Automatic Control (Green / Gray)

This indicates the status of the internal PLC control. If the process requires that the actuator is activated, this signal will be activated. This signal is only effective if the actuator is in "Auto" mode.

4. External control (Green / Gray)

This represents the control that comes from an "external" source. Generally this signal comes from some kind of local field control, such as keypads, buttons or similar. This signal

operates independently of the state of the "Automatic" signal and also ignores the "Production Interlock"

5. Production interlock (Green / Red)

This displays the status of the production interlock of the actuator. Generally this includes logics and blockings to prevent damage to the product. This interlock can be disabled with the "Release Manual" option.

6. Safety interlock (Green / Red)

This only includes interlocks that have direct effect to the safety of people and equipment. Generally this includes interlocks such as door switches, limits switches, emergency stops, etc. This interlock cannot be ignored by any means. This interlock is always active.

7. Manual release (Blue / Grey)

This option allows the operator to ignore the "Production interlock" and is a function for maintenance purposes. This way one can test actuators without the whole process running. However, this function should not be activated permanently, since the "Production Interlock" will not be active, thus the process is not safe! , If this mode is activated, the actuator turns blue in the pictures of the process.

8. Maintenance (Red / Grey)

This mode allows you to block an actuator so that it cannot be activated with any form of control. This mode is designed to lock an actuator when in maintenance. When this mode is activated, the actuator turns black in the process images.

THIS ACTION DOES NOT SUBSTITUTE ANY ELECTRICAL AND/OR MECHANICAL BLOCKINGS AND SECURITY MEASURES THAT MIGHT BE NECESSARY TO DO MAINTENANCE!

9. State of the periphery (Green / Gray)

This shows the current status of the actuator. There you can see if the actuator has confirmation for its "On" or "OFF" states and if the actuator is activated with it's "OUT".

10. Alarm (Red / Grey)

This indicates whether the actuator has an alarm or if there is an alarm that is not yet confirmed. Each actuator always monitors the state of its feedbacks and activates an alarm if its feedbacks are not as expected.

If an alarm persists in the actuator, the circle to the left of the indicator is red, which means that the actuator is still in a state of failure, and the problem still persists. So the alarm actuator cannot be acknowledged.

If Circles this gray, there was an alarm, which is already solved but not yet acknowledged. The Alarm can then be acknowledged by clicking the alarm indicator.

11. Check Status (Lilac / Grey)

This indicates that the program detects a failure in the status of this actuator. Usually this happens during the "Check Start position" step, when an actuator is not in the expected state for a starting process.

5.1.2 Advanced Parameters

This window can change the configuration of the actuator. This window is accessible only with a high user privilege level, and is not available to operators. You can set time delays, alarm time and can configure the periphery of the actuator

1. Ignore Alarm

If this feature is enabled, the module will not activate any alarms. The module continues to operate with all features enabled, but without triggering alarms. If on ignore mode, the module turns yellow in the process image.

2. Simulation

This function allows to completely simulating the periphery of the actuator. That means that the actuator completely ignores the state of their "Feedbacks" and always assumes that the "Feedbacks" are in the correct state. This mode is used if a Feedback is not working properly, but the process must continue working. Thus the process can operate regardless of the state of the actuator. The output of the actuator is not affected by the simulation. If in Simulation, the actuator turns yellow in the process image.

3. Lock by Alarm

This feature allows activating the safety interlock if the actuator detected an alarm. Normally this is used for motors, so they are turned off if there is a fault in the motor control.

4. Enable Feedbacks

Each actuator can have up to two monitored Feedbacks. The Feedbacks 1 is assigned to the "off" or "closed" state of the actuator, and Feedbacks 2 to "on" or "open". Both feedbacks can be activated if existing.

5. Feedbacks State and switch Feedbacks

Here one can see the state of the signals from the periphery of the Feedbacks. There is also the option of exchanging the peripheral feedbacks signals, in the case that this is required by the wiring of the actuator.

6. Switch Cycles/Running Hours

The value of "Switch Cycles" shows how many times the actuator was been activated since the last reset.

The "Running hours" equals the hours up this account actuator and the actuator time was on.

With the Reset button to reset these two values.

7. Actuator timers

The actuator has three internal timers that can be adjusted by the user.

The "Delay Off" is the time that the actuator stays activated, when the program no longer activates the actuator.

The "Delay on" time is the time the actuator waits before turning on the actuator, when it receives its control signal.

The "Alarm Delay" is the time that the actuator waits until the Feedbacks are monitored and alarm is triggered on failure.

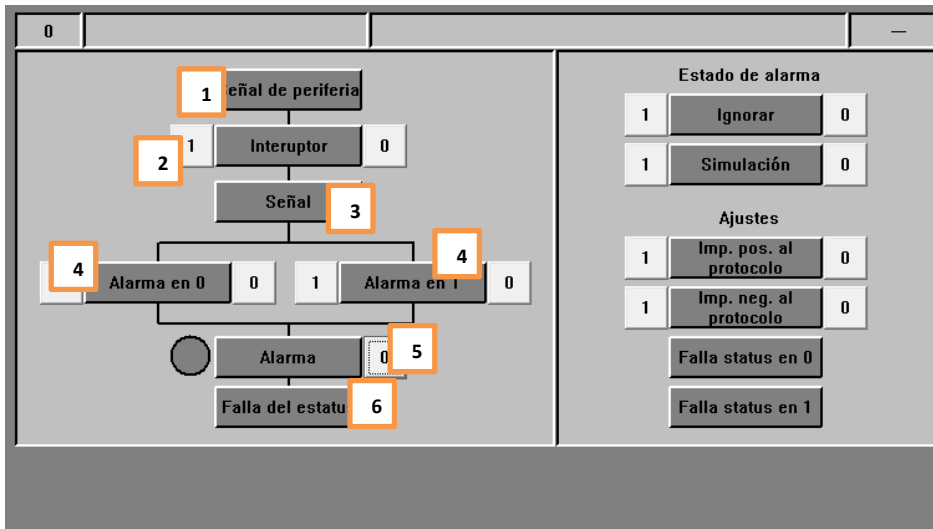
5.2 Digital Inputs

A digital input represents all inputs not directly associated with any other module type. Digital inputs are usually level sensors, proximity sensors, buttons etc...

In the process displays the digital input is represented by the following symbol:



5.2.1 General details



This window represents the status and basic settings of digital input.

State of digital input:

1. Periphery Signal (Green / Gray)

This indicates the direct signal coming from the sensor, without considering delays or simulations. This value is only for maintenance purposes. If the operator wants to know the status of the digital input, he should see the "Signal" indicator, which reflects the process state of the digital input, not the direct peripheral input.

2. Switch (Green / Gray)

This is a setting that can be activated on the digital input. This setting is only available to system administrators. The operator has only read only permission.

If activated, the digital input reacts as a "Flip/Flop", which means if the periphery signal turns on; the internal signal also activates and stays activated until the periphery signal is turned on again.

This function is useful for handling local pump controls that are turned on with only one button. When the button is pressed, the pump starts until the button is pressed another time.

3. Signal (Green / Gray)

This represents the state of the signal on which the automation program and all processes work. Usually this signal is directly dependent on the sign of the periphery, but also the “Switch” and “Simulation Mode are considered.

4. Alarm 0 or 1 (Green / Gray)

This setting is only available to system administrators.

With these two settings one can set when the digital input enters the alarm state.

Depending on the setting, the digital input enters the alarm state if the input is turned off, turned on, or even both after considering the alarm delay time.

5. Alarm (Red / Grey)

This indicates whether the entry has an alarm or if the alarm is not yet confirmed. Each digital input activates the alarm depending on the "Alarm at 0" and "Alarm 1" settings. If the alarm still persists, the circle to the left of the indicator is red. This means that the entry is still in a state of failure, and the problem still persists. So the alarm entry cannot be confirmed.

If Circles this gray, there was an alarm, which is already solved but not yet confirmed. One can acknowledge the alarm by clicking the alarm indicator.

6. Status Check (Lila / Grey)

This indicates that the program detects that the module is not ready for executing any associated process. This usually is not a malfunction but a notice that a module is not properly adjusted, and that the program has to wait until this problem is resolved to continue with the process.

5.2.2 Advanced Parameters

This window could change the configuration of the digital input. This window is accessible only with a high level of user, and is not available to operators. You can adjust time delays, times and types of alarms.

1. Ignore Alarm (Yellow / Gray)

If this feature is enabled, the module will not activate any alarms. The module continues to operate with all features enabled, but without triggering alarms. If on ignore mode, the module turns yellow in the process image.

2. Simulation (Yellow / Gray)

This function allows simulating completely the periphery of the module. That means that the "signal" used by the program to react to the state of the digital input does not depend on the "Sign O", but could be adjusted by the operator according to the requirement of the process. This allows the process keeps running even if a sensor is failing.

3. Positive and negative pulse protocol (Green / Gray) Impulse

This feature only applies to "BatchXpert" system, since "BatchXpert Compact" system does not incorporate historical records. If one of these functions is enabled, the module makes a record of the historical system each time, when the sensor switches from "on" to "off" or reverse (depending on setting). This allows signals to record changes in the historical process system.

4. Failure to 1 and failure to 0 (Green / Gray)

This indicator shows which state is expected by the program that has the digital input. If the digital input does not meet the condition required by this adjustment, the module will activate the message "Fault status".

This is not a setting that can be changed by the operator or administrator. This is a function that can only be used by the PLC program.

5. Timers

The module has three internal timers that can be adjusted by the user.

The "Delay Off" is the time the sensor is activated, but the periphery is no longer lit"

The "Delay On" is the time that the module expects to activate its "signal" when the internal "O Signal" is on.

The "Alarm Delay" is the time that the module expects to activate the alarm when the module fulfills its alarm condition "Alarm 1" or "Alarm at 0".

6. Values up

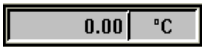
The value of "counter activations" shows how many times the module was activated since the last reset.

With the Reset button to reset these two values could Zero.

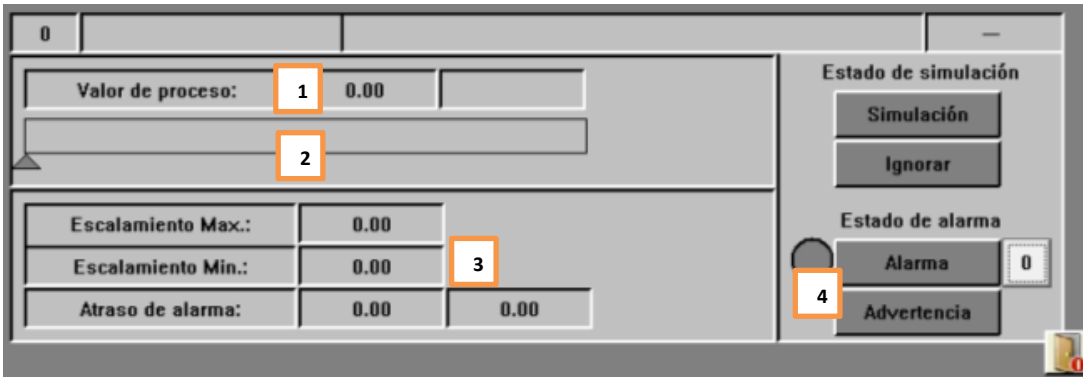
5.3 Analog inputs

An analog input represents all measurements and analog values connected to the system. An analog input represents a measurement and shows the value of this measurement. It is also possible to adjust various limits for warning and alarms.

In the process displays the analog input is represented by the following symbol:



5.3.1 General details



1. Process Value (Grey / White / Yellow)

This table shows the modules current process value and engineering unit. This value represents the instantaneous value of this measurement and incorporating all scalings, polygonal tables and filters.

2. Bar value range

This bar shows the ratio of the value of processo in regard to their high and low limits. Also indicates the limits with arrows below the bar processo value to visualize the relationship of the process limits to the value of the module.

3. Scaling and alarm delay

Indicates the values of scaling adjustments and current Alarm delay. In the basic parameters, this parameters are read only. Please see section "Advanced Details" section of this module to see details.

4. Alarm and Warning

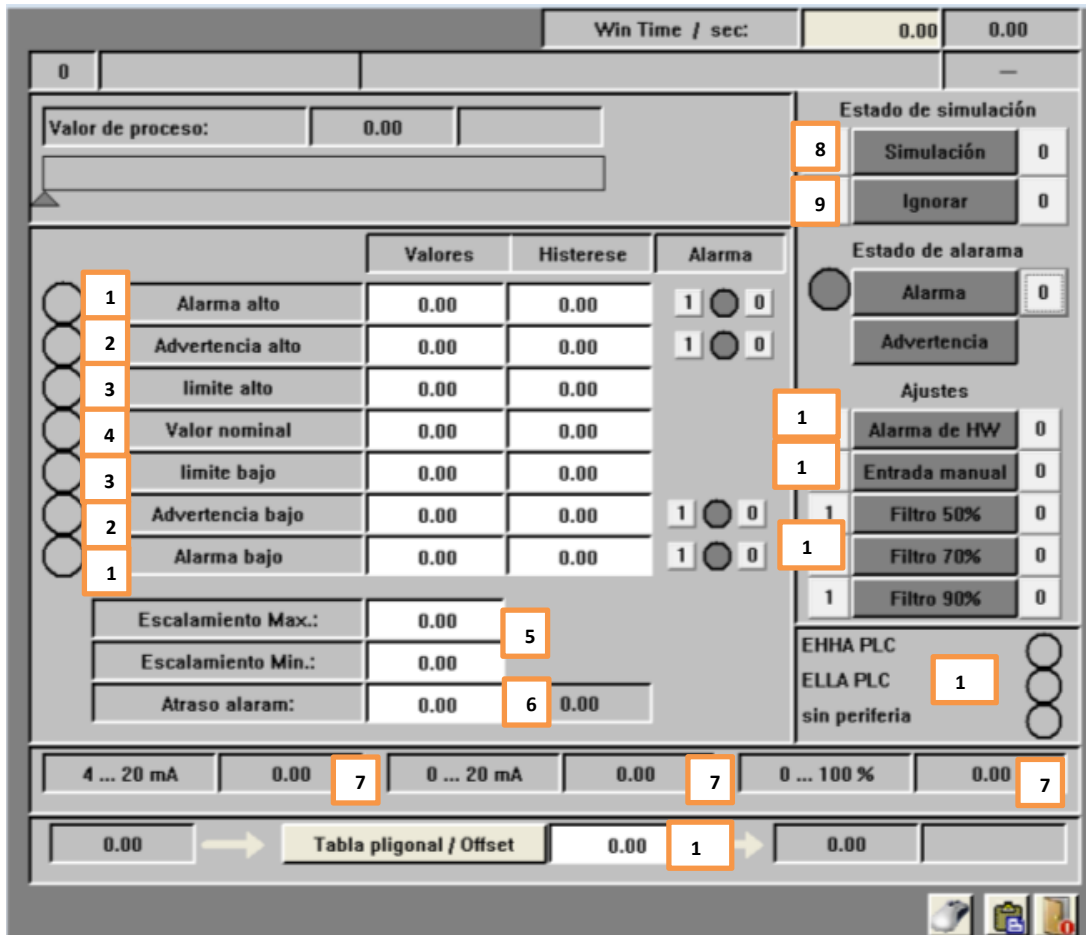
This indicates if there is currently an active alarm or a not acknowledged alarm on the module. Each module activates its alarm depending on its on high and low alarm limits, adjusted in the parameters.

If the alarm persists in the module, the circle to the left of the indicator is red. This means that the module is still in a state of failure, and the problem still persists. So the alarm cannot be confirmed until the alarm is resolved.

If Circles this gray, there was an alarm, which is already solved but not yet confirmed. The Alarm can be acknowledged by clicking the alarm indicator.

The indicator "Warning" shows that the value of the module exceeding its high or low warning limit. This is a visual indication to the operator to warn of this extraordinary state.

5.3.2 Advanced Parameters



This window allows advanced configuration and parameterization of the Analog inputs. This window is only accessible Administrators of the system, and is not available to operators.

General:

Hysteresis values generate a "dead band" to prevent continuous alarms or warnings caused by fluctuating process values. The hysteresis value always acts above and below the set alarm or warning limit. If the process value falls below the limit minus the hysteresis, the signal corresponding limit signal is deactivated. If the process value gets bigger than the adjusted limit plus the hysteresis, it activates again.

For example: If the limit is set at 90 with a hysteresis of 30.

The limit signal turns off when the process value is below $90 - 30 = 60$.

If the process value goes up again, the limit signal turns on, when the value is $90 + 30 = 120$.

The current limit signal status can observe on the left side of each adjustable limit as a small circle. If this circle is **Green**, the module detected that the process value is above the set limit, also considering the hysteresis. If this **Grey** the process value goes below the limit, also considering the hysteresis.

1. High / low alarm

If the process value exceeds these limits, considering the hysteresis, the signal "high value" or "low value" are set in the program. The state of these signals is indicated by circles to the left side of the adjustment.

If the limit is set to generate an alarm by activating the alarm option on the right of the limit, the alarm delay of the module starts. If this delay ends, the module activates the general alarm, indicated by the red color.

2. Warning high / low

In the same way as the alarm limit, this limit activates a "Warning" signal. It does not consider the alarm delay and directly activates the "Warning" mode, indicated by the purple color in the process image symbol.

3. Limit high / low

Operation of these values depends only on the implementation in the project. By default, these values have no effect.

4. Nominal value

Operation of this value depends only on the project implementation. By default, this setting has no effect.

5. Scaling

This setting adjusts the scaling of this analog input. Since almost all analog measurements are connected with some standardized interface as 0-20mA, 4-20mA, 0-10V, or similar, these values must be normalized or scaled to their respective process values.

To normalize these values, the system must know the minimum and maximum value of the interface of the connected interface. These values depend entirely on the measuring equipment that is connected to the analog input card of the PLC. The scaling value of the interface of the connected equipment and the scaling value of the interface module **must always** be equal.

For Example:

If a temperature sensor which emits a signal of 4-20mA, with 4mA corresponds to 20 ° C and 20 mA corresponds to 120 ° C is connected, the scaling should be adjusted in the module at 20 ° C and 120 ° C.

6. Alarm Delay

If the "high" or "low" values are getting triggered, and the alarm option is activated for the activating limit, the timer starts counting. If the timer expires, the module enters the alarm mode.

7. Raw Interface Values

These values are for maintenance purposes and indicate the value of the interface that is connected at the PLC.

8. Simulation (Yellow / Gray)

This function allows to completely simulating the periphery of the module. This means that the "Process Value" used by the program, no longer depends on the "Periphery Value", but can be adjusted by the operator according to the requirement of the process. This allows the process to continue operation even if a sensor is failing.

If this mode is activated, the process value turns yellow, indicating the simulation mode.

9. Ignore Alarm (Yellow / Gray)

If this feature is enabled, the module will not activate any alarms. The module continues to operate with all functions activated, but without triggering alarms. If on ignore mode, the module turns yellow in the process image.

10. Alarm Hardware

If this setting is enabled, the system monitors the state of the signal from the periphery. If the module detects a fault in the interface, such as a broken wire or a dead sensor, the module activates its alarm state and indicates the failure of the periphery in the "periphery error" box.

11. Manual Input

This setting can only be activated by a programmer. It indicates that instead of being a value of a measurement, the value is an input to some nominal value entered by the user of the system. When this mode is enabled, the value of process and process module change to white.

12. Filters

If you try to measure values with a high degree of fluctuation, such as electrical current or flow with a peristaltic pump, the measurement value will be very unstable and can negatively affect regulators. If these filters are activated, the process value is "smoothed" with an integrated filtering and smoothing algorithm. To activate a higher degree of filtering of the process value, one can enable multiple filters simultaneously.

13. Periphery State

This indicates the status of the interface of the periphery which is connected to the PLC. If the "Hardware Alarm" is enabled in the module, and the module detects a fault in the interface, this field indicates a fault.

14. Table polygonal

Since some values are not linear measurement values, the module allows you to incorporate a polygonal table to linearize these values. The value in this field indicates the number of the table that the module currently applies to linearize the process value. If 0 is set, the module works without applying the polygonal table and the process value operates directly.

5.3.3 Table polygonal

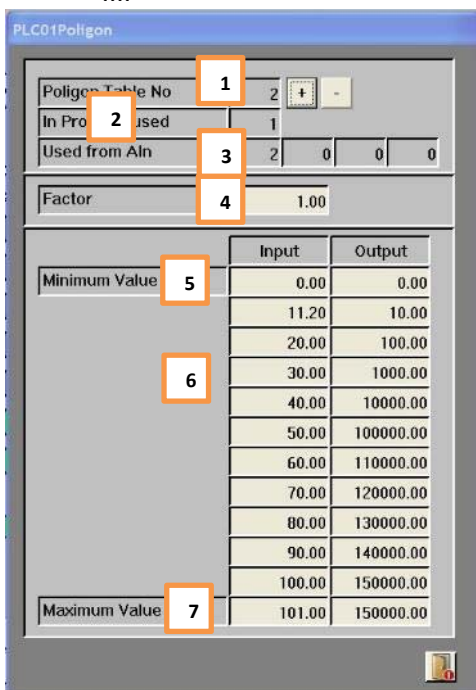
If the dependence of the analog value and the process is nonlinear, a polygonal table can be applied to linearize the process value.

The following example tries to explain the function of a polygon table:

Given a measurement of the volumetric content of a non-cylindrical tank through its water column (pressure). In this case, the pressure value (measurement value) must be linearized, to indicate the correct volumetric content of the tank (process value).

Example level tank with a pressure probe:

- 11.2 mbar 10.0 liters
- 20.0 mbar 100.0 liters
-



1. Polygon table number

This number indicates the number of the Polygon table currently being edited in the window. To change the table could hold the two buttons "+" and "-" to change the table being edited.

2. Used in the program

This number indicates how many analog inputs "Ain" are using the polygonal table that is currently selected.

3. Used from

These field indicates the numbers of the first four analog inputs using the polygon table. This indication can easily identify the analog inputs that are currently using the selected traverse table.

4. Factor

This factor applies to all output values of the polygon table algorithm. By adjusting this value it is possible to, for example correct the error introduced if a polygonal table is adjusted by using water, but the medium has another product density (for example syrup, wine, ...), which naturally would result in a false measurement.

5. Minimum Value

This represents the minimum value considered by the polygon table. It is recommended that this value corresponds to the minimum analog input scaling value. In the above example, if a measurement of 0-1 bar is used to measure the volume of a tank, the minimum value of the table should be set to 0 bar.

6. Table Values

These values represent the values of the polygon table. The input values correspond to the actual measurement of the measurement, and the output values correspond to the corresponding process values. The polygonal table calculates the values continuously between the values entered to the polygon table.

7. Maximum

This represents the maximum value that considered by the polygon table. It is recommended that this value corresponds to the maximum analog input scaling. In the above example, if a measurement of 0-1 bar is used to measure the volume of a tank, the maximum value of the table should be corresponding to 1 bar.

5.4 Analog output (PID)

An analog output represents all Regulators and devices controlled by means of an analog output signal. This module also implements the complete operation of a PID controller, with all its settings and limit values. If the operation of a regulator is not required, you can disable the operation of the controller and operate the analog output directly as a value to an external device such as a frequency converter or similar. This module can be used for all kinds of regulations, such as control valves, flow controls.

In the images of the process, the controller is represented by the following symbol:

48.00	°C
0.00	%

5.4.1 General details

1	01.10.V01	regulador de calentador de CIP		—				
1	Valor del proceso	0.10	°C	1	Simulación	6	Alarma	0
2	Valor nominal	48.00	°C	2	4 Val. nominal en manual	0	Advertencia	
3	Valor de salida	0.00	%	3	5 Salida en manual	0	7 falla estado	
8								

1. Process Value

This represents the current value of the process that the regulator control algorithm is using for its calculations. This value usually comes from an analog input. This value can be simulated when the mode "simulation" is enabled.

2. Nominal value (Setpoint)

This represents the nominal value of the regulator. The control algorithm will try to adjust its output in such a way that the value of the process comes as close and quickly as possible to the nominal value. Usually this value is adjusted from the processes and sequences. If the "nominal value in manual" mode is enabled, the value can be adjusted without the intervention of any process or automatic operation.

3. Value of Output

This represents the current value of controller output. Depending on the regulated equipment that corresponds to an opening angle, speed, If the mode "Manual Output" is enabled, this value could be adjusted directly, without the control algorithm involved...

4. Nominal value in manual (Green / Gray)

This mode allows the operator to enter a nominal value to the regulator directly. The control algorithm is still active in this mode, so the controller will try to adjust its output based on the control algorithm. The automatic sequences and process will not adjust the regulator setpoint when this mode is activated.

5. Manual Output Value

This mode allows you to adjust the output value directly, without the intervention control algorithm. With this option active, one can set the speed, opening angle, directly without involving the PID algorithm.

6. Alarm and Warning

This indicates whether the module is currently in alarm state or if the alarm is not yet confirmed. Each module activates its alarm depending on its high and low alarm limits. If the alarm persists in the module, the circle to the left of the indicator will be red. This means that the module is still in a state of failure, and the problem still persists. So the alarm entry cannot be confirmed.

A gray circle means that there was an alarm, which is already solved but not yet confirmed. The alarm can then be confirmed by clicking the alarm indicator.

The indicator "Warning" indicates that the value of this process module is reaching its preset warning levels.

7. Fault state (Lilac / Grey)

This indicates that the program detects that the module has the wrong state to continue its process. That usually is not a malfunction but a notice that a module is not properly adjusted, and the program must wait until this problem is resolved to continue with the process.

8. Trend

This button opens the continuous trend of the regulators values. This trend shows the values of the regulator, and helps to optimize the regulator behavior during commissioning.

5.4.2 Advanced Parameters

This window can change the configuration of the controller. This window is only accessible with advanced parameter privileges, and is not accessible to operators. You can adjust the control algorithm values, alarm values and other functions.

1. Parameters of PID algorithm

This section adjusts all settings corresponding to the PID Algorithm directly.

- The "Reverse Control" function indicates which direction the PID control algorithm works (Process Value – Setpoint, Setpoint – Process Value).
- The values Proportional, Integral and Differential adjust the basic parameters of the PID control algorithm. These Values directly affect the behavior of the regulator and should only be adjusted by experts in regulations. For more information, please review the articles "http://en.wikipedia.org/wiki/PID_controller".
- **"Dead Band"** This regulation establishes a range where the regulator does not change its output value.
- **"Output Ramp"**. This value limits the change in output to a value %/ sec. If the controller changes its output value faster than this value, the output is limited to the steted value. This value can be used for valves or pumps to avoid damage due to abrupt adjustment. A value of 0.0 deactivates the ramp and allows instantaneous changes in output.

2. Startup value

In this section you can set the startup behavior of the regulator. Mainly there are two ways to start the controller:

- **Fixed startup value over time**

With this option, the controller starts with a fixed value over time. The start value can be set in the "Startup Value" and will be maintained until the "Startup Time" is done.

- **Immediate start with proportional (Kp)**

If the value of the start time is set to a value 0 or a negative value, the regulator starts with an initial value for the proportional factor and immediately starts executing its PID algorithm.

3. Fuzzy Logic

When needed the developer can supply up to two values for the "Fuzzy Logic" Algorithm to the controller. A factor can also be adjusted, which indicates how much effect the value will have on the output of the controller.

4. Alarms and limits

Here the Alarm limits of the controller can be adjusted. The value "Check Delay" indicates a time for which the limit monitoring is delayed. This time starts when the controller is started. This way you can set a time within which the regulator must have regulated its process value and from then on monitor its values.

Absolute limits can also be set, which the process value may not exceed. When the process value exceeds the presented limits, after the "Check Delay" was fulfilled, the controller generates an Alarm.

Additionally you can specify a hysteresis, which indicates the maximum allowable deviation from their nominal value. The hysteresis value is activated when the time of "Check Delay" was fulfilled.

Similar to the alarm hysteresis, you can activate a "Warning" hysteresis. The operation is the same, only it generates a warning instead of an alarm.

5. Scaling

After the PID algorithm, the output can be scaled to the required value. With this feature you can also limit the output to a certain maximum or minimum. The value "input" for the regulator output value corresponds to the internal value between 0-100% and the value "out" is the output value for the user.

6. Operations

The controller has several settings and functions which can be activated when needed.

- When "Disable output" is activated, the regulated will not write its output to the assigned periphery of the PLC. In this case it is an internal regulator, which has no direct connection to equipment in the field.
- The "Enable Warning" option activates the Warning hysteresis and limits of the Regulator.
- The "Filter" worked in the same way as the filter of the analog inputs, and is able "soften" the process value before entering the PID.

7. Status

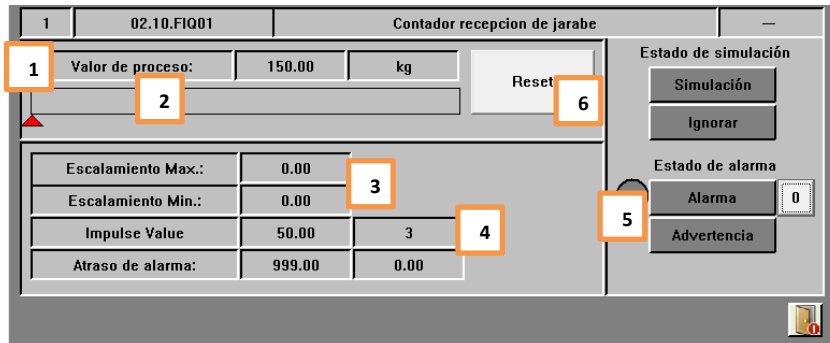
This table shows the number of current states of the internal PID. The states are:

- **"Enable Alarm"** This indicates that the PLC is activating the controllers alarm evaluation
- **"Status Check"** This indicates that the program detects that the module has the wrong state to continue its process. That usually is not a malfunction but a notice that a module is not properly adjusted, and the program must wait until this problem is resolved to continue with the process.
- **"Static Value"** This indicates that the PLC requires the Regulator function statically, without activating the PID algorithm.
- **"Start"**: Indicates that the PLC is activating the PID
- **"Active PID"** Indicates the PLC being activated and the PID control algorithm is up and running
- **"MovMin"** and **"MovMax"** indicates that the PLC requires the PID assumes its maximum or minimum value of output.

5.5 Counters

A counter represents a module that counts pulses of a digital input or any other digital signal. Generally this module is used for counting amounts from Flow meters or similar.

5.5.1 Basic parameters



1. Process Value (Grey / White / Yellow)

This section shows the modules current process value and engineering unit. This value represents the instantaneous value of this counter.

2. Bar value range

This bar shows the ratio of the value of proceso in regard to its high and low limits. Also indicates the limits with arrows under the bar of the process value to visualize the relationship of the process limits the value of the module.

3. Scaling and alarm delay

Indicates the scaling values of the module. Please see section "Advanced Details" section of this module to see details.

4. Impulse value and pulse counter

This two values indicate the value of each pulse to the value of processes, and the counter shows the number of pulses that have been registered since the last counter reset

5. Alarm and Warning

This indicates if there is currently an active alarm or a not acknowledged alarm on the module. Each module activates its alarm depending on its on high and low alarm limits, adjusted in the parameters.

If the alarm persists in the module, the circle to the left of the indicator is red. This means that the module is still in a state of failure, and the problem still persists. So the alarm cannot be confirmed until the alarm is resolved.

If Circles this gray, there was an alarm, which is already solved but not yet confirmed. The Alarm can be acknowledge by clicking the alarm indicator.

The indicator "Warning" shows that the value of the module exceeding its high or low warning limit. This is a visual indication to the operator to warn of this extraordinary state.

6. Reset

This button resets the current counter value to zero. This button is released only if the counter does not have activated its "Block Reset" signal from the process

5.5.2 Advanced Parameters

This window could change the configuration of the counter. This window is only accessible with a high level of user, and not accessible to operators. You can set limit values, and the values that each urge.

1. High / low alarm

If the process value exceeds these limits, considering the hysteresis, the signal "high value" or "low value" are set in the program. The state of these signals is indicated by circles to the left side of the adjustment.

If the limit is set to generate an alarm by activating the alarm option on the right of the limit, the alarm delay of the module starts. If this delay ends, the module activates the general alarm, indicated by the red color.

2. Warning high / low

In the same way as the alarm limit, this limit activates a "Warning" signal. It does not consider the alarm delay and directly activates the "Warning" mode, indicated by the purple color in the process image symbol.

3. Limit high / low

Operation of these values depends only on the implementation in the project. By default, these values have no effect.

4. Nominal value

Operation of this value depends only on the project implementation. By default, this setting has no effect.

5. Scaling

These settings adjust the scaling of this analog input. Since almost all analog measurements are connected with some standardized interface as 0-20mA, 4-20mA, 0-10V, or similar, these values must be normalized or scaled to their respective process values.

To normalize these values, the system must know the minimum and maximum value of the interface of the connected interface. These values depend entirely on the measuring equipment that is connected to the analog input card of the PLC. The scaling value of the interface of the connected equipment and the scaling value of the interface module **must always** be equal.

For Example:

If a temperature sensor which emits a signal of 4-20mA, with 4mA corresponds to 20 ° C and 20 mA corresponds to 120 ° C is connected, the scaling should be adjusted in the module at 20 ° C and 120 ° C.

6. Impulse value and pulse counter

This two values indicate the value of each pulse to the process value and the counter shows the number of pulses that have occurred in the counter since last reset.

7. Alarm Delay

If the "high" or "low" values are getting triggered, and the alarm option is activated for the activating limit, the timer starts counting. If the timer expires, the module enters the alarm mode.

8. Simulation (Yellow / Gray)

This function allows to completely simulate the periphery of the module. This means that the "Process Value" used by the program, no longer depends on the "Periphery Value", but can be adjusted by the operator according to the requirement of the process. This allows the process to continue operation even if a sensor is failing.

If this mode is activated, the process value turns yellow, indicating the simulation mode.

9. Ignore Alarm (Yellow / Gray)

If this feature is enabled, the module will not activate any alarms. The module continues to operate with all features enabled, but without triggering alarms. If on ignore mode, the module turns yellow in the process image.

10. Alarm Hardware (Red / Grey)

This signal indicates that the counter module is currently monitoring the counter signal. If the signal does not appear within the alarm delay, an alarm is activated. This helps to ensure that counting impulses arrive in between a certain amount of time.

11. Minimum and maximum alarms (Green / Gray)

Indicates whether minimum and maximum alarms are enabled for this module.

12. External alarm (Red / Grey)

This symbol indicates an alarm that comes from outside (external) of this module. Usually this represents external alarm from the connected devices.

13. Block reset (Green / Gray)

If this option is activated, the counter cannot be reset manually. This signal cannot be activated by the operator, as it is a signal that is activated and deactivated by the process and its corresponding sequences. This feature prevents an accidentally counter reset.

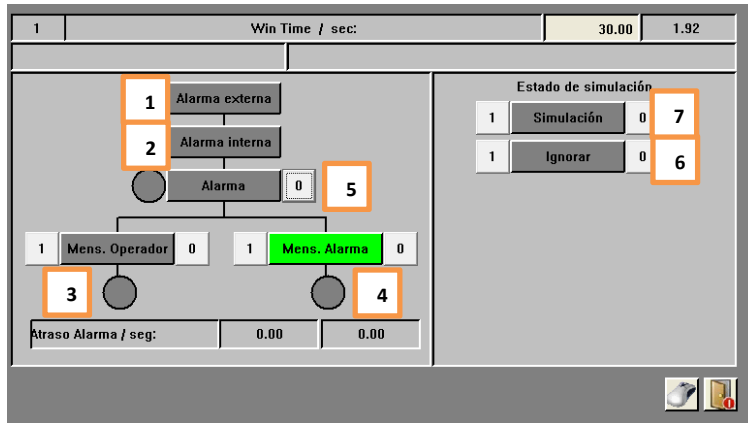
14. Impulse (Green / Gray)

This symbol shows the current state pulse signal on which the counter module is acting. In one sense it can be considered as the periphery of the counter signal. Normally this signal comes from a digital input module.

5.6 Messages

Messages represent information and messages from the executing process of the plc to the Operator. A message can act as an operator message or as an alarm message. The difference between the two types of message is that an operator message is a notification to operator (as a warning for manual operation) and an alarm is an alarm (such as "Deviation too high"). The meaning of the messages depends only on the implementation of the processes.

In the images of the processes a message is represented by the following symbol:



In this window you can change the message settings. Since the module has less complexity as other modules, such control modules only have one window where you can change all the settings.

1. Alarm / External Status (Green / Gray)

This indicates the alarm signal from the process, without considering any delay or simulations.

2. Alarm / Status Internal (Green / Gray)

This represents the state of the signal on which the internal program works. Generally this signal depends directly on the process signal, but also simulations and delays are considered.

3. Operator Message (Blue / Grey)

This setting causes the message to be considered as an operating message rather than an alarm message. If the message is activated, the circle below the setting turns blue to indicate the presence of the operating message. Generally these messages indicate non critical information to the user, and usually involve some manual operations that must be executed in order to continue with the process.

4. Message Alarm (Red / Grey)

This setting causes the message to be considered as an alarm. If the message is activated, the circle below the setting turns red to indicate the presence of the Alarm message.

Generally this indicates specific alarms that are not already covered by the default module alarms.

5. Alarm (Red / Grey)

This indicates whether the message has an alarm or if an alarm is not yet confirmed. If the alarm still persists in the message, the circle to the left of the indicator is red. This means that the entry is still in a state of failure, and the problem still persists. So the alarm entry cannot be confirmed.

If Circle is gray, there was an alarm, which is already solved but not yet confirmed. One can acknowledge the alarm by clicking the alarm indicator.

6. Ignore Alarm (Yellow / Gray)

If this setting is activated, the module will not activate any alarms. The module continues to operate with all features enabled, but without triggering alarms. If on ignore mode, the module turns yellow in the process image.

7. Simulation (Yellow / Gray)

This function allows to completely simulate the periphery of the module. This means the "internal state", which the program uses to react to the message, is no longer dependent on "external state", but can be adjusted by the operator according to the requirement of the process.

5.7 Switches

The switches represent adjustments or confirmations can be adjusted by the operator. The module can only have two states. On (green) and off (gray). Normally the switches represent optional settings that the operator can select during the process (for example "Fill tank" or "Reset automatic processes" ...)

In the process images, switches are represented by the following symbol:



6 Units (Unit)

Units are main part of the process management and represent sequences that can run during a process. A unit can execute a recipe representing the technological process for producing a product or performing a specific function of the machine.

Each unit can execute a sequence of steps, which is defined by recipes. A recipe represents the sequence of steps to execute and their respective nominal values. Each unit can run one recipe at a time. A recipe can define the sequence of steps for several sequences that work together during the process. These sequences work together during the process are called "Batch Area". Each recipe is in a Batch area, and thus defines the sequence of steps and their nominal values for all sequences assigned to this Batch area.

6.1 Symbol pictures of the process

A unit is represented by the following symbol in the process image



1. Operating status of the sequence

The current operating status of the sequence. More details in "[Operating status](#)"

2. Forward or back one step in the sequence

These Buttons let you jump forward or backward one step in the sequence of steps in the current unit. This function is only available if the Unit is currently not in "Automatic" and if a recipe is running. **WARNING! Using this function can have undesirable effects to the process and should only be used by trained and qualified personal.**

3. Sequence Name

Shows the current name of the sequence. The two numbers in parentheses correspond to the "Number of the PLC / Number of the unit". A mouse click on this box opens a list of all defined steps of the current recipe/unit. More details in "[The view of the process steps](#)"

4. Recipe name and batch number

This box shows the name of the recipe that is running at the moment. To identify the process, each process also has a sequential Batch Number. This number also appears in this box. Clicking this dialog window where opens the window to start new recipes.

5. Step sequence

This box indicates the current action that is performed by the unit. The step number indicates the step in the recipe and the number of configured action indicates the type of action that is configured for this step in the recipe.

6. Process Details

With this button one can open the "Process Details" where the setpoints and parameters of a unit can be adjusted. It also includes information whether the unit currently has a fault or message to notify the operator about this. For more details read the chapter "[Details of the process](#)" And "[Details of the unit](#)".

6.2 Operating status

Each sequence has an operating state. A sequence can have one of three general states of operation. They control the process execution (the steps are defined in the recipe) and control modules that belong to this process. The state of the sequence can be manipulated by the operator by clicking the respective button state.



1. "Automatic"

The execution of process steps works fully automatic. If a step ends, the sequence automatically continues to the next step which is configured in the recipe. Manual operations are not possible in the control modules belonging to this unit. It is generally not possible to operate valves or actuators manually when the sequence is in this state.

2. "Pause"

The implementation of the current step works fully automatically, but if the current step terminates, the sequence automatically switches to "Stop". In this state it is possible to activate control modules manually. It is possible to open valves and actuators manually.

Warning! Since the sequence is running the process, the process will also enable actuators according to the logic of your process! That could lead to potentially dangerous situations!

3. "Stop"

In this state, the unit stops the automatic execution of processes and leaves all control modules fully available to the operator. **Warning. Depending on the type of process this mode can cause no optimal situations for your product since the automatic process execution is stopped!**

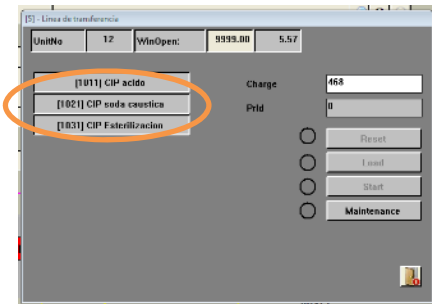
In general all the modules are assigned to one or more process units. This assignment is done in PLC programming, and cannot be manipulated by the operator. Depending on the status of the unit, control modules of the respective unit are released or blocked for manual operations.

6.3 Starting a program

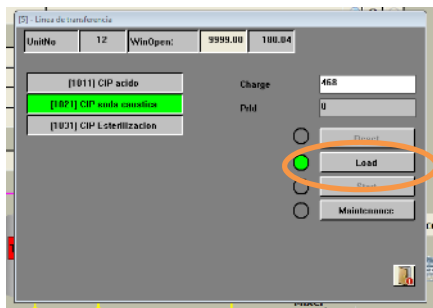
To start a recipe or program in a unit, one must click on the recipe name in the symbol of the unit in the process images.



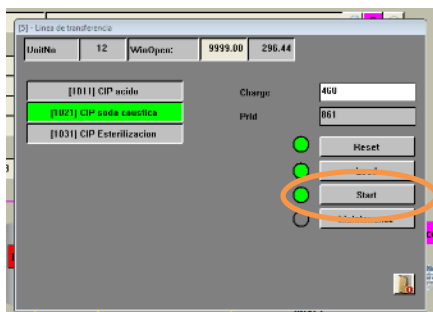
A window opens, in which the operator can choose a Recipe to execute in the selected unit. To start the Units recipe, the unit must be in the "Automatic".



When the program is selected, you can download the program to the unit



When the program is loaded, you can start the sequence. "Start" is available only if the sequence is framed in automatic mode.



Clicking the "start" button, the sequence starts to boot and run the selected program.

6.4 Details of the process

When a process is running a recipe (program), you can open the process detail. This window lets adjust the current nominal values of all defined parameters of a recipe step, and observe the actual values of these parameters.

Each unit has a button with the symbol of a "magnifying glass" that can open the process details.

In this window you can see all the parameters of the current step of the unit.

1. Name and unit current step do

On top of the window

You can see the name of the unit, the current step and the recipe of the unit that is currently selected.

2. Parameter Name and engineering unit

The background color

Changes in accordance with the type of Parameter and thus helps the operator to monitor the process. The parameters can have the following colors:

- **Red**
This color indicates that it is a parameter that controls an alarm condition such as deviations or maximum and minimum limits
- **Green**
This color indicates that it is a parameter "Step end parameter" that controls the end of the step and starts the transition to the next step. Examples of well parameters are: Filling, mixing time,
- **Blue**
This indicates a parameter that requires operator intervention. Generally this type is used for confirmation to do the operator.
- **Gray**
If the background color is gray, it is a normal range without any additional work

3. Nominal value of the parameter

In these two columns one can monitor the Nominal value and the current value of the processes parameters. If the parameter allows it, the nominal value of the parameter can be changed by clicking on the nominal value.

If it is an "enumeration" instead of a numeric value, the window shows the current selection of the list instead of the nominal and actual values. Clicking on this list opens a new window where a new nominal value can be selected from a list of predefined options.

4. List button to open global parameters

With this button the global parameters on a unit are accessible. These values are independent of the action executed in the unit and represent global, recipe independent adjustments of the respective unit.

6.5 Details of the unit

Each system unit incorporates certain internal states, which can be seen by clicking the "Unit Status" button.

The screenshot shows the 'PLC Unit Status Info' window with the following data:

Section	Item	Value
1. Process Status	Unit Active	On
	CIP active	On
	Startposition	On
2. Alarm Status	alarm active	On
	Watchdog Alarm	Off
	Emergency Hold	Off
	Maintenance	Off
3. Message Status	Startposition Error	Off
	Operator Request	Off
4. Hygienic Status	Steril	On
	Clean	Off
	not Clean	Off
	Request CIP	On
Product Status	Product 1	On
	Product 2	On
	Product 3	On
	Product 4	On
5. Time/Cycles without CIP	without CIP maximum:	0123456789 0
	Cycles without CIP actual:	1234
	Time maximum for steril:	0123456789 0
	Time maximum for clean:	0123456789 0
	Time without CIP:	1234
	Active Time:	1234

1. Process Status

Status of the current units. The unit can run a CIP, a program for production or can be in the "Starting Position". This indicates the production state of the current unit.

2. Alarm Status

This indicates the status of the alarm unit. The cause of the alarm is indicated in this table.

- A **"Watchdog Alarm"** means the monitoring time is fulfilled, but the current step is still underway. The process takes longer than normal.
- **"Emergency Hold"** is active if the unit is stopped due to a failure in the emergency stop circuit or an emergency situation has occurred.
- **"Maintenance"** is indicated if "Maintenance" is enabled on this unit. In this mode, the unit cannot be activated and cannot executed any process or recipe.

3. Status Message

This table shows statuses that require operator attention. "Start Position Error" indicates that there is a problem with some control module that the unit should be used during the process, which is in failure mode or unavailable. In this case you should check out the process images to find the module that is not in the correct condition.

4. Hygienic Status

The "Hygiene state" indicates the cleaning status of the current unit. The unit internally maintains a hygiene state, so that the operator can always see if the unit requires a deep cleaning, sterilization or is available for the process. If the user has sufficient access privileges, the hygiene state can also be adjusted manually.

5. Time / Cycle without CIP

Here the maximum cycles or time, from when the unit automatically reduces its hygiene status can be adjusted. This time should be set according to the requirements of the plant. One possible application would be the maximum time that a tank is considered sterile, is two days. In this case the "sterile Maximum Time" is set to 48 hours. When this time expires, the tank automatically changes its status from sterile to clean.

6.1 Unit Process Step View

In this window you can see the steps that are defined in the recipe of the current recipe program. The current step that the PLC is running is marked with green. To open this window should right-click the name of the drive



7 System Windows

7.1 "Tools"

You can open the "Tools" window of the system with tools button in the bottom of the menu bar.



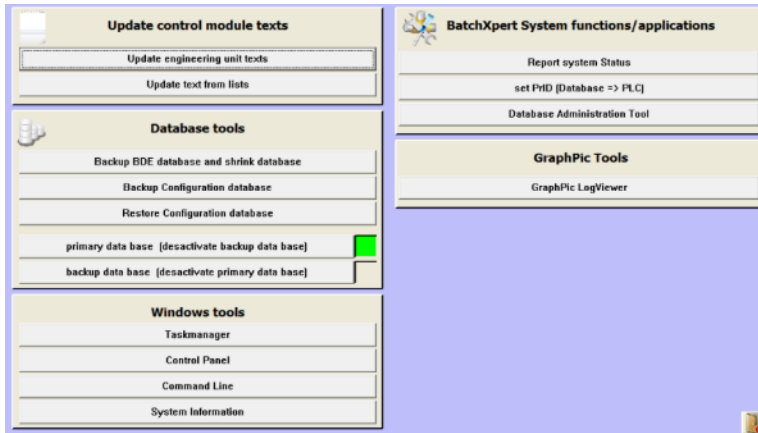
This button opens the basic tools. These have the following options



- 1. Calculator**
Open standard calculator of the operating system (Windows)
- 2. Windows Explorer**
Open the file browser of the operating system (Windows)
- 3. Web Report, Print Report, Excel Report**
This opens the reports of the respective system, if installed and activated on the system. If a report is not enabled, this button has no function.
- 4. Documentation**
This opens a window with manuals and documentation of the BatchXpert system and its subsystems.

7.2 Window "Advanced Tools"

This allows you to change settings, and view the "BatchXpert" system status. This window is only accessible by system administrators.



7.2.1 Update control module texts

This Tool allows you to update HMI texts with texts stored in the data base system. Normally the texts and units of measurement are updated when the system starts. With this function it is possible to update the text of the control modules, when the database is changed data without restarting the entire system.

7.2.2 Database tools

These Tools allow you to perform maintenance tasks on the database system.

The "Backup BDE and shrink databases" runs an automatic backup of the historical database and then deletes old (more than 6 months) of the database In order to free up space on your hard disk.

The selector for primary and secondary database allows to manually activating the second database. This function is only available if this feature is enabled and set to the system.

7.2.3 Windows Tools

This category allows you to start basic and common operating system tools. This tool will not be explained in this manual.

7.2.4 BachXpert System functions / Application

This category allows you to execute special tasks of system maintenance.

With the "System Status Report" button you can get a thorough diagnosis on system performance of the reporting and logging system. Please review the chapter "Communication Overview" For more details.

The "Set Prid (Database => PLC)" button allows synchronizing the PRID (Process identifier) of the database with the ID of the PLC. The PRID is a number which uniquely identifies each process running on the system. When a backup of the PLC is restored, it may happen that the PRID stored in the PLC is not current, and PLC would allocate an already used PRID. In this case you can adjust manually PRID to last that was stored in the database. This function is also automatically activated when the system starts up.

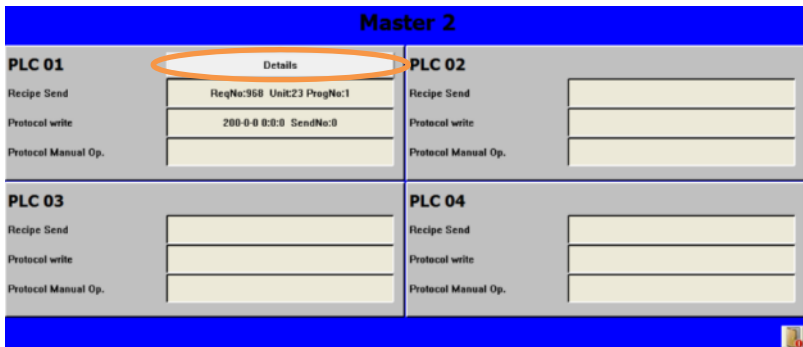
7.2.5 GraphPic Tools

This category allows you to initiate useful tools GraphPic SCADA system. For more details, please refer to the GraphPic documentation.

7.3 Communication Overview

The option "Advanced Tools" -> "System Status Report" opens the systems reporting detail window. This window shows the current activity of the historical data recorder and the recipe downloading algorithm. Shows always the last activity that was executed by the protocols or recipe system for the respective PLC.

In the box "Recipe Send" last recipe that was sent to the PLC is shown and in "Protocol write" and "Protocol Manual Op" show the last historical data record sent to the database. These values help to check the correct operation of the reporting system and recipe sending system.



For more details, you can open more details on systems with the "Details" button.



1. Recipe Request Information

In this section you can get more information about the mechanism of sending recipes to the PLC. The last unit to receive a recipe, for which PRID and Program number it, was. If a Unit is requesting a Recipe, which does not exist in the database, the Unit will be marked as "Error by Unit". In this case you can check the correct operation of the recipe sending.

2. Telegram info

You can see the states of the two buffers for the historical process data and the manual operations. You can see the filling level of the buffer and how many records are currently within. Since each server has its own reporting buffer, you can select the server to look up with the numbered buttons on the top. If a server does not exist, the buffer will fill up and will be marked as Alarm, since there is no server ever receiving the reporting data.

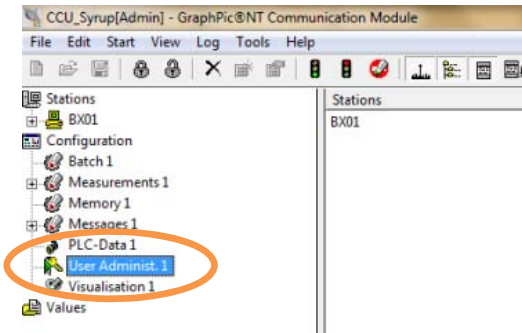
3. Alive Signal Communication

In this section you can see the live signals from all servers connected to the system. To demonstrate its correct operation PLC, each BatchXpert Server permanently sends a

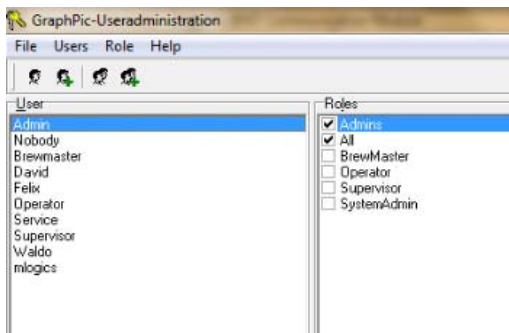
counter to the PLC. The PLC evaluates this counter to know which servers available in the system, and sends it back to indicate the correct function of the PLC.

8 User Management

To access the User Administration, you must open the communication module and the Configuration section should open the "User Administration".

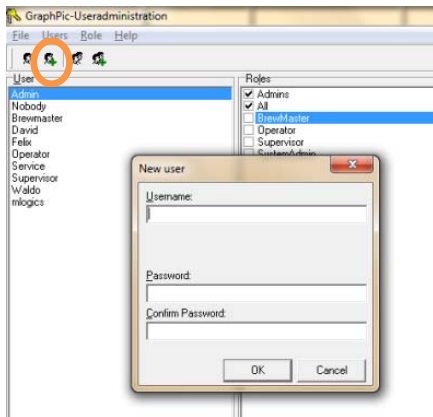


With user management, you can limit the number of users who have access to certain features of the modules contained in the project. User groups are created for this purpose, they receive certain permissions. Individual users can be connected to any of these groups. This gives them all the permissions of the groups that were assigned to them.

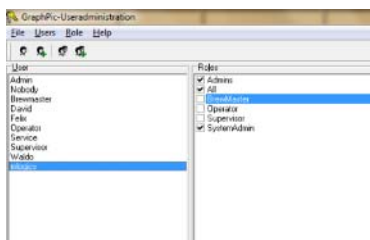


8.1 Create a new user

To create a new user, you must click "New User" at the top of the user administrator. In the popup window, you can enter the name and password of the new user.

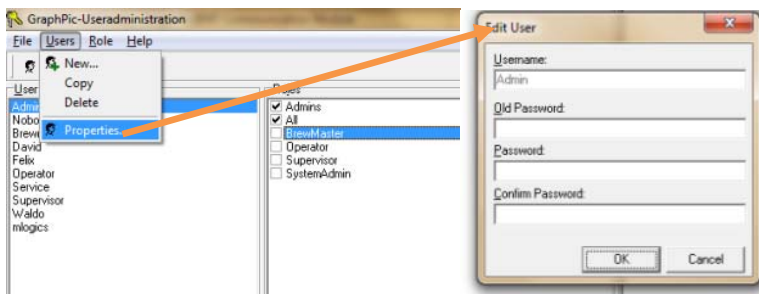


After the new user appears in the list of users where you can assign the roles required for its function.



8.2 Changing the password of an existing user

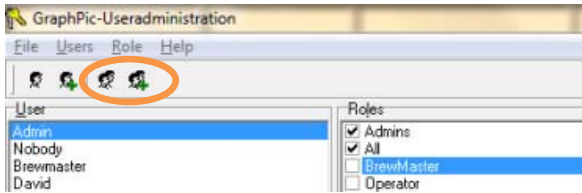
To change the password the user must select the appropriate user from the list on the left and then open the properties of this user.



In the window that opens, you can enter the new user password.

8.3 Create a new Role

Granting access rights is always done for a specific role (group). The standard roles are *Administrator* and *All*. The administrator role has all rights and cannot be edited or deleted. All users belong to the group *All* and this group can also not be deleted. This group defines the minimum rights each user has.



Besides these two roles, you can create any number of additional roles (menu point Role | New). For editing the role, double-click on the respective list entry (corresponds to the menu point Role | Properties) or the corresponding button in the toolbar. The window "Edit role" appears which lets you change the name of the role and activate rights. The left side shows all modules and stations contained in the project. By selecting an entry, the available rights appear on the right.

You can delete roles with the menu point "Role | Delete".

Just like with the roles, there two standard users are Administrator and Nobody.

The administrator is a member of the role Administrators and thus has all available rights. The user nobody can be assigned to any roles. In the system's basic status (after starting the system or logout of a user) the user nobody is always logged on.

You can delete users with the menu point "User | Delete".

9 Hardware (PLC)

The BatchXpert Control System is generally running on Simatic S7 compatible PLCs such as the “Vipa Speed 7” series, the Siemens S7-300 series or the Siemens S7-400 series. All of these PLCs are generally similar, but have some differences. For more details please view the Manuals of the respective CPU installed in the Project. However there are some general considerations common to all S7 compatible CPUs.

9.1 Operating Mode Switch

The **default operation mode for BatchXpert is “Run” or Run-P”** where available. Stop may only be active for specific Maintenance task where a Technician is required.



- With the operating mode switch you may switch the CPU between STOP and RUN.
- During the transition from STOP to RUN the operating mode START-UP is driven by the CPU.
- Placing the switch to MRES (Memory Reset), you request an overall reset with following load from MMC, if a project there exists.

9.2 Memory Reset (Factory Reset)

A memory Reset of the PLC will delete all data stored in the memory of the PLC! This includes ALL data including the process Logic and data. **After a Memory Reset a subsequent Download of the PLC program is ALWAYS required!** For guidance on how to restore a PLC Backup please read the manual “Manual Restore PLC”.

It is NOT recommended to perform Memory Resets without prior clarification of a trained technician. Please keep in mind the following:

- All logic will be deleted until downloaded again into the Controller, which must be performed by a trained technician! This means that there will be NO logic whatsoever running in the controller. No Valve or Motor functionality, not even Manual; No HMI will be able to connect.
- Parameters and Settings of all the control Modules (such as: Regulators, Valves, etc.) will be reset to the values that were set at the time that the backup was taken.
- While restoring a backup, all PLC data and processes will be reset to the time where the backup was taken. This means that all the sequences and ALL processes lose their status and will be reset, making it impossible to continue with a process that was currently underway!
- After restoring the backup the statuses of all processes must be established, the appropriate recipes must be initiated and the units must advance their steps into the corresponding steps.



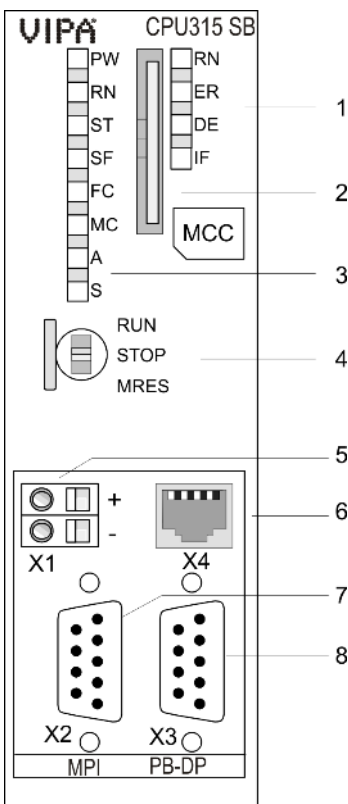
9.3 Battery backup for clock and RAM on “VIPA Speed 7”

A rechargeable battery is installed on every CPU 31xS to safeguard the contents of the RAM when power is removed. This battery is also used to buffer the internal clock. The rechargeable battery is maintained by a charging circuit that receives its power from the internal power supply and that maintain the clock and RAM for a max. period of 30 days.

CAUTION!

Please connect the CPU at least for 24 hours to the power supply, so that the internal accumulator/battery is loaded accordingly. After a power reset and with an empty battery the CPU starts with a BAT error and executes an overall reset. The loading procedure is not influenced by the BAT error. The BAT error can be deleted again, if once during power cycle the time between switching on and off the power supply is at least 30sec. and the battery is fully loaded. Otherwise with a short power cycle the BAT error still exists and an overall reset is executed.

9.4 Hardware of an “VIPA Speed 7”



The following shows the Hardware and LEDs of a Vipa Speed 7 CPU

- 1 LEDs of the integrated PROFIBUS DP master
- 2 Storage media slot (lockable)
- 3 LEDs of the CPU part
- 4 Operating mode switch CPU
- 5 Slot for DC 24V power supply
- 6 Twisted pair interface for Ethernet PG/OP channel
- 7 MPI interface
- 8 PROFIBUS DP/PtP interface

Components 5 - 8 are under the front flap!

9.5 General LED of an “Vipa Speed 7”

The following Table shows the LED stats of a Vipa Speed 7 CPU. The default Status is marked in **Green**.

The “SF (SFAIL)” may be active while a Profibus Slave is missing. Please check the Profibus LED status and the connected Profibus Stations such as Remote IO Stations or Frequency Converters.

RN (RUN)	ST (STOP)	SF (SFAIL)	FC (FRCE)	MC (MMC)	Meaning
green	yellow	red	yellow	yellow	
Boot-up after PowerON					
●	BB*	●	●	●	* Blinking with 10Hz: Firmware is loaded.
●	●	●	●	●	Initialization: Phase 1
●	●	●	●	○	Initialization: Phase 2
●	●	●	○	○	Initialization: Phase 3
○	●	●	○	○	Initialization: Phase 4
Operation					
○	●	X	X	X	CPU is in STOP state.
BB	○	X	X	X	CPU is in start-up state, the RUN LED blinks during operating OB100 at least for 3s.
●	○	○	X	X	CPU is in state RUN without error.
X	X	●	X	X	There is a system fault. More information may be found in the diagnostics buffer of the CPU.
X	X	X	●	X	Variables are forced.
X	X	X	X	●	Access to the memory card.
X	BB*	○	○	○	* Blinking with 10Hz: Configuration is loaded.

on: ● | off: ○ | blinking (2Hz): BB | not relevant: X

9.6 Ethernet LED of an “Vipa Speed 7”

The green L/A-LED (Link/Activity) indicates the physical connection of the Ethernet PG/OP channel to Ethernet. Irregular flashing of the L/A-LED indicates communication of the Ethernet PG/OP channel via Ethernet.

If the green S-LED (Speed) is on, the Ethernet PG/OP has a communication speed of 100MBit/s otherwise 10MBit/s.

9.7 Profibus LED of an “Vipa Speed 7”

The “SF (SFAIL)” may be active while a Profibus Slave is missing. Please check the Profibus LED status and the connected Profibus Stations such as Remote IO Stations or Frequency Converters.

RN (RUN)	ER (ERR)	DE	IF	Meaning
green	red	green	red	
○	○	○	○	Master has no project, this means the interface is deactivated respectively PtP is active.
●	○	○	○	Master has bus parameters and is in RUN without slaves.
●	○	B B	○	Master is in "clear" state (safety state). The inputs of the slaves may be read. The outputs are disabled.
●	○	●	○	Master is in "operate" state, this means data exchange between master and slaves. The outputs may be accessed.
●	●	●	○	CPU is in RUN, at least 1 slave is missing.
●	●	B B	○	CPU is in STOP, at least 1 slave is missing.
○	○	○	●	Initialization error at faulty parametrization.
○	●	○	●	Waiting state for start command from CPU.

on: ● | off: ○ | blinking (2Hz): BB

10 Legal

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