BRAUMAT / SISTAR Operator Manual

BRAUMAT, SISTAR

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1 Introduction

1.1 Target Group

This documentation is aimed at persons involved in the areas of operator control.

1.2 Intended Audience

This documentation provides detailed instructions for operators who need to control and monitor processes using the software product BRAUMAT / SISTAR.

1.3 BRAUMAT / SISTAR Software Structure

The BRAUMAT / SISTAR software consists of the following modules:

- The configuration system:
  - Visualization System
  - Automation System
  - Recipe System
  - Route control
- The runtime system:
  - Visualization
  - Order Management
  - Messages
  - Curves
  - Step protocols

1.4 Abbreviations used

Throughout this document, the following abbreviations are frequently used:

Table 1-1

Abbreviation	Complete name	Description
ICM	Individual Control Module	Valves, pumps and motors
BLR	Binary Logic Result	Configuration and online representation of connection logics
OP-REQ	Operator Requests	Requests which need interaction and must be confirmed by the operator
ROP	Recipe Operation	A block/step in the recipe on the recipe server
EOP	Equipment Operation	An assigned function on the automation system representing the recipe operation
RCS	Route Control System	Route control
PCU	Process Control Unit	Responsible for the coupling between AS and OS or OS and OS
IOS	Information- and Operation System	Server or Client Station

2 BRAUMAT / SISTAR Application Center

The Application Center is used for the overview and selection of all selectable applications of the system. For the Plant Operations the tabs Production and Archives are used. The Application Center can be started from the desktop by clicking on the following button:

Table 2-1

Application (Production)	Symbol	Function
Process diagrams	 Process diagrams	Used as Runtime System to visualize, operate and control the entire production plant.
Sequence control	 Sequence control	Used for the representation of the current state of the process cells. In addition, it is possible to select and to operate the individual units. With this, the user can intervene in the current process and influence the different processes.
Order management	 Order management	Used to create, process, track and monitor orders and batches.
RCS online	 RCS online	Used for planning, processing and the diagnosis of routes. It allows controlling and monitoring in an easy and transparent manner.
Recipe management	 Recipe management	Used for the generation and administration of the recipes, e.g. changing parameter values.
Recipe online	 Recipe online	Used to visualize the processing steps of the control recipes. Based on the recipe procedures, the recipe system generates the control recipes by substituting the process/order parameters with the current master recipe/order parameters.
Batch trends	 Batch trends	Used for a graphic output of measured values. It enables the time display of archived or running curve values as diagrams on the screen. Measurement value curves can be loaded from different area servers via an area selection dialog.

Application (Production)	Symbol	Function
Step protocols		Used to view and print Step log files.
Changes and messages		Used to display and print messages as well as any recorded process operations and configuration changes from the same time period.
Maintenance		The application maintenance data is used for default, checking and acknowledging maintenance intervals, e.g. Maintenance data for ICMs Maintenance data for user aggregates
Special Values		The application “Special values” is used to define and edit of up to 511 special values.

2.1 Language Selection

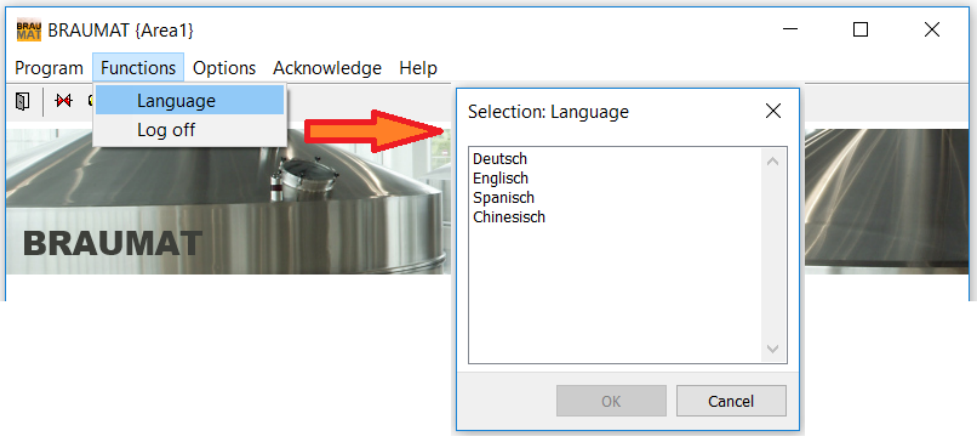
In the delivery version of the system the languages, 'German', 'English', 'Spanish' and 'Chinese' are available. Upon request, other languages can also be created and supplied.

To change the language, navigate to the “Menu > Functions > Language”.

A new dialog opens where the new language can be selected and applied with the “OK” button.

After a new language was selected the BRAUMAT / SISTAR system application need to be restarted.

Figure 2-1



3 Process Mode - User Interface

3.1 Introduction

This chapter gives you an overview over the basic handling of BRAUMAT / SISTAR and introduces you to the most important functionalities how to control and observe the running process.

3.2 Basic Tasks of the User Interface

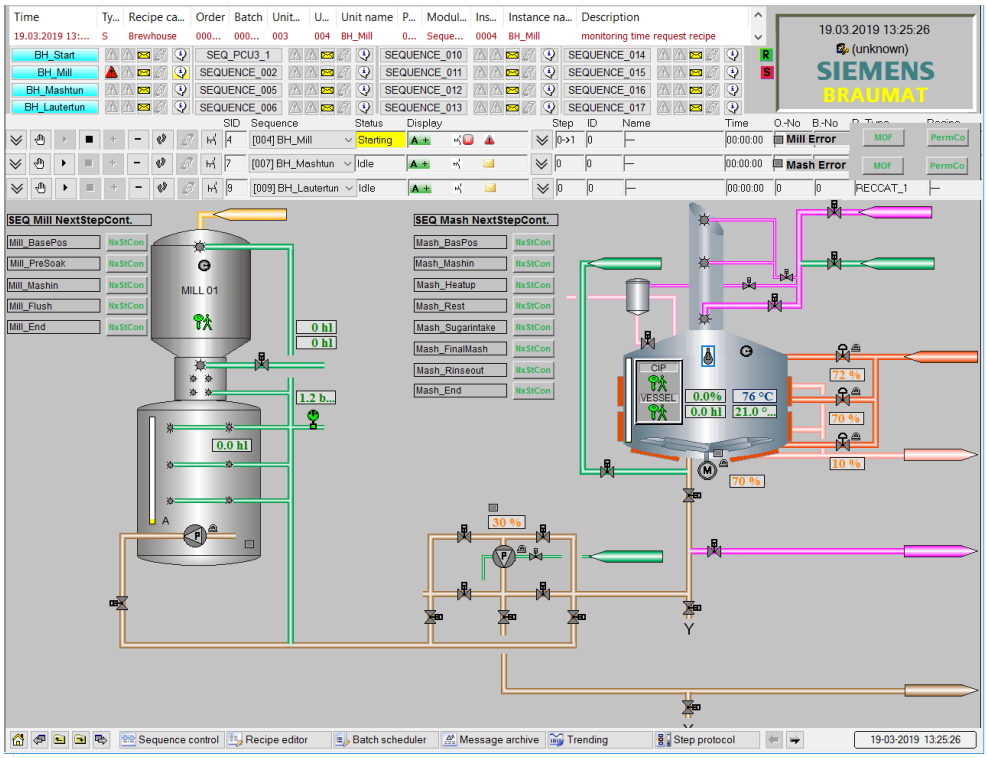
In principle, the OS user interface provides the following tasks in process mode:

- Continuous overview of the entire plant and the corresponding units
- Focusing the plant operator's attention to possible problems
- Quick change of pictures and explicit selection of the process pictures, e.g. in which errors have occurred.
- Fast operator control sequences using operator buttons at standardized positions.
- Actual status of the current Batches

3.3 Typical Layout of the User Interface

In general, the BRAUMAT / SISTAR user interface is configurable and could therefore vary in different projects. The Screenshot below is showing a typical user interface where all the necessary information's are available to control the process easily. The different sections of the example are described in the next chapters.

Figure 3-1



3.4 Overview Area

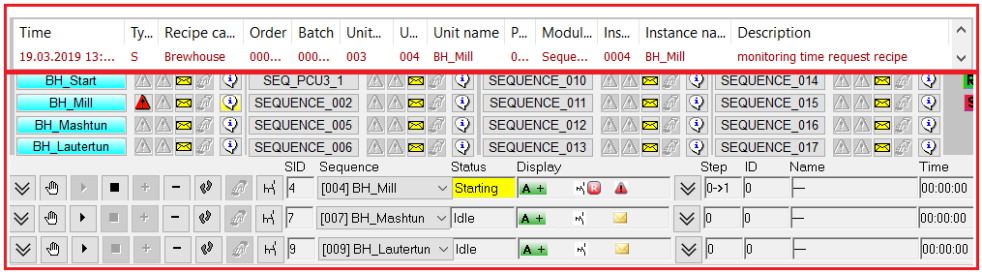
The upper part of the screen is divided into 2 area panels:

- The top part is showing the “Message control faceplate” which informs the operator about all relevant Alarms and Messages.
- The bottom part is showing the “Smart unit faceplates”. Each faceplate is representing one Unit.

Error messages, warnings, process messages and operation messages are displayed as icons and can be reset and acknowledged.

You can jump directly to process picture of the Unit by clicking on it.

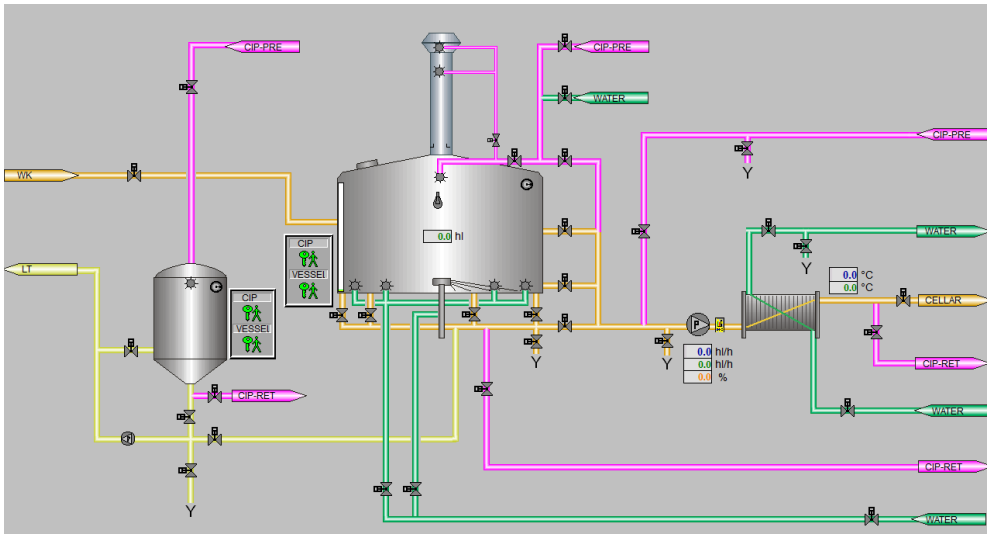
Figure 3-2



3.5 Work Area

The so called “Work Area” is the center part of the process image and visualizes the actual process information for the related units, equipment’s and control modules. Additionally, it gives the operator the possibility to interact with the process.

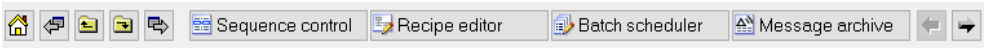
Figure 3-3



3.6 Button Area

The button area allows the operator to access several other Applications, e.g. the Archive System or Step protocol directly from the process picture.

Figure 3-4



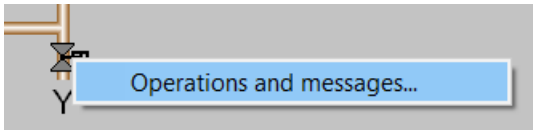
3.7 Appearance of the Cursor during Operation

The operator can interact with the process by moving the mouse cursor to an object, e.g. button, button or faceplate. If the object is operate-able the normal cursor turns into a “Hand” cursor. By left clicking on the object the configured actions will be carried out, e.g. open a Valve faceplate.

Figure 3-5

By right clicking on an object a further dialog named “Operations and Messages” appears which will guide you directly to application “Message Archive”. See chapter 8.2 Message archive for more details.

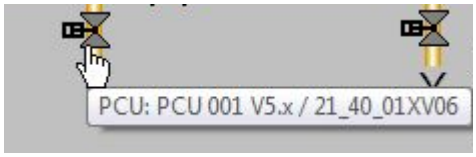
Figure 3-6



3.8 ToolTip Function

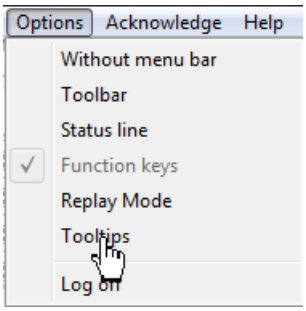
A Tooltip is a message which appears when a cursor is positioned over an object, e.g. a Block icon. In BRAUMAT / SISTAR context the Tooltip is showing the PCU number and the instance name.

Figure 3-7



The tooltip functionality can be enabled / disabled from the Process Diagrams “Menu bar > Options > Tooltips”.

Figure 3-8



3.9 Common Functions

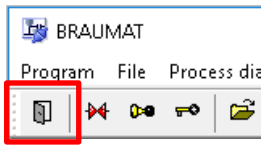
BRAUMAT / SISTAR consists of several applications. In this section, functions which are common to all of them are described. If needed, the common functions can be displayed or hide from the “Menu bar > Options > Toolbar”.

Exit the program

To exit the current program:

- Click the corresponding icon (see image),

Figure 3-9



or

- Press “Alt” + “F4”,

or

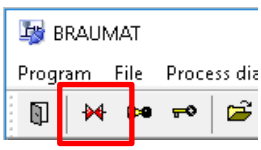
- From the Menu, navigate to “Program” and select the entry “End”

ICM (Valve, Motor) - acknowledge fault

To acknowledge all pending ICM alarms:

- Click the corresponding icon (see image),

Figure 3-10



or

- Press “F11”,

or

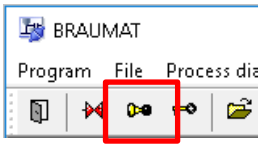
- Select the entry menu item “Acknowledge > Acknowledge ICM errors”

Acknowledge horn

To reset the alarm device (lamp, horn):

- Click the corresponding icon (see image),

Figure 3-11



or

- Press “F12”,

or

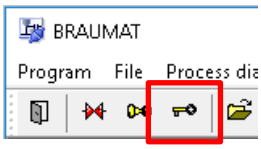
- Select the menu item “Acknowledge > Acknowledge horn”

Log Off

To Log Off from the BRAUMAT / SISTAR System:

- Click the corresponding icon (see image),

Figure 3-12



or

- Select the menu item “Functions > Reset Password”

The current user will be logged out, and logged files are not registered under this user anymore.

3.10 Symbolic Icons in the Process Picture

Next to the individual devices, one or more additional icons may be displayed in the process picture, indicating the device status.

Table 3-1

Priority	Icon	Meaning
1.		Affected by Maintenance (ABM)
2.		In maintenance
3.		Manual operation active
4.		„Force release“ active
5.		„Simulation feedback“ active
6.		Interlock is active, Device could not be switched on or operated

Example for a device status: “Manual operation active, ‘Force release’ active”:

Figure 3-13

3.11 Working with Tags and Variables

Tags are names given to various project components, like valves, motors and controllers. A tag uniquely identifies the corresponding object.

3.11.1 Searching for Variables and Objects in Project Pictures

With BRAUMAT / SISTAR it is possible to search for objects used in the project by means of their tags. Searches can be performed in scope off the current picture (local tag search) or in scope off all pictures (global tag search).

Searching within a picture

To start a local tag search, do one of the following:

- Click the highlighted icon,

Figure 3-14

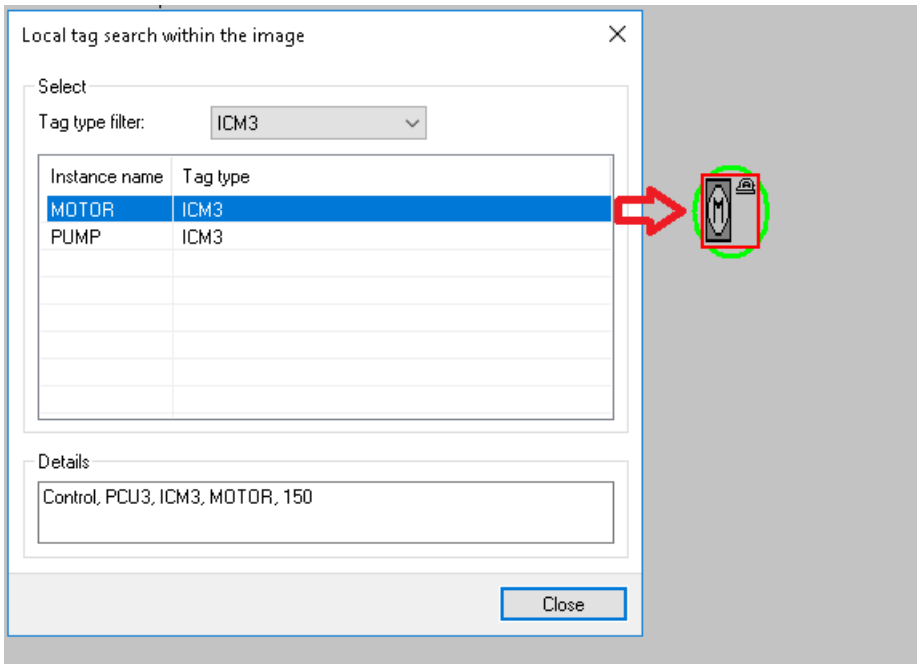
or

- Click the menu item “Process diagrams > Tag search > Within picture”

A dialog box opens which lists all tags in the current picture, sorted by their name. You can use the dropdown list “Filter” to limit the displayed tags to specific types.

Selecting one of entries in the main list will highlight the corresponding component in the process picture.

Figure 3-15



Global Tag search

To start a global tag search:

- Click the highlighted icon,

Figure 3-16

or

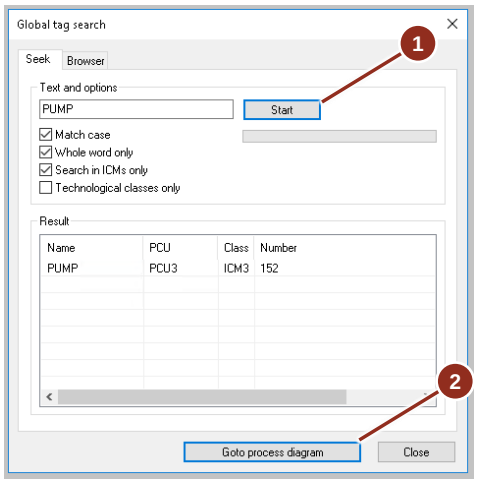
- Click the menu item “Process diagrams > Tag search > Global”

A dialogue with two tabs “Seek” and “Browser” will open.

Select the “Seek” tab to search for a specific string across the project.

1. By entering the tag name in the “Seek” field and clicking on the “Start” button (1), the “Result” section will show matches to the search term.
2. Additional filter options will help you to limit the result set.
3. Click the button “Goto process diagram” (2) to automatically jump to the Process Diagram in which the tag was found and highlight the object.

Figure 3-17

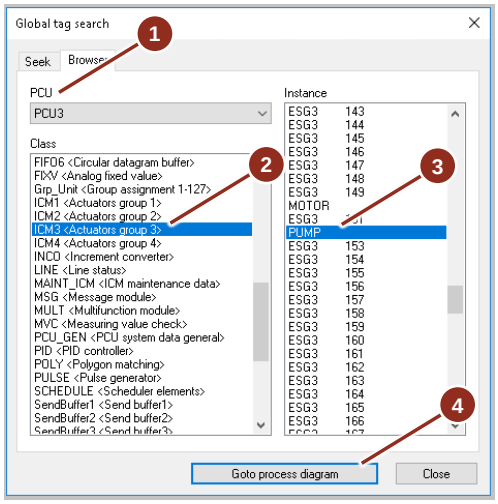


Alternatively, select the “Browser“ tab to browse through the whole project.

The dropdown list “PCU” (1) and the “Class” list (2) allow you to filter the tags in the project.

The Instances list (3) will be immediately updated with the tags which match the filter criteria.

Figure 3-18



Click the button “Goto process diagram” (4) to automatically jump to the Process Diagram in which the tag was found and highlight the object.

Click “Goto process image” and the image of the corresponding tag will open.

3.11.2 Tag Information

To display the information associated with tags in the current picture:

- Click the highlighted icon,

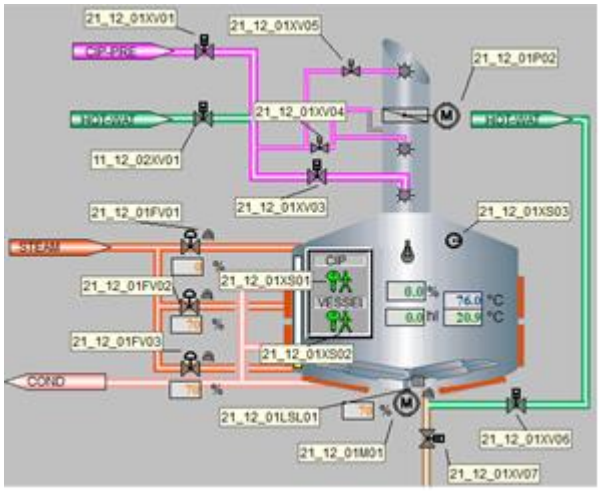
Figure 3-19

Or

- Click the menu item “Process diagrams > Tag information”

As a result, the tags of all components are superimposed on the current picture:

Figure 3-20



3.11.3 Setting Bit Variables (for Switches and Selections)

Depending on the configuration of the project there are two ways to set/reset a bit variable

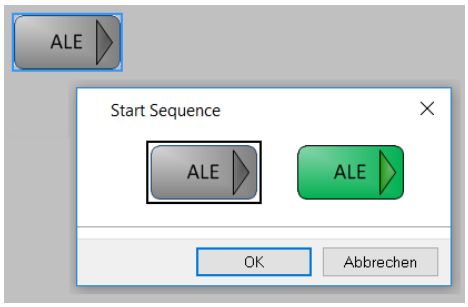
- Directly by clicking onto the Button in the process picture,

Or

- Indirectly, by clicking onto the Button in the process picture a further dialog box opens where the operator can set or reset the corresponding bit variable, see below:

You can either set or clear the corresponding bit flag. Confirm your selection by clicking the “OK” button

Figure 3-21



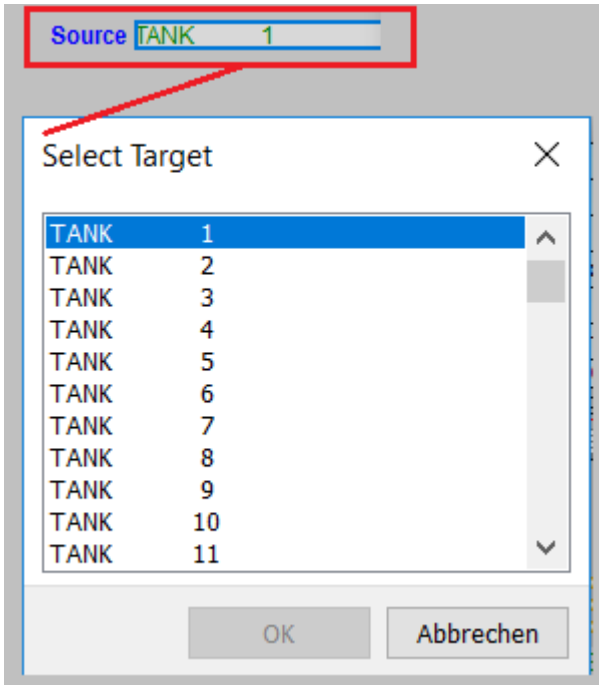
3.11.4 Setting Text Variables

Double-clicking on a text variable opens a dialog box.

The “Selection” dialog shows a list of predefined texts for the corresponding variable.

Chose the desired value with a single mouse click and confirm your selection by clicking the “OK” button.

Figure 3-22



3.12 Binary Connection Logic (BLR)

The "Binary Connection Logic" application provides a graphically representation of connection logics to the operator for fast and easy diagnostics and troubleshooting of a logic operation status (inputs, interim results/gate and output) which are typically used for Interlock purposes.

If the input value(s) or the output value of the logical operating results to “FALSE” the element is displayed in red color, otherwise in green color.

Figure below is showing an example of the BLR object where the logical operation results to “FALSE”.

Figure 3-23

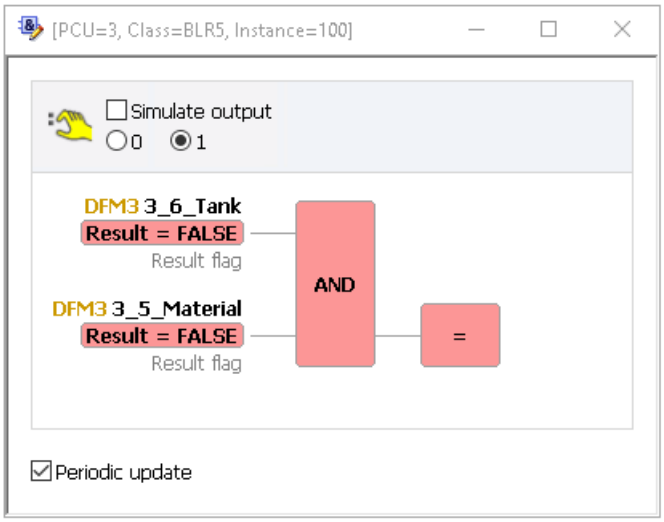
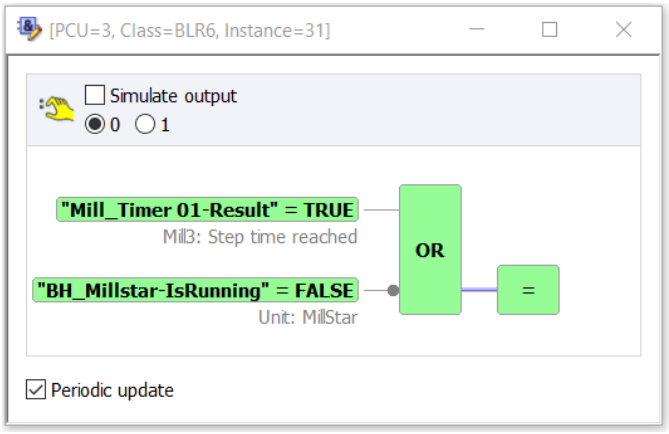


Figure below is showing an example of the BLR object where the logical operation results to “TRUE”.

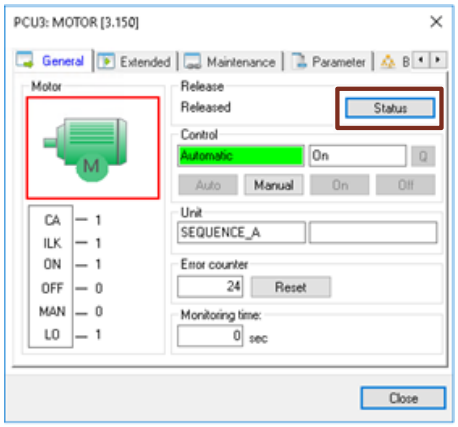
Figure 3-24



Depending on the context of use, it could be opened by one of the following applications:

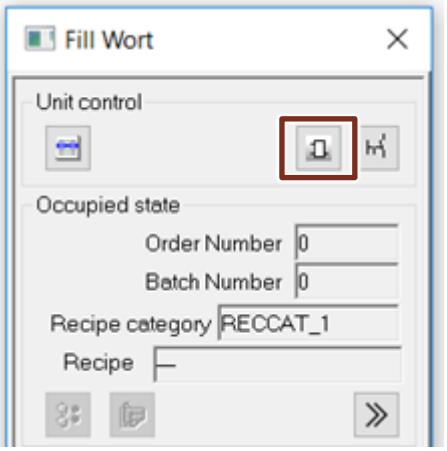
- From the ICM faceplate by pressing the button “Status” in the release section

Figure 3-25



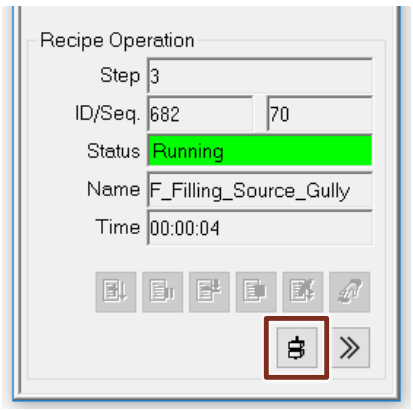
- From the Unit faceplate by using the command “Permanent condition” (Sequence Interlock)

Figure 3-26



- From the Unit faceplate by using the command “Next Step condition“ (Step Interlock)

Figure 3-27



4 Faceplates

4.1 Introduction

Faceplates are pop-up windows that appear when the user left-clicks on an object on the image such as a valve or pump. The resulting pop-up window can be used to issue commands to the device or to switch between automatic and manual mode.

4.2 Individual Control Elements (ICM) Faceplate

For the monitoring, control and simulation of Individual Control Elements (valves and motors) a faceplate is available. The faceplate is displayed by double-clicking the corresponding element symbol.

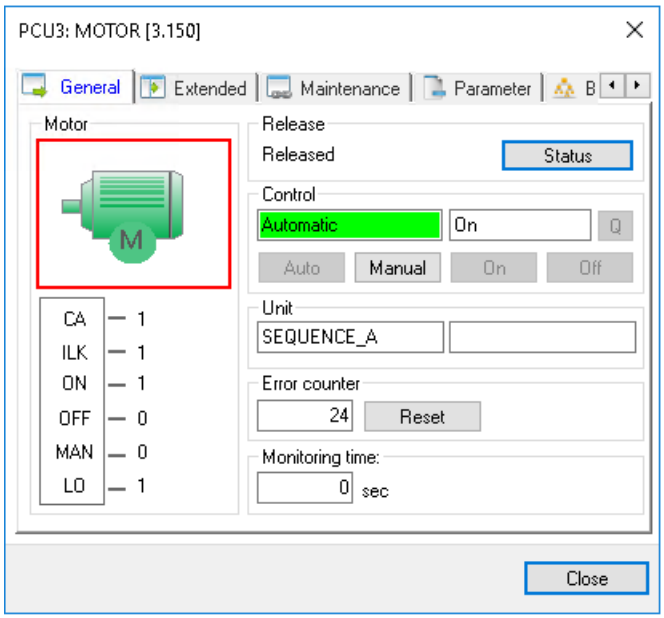
The faceplate dialog provides five tabs:

- General
- Seat lifting (optional)
- Extended
- Maintenance
- Parameter
- Batch
- About

Tab “General”

The tab “General” gives an overview over the current state of the ICM and allows the basic control of it.

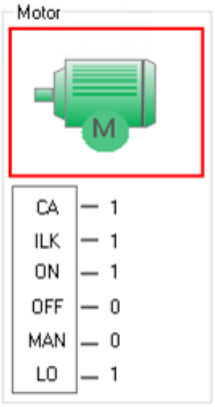
Figure 4-1



Status Overview Section

In the left part of the faceplate, the status overview of the ICM is displayed by the meaning of six status bits.

Figure 4-2



Their respective meanings are:

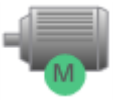
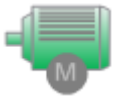
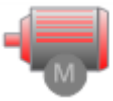
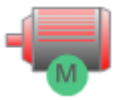
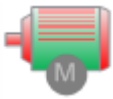
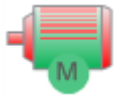
Table 4-1

Abbrev.	Meaning	Value = 1	Value = 0
CA	Command automatic, Control of the user program or procedure	activate	deactivate
ILK	Operating Interlock	Enabled, ICM can be switched on.	Locked, ICM is automatically turned off and locked.
ON	Feedback ON of ICM	On	
OFF	Feedback OFF of ICM	Off	
MAN	Manual mode	Mode is Manual	Mode is Automatic
LO	Load output	Active	Inactivate

Additionally, the displayed symbol of the ICM is indicating whether the ICM is switched on or off or if a possible error is active. The table below is illustrating the symbols and their meaning.

NOTE Depending on the project configuration the representation of the symbols and their meaning could vary.

Table 4-2

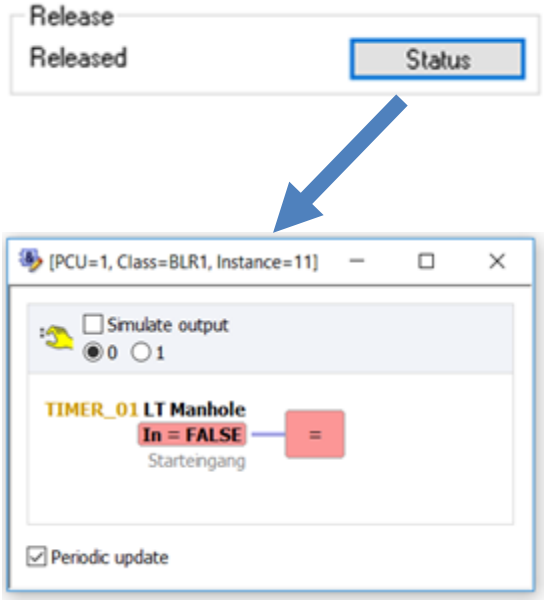
Symbol	State
	Off
	Command Off
	Command On
	On
	Error Off
	Error Command Off
	Error Command On
	Error ON

Release Section

The interlock status of the ICM is shown in the release section.

Possible values are “released” or “locked”. By clicking on the status button a separate window opens which displays the binary logic that caused the interlock.

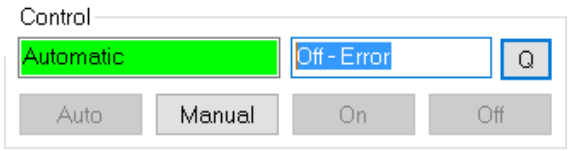
Figure 4-3



Control Section

In the control section the operator mode can be switched between automatic and manual mode via the corresponding buttons. The actual operation mode and state of the ICM is displayed. The ICM can be switched to “On” or “Off” by using the corresponding buttons. If active, the current fault of the ICM (for example no feedback or expired timeouts) could be acknowledged by clicking the button "Q".

Figure 4-4



NOTE Depending on the configuration, it may be that Handgroups are used in the project. Handgroups have an influence of the behavior when switching between automatic and manual mode. In this case, a combination of objects can be switched simultaneously. This can affect the current process.

Unit Section

In the unit section the configured units are displayed. Each ICM can be assigned to up to two units. The unit which has requested a route is displayed in the second field when the ICM is occupied by a Route Control Server. When no unit assignment has been configured, the RCS unit is displayed in the left field.

Figure 4-5

Error Counter Section

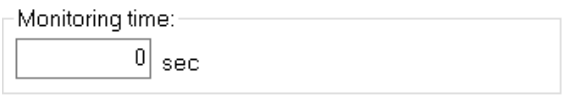
The number of monitoring time violations is displayed in the error counter section. The counter can be reset by pressing the "Reset" button.

Figure 4-6

Monitoring Time Section

A monitoring time is the maximum time that can be used to complete an action, e.g. until a valve reaches its end position. After that time a fault for the ICM will be generated. The monitoring time section is providing the number of seconds till the monitoring time expires.

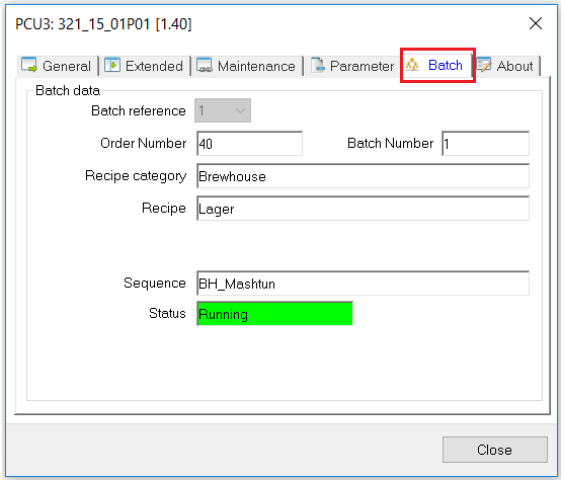
Figure 4-7



Tab “Batch”

The “Batch” tab is providing detailed information about the batch running on the sequence to which this ICM is assigned.

Figure 4-8



Tab “Seat lifting” (optional)

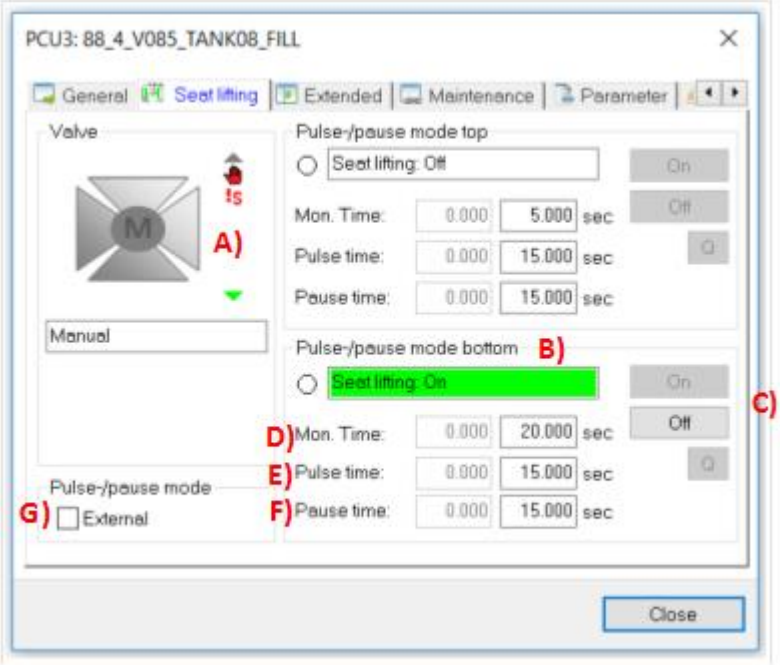
The Seat Lifting tab is visible if the ICM control is interconnected to an instance of the class "SLB" (seat lifting). Otherwise this tab is invisible.

In this tab the additional activations of the corresponding seat lifting top and bottom for double seat valves can be visualized and operated.

The following functions are available, while b) to f) is available for top and bottom mode separately.

a) Block symbol, signaling the seat liftings and display of the operating mode (manual, simulation, error)
b) Display field seat lifting on, off, locked
c) Command buttons On, Off, Q (acknowledge error)
d) Monitoring time in seconds
e) Pulse time current and setpoint in seconds
f) Pause time current and setpoint in seconds
g) "External" selection box for pulse/pause mode

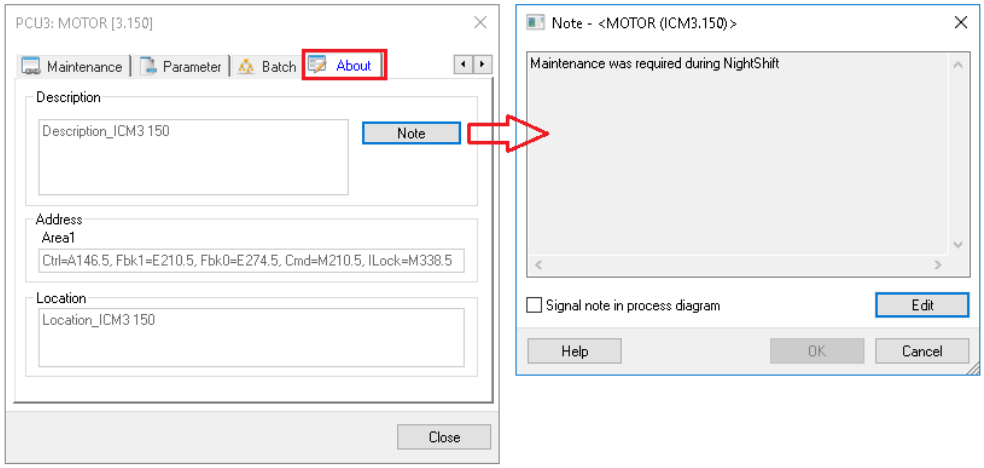
Figure 4-9



Tab “About”

If configured, the tab "About" is providing additional information’s, e.g. description, address and location information. Furthermore, the operator has the possibility to leave free configurable information’s by using the “Note” button as displayed below.

Figure 4-10



Tabs “Extended”, “Maintenance”, “Parameter”

The above-mentioned tabs are not in scope of a typically operator work and therefore not described in this document.

4.3 Digital Faceplate

This faceplate is used for the monitoring and simulation of digital inputs, e.g. for sensors, swing-bend, etc. The digital inputs will be passed through timers to debounce the input signals.

The faceplate dialog provides three tabs:

- General
- Parameter (not in scope of a typically operator work and therefore not described in this document)
- About

Tab “General”

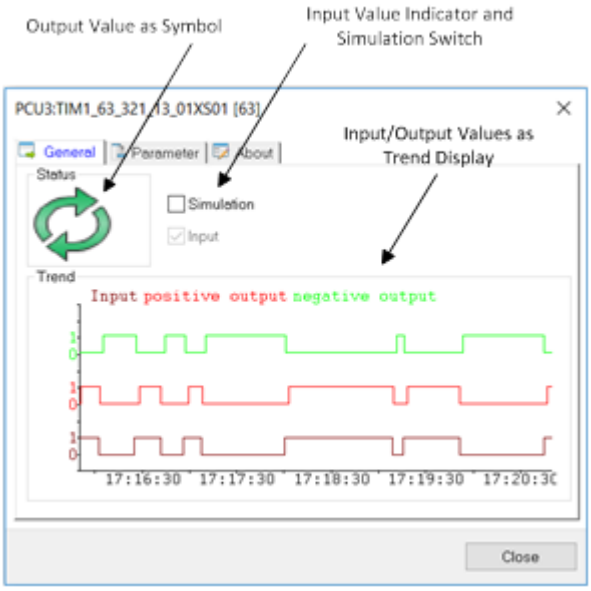
The tab “General” gives an overview of the state of the digital inputs and outputs as symbol indicators and as trend display. Setting the checkbox “Simulation” allows simulating the input value. While the simulation is running, a red exclamation mark “!” is displayed to indicate that the simulation is currently active.

NOTE The simulation feature should be handled with care to avoid unwanted behavior.

Tab “About”

In the tab "About", general configuration information is displayed (description, address, location).

Figure 4-11



Symbolic Representation in the Process Image

While the simulation is running, a red exclamation mark “!” is displayed to the right of the device symbol in the process picture.

Figure 4-12

4.4 Analogue Faceplate

The faceplate is used to monitor and simulate analogue input and output values, e.g. temperature or pressure measurements.

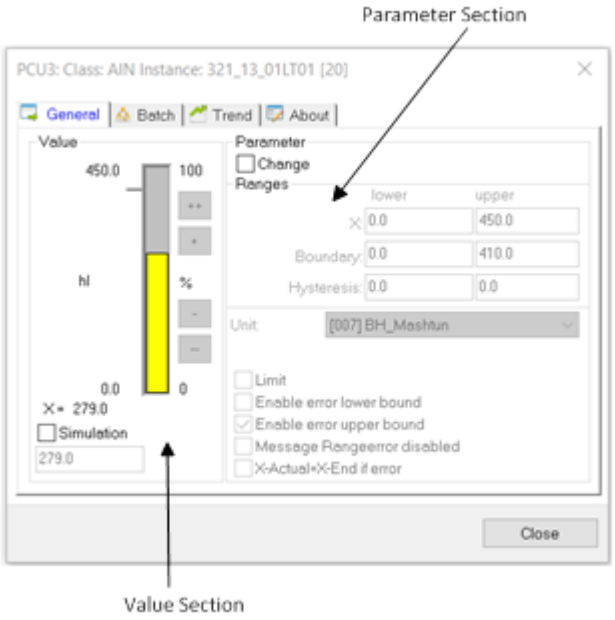
The faceplate dialog provides four tabs:

- General
- Batch
- Trend
- About

Tab “General”

In the tab "General", the analogue values are displayed numerically and as a vertical bar graph.

Figure 4-13



In the “Value” section, the current value and the limit values are shown.

Selecting the checkbox "Simulation" will use simulated analogue values. They can be modified manually by direct input or through the buttons to the right of the bar graph:

Table 4-3

Button	Effect
„+ +“	Large increase
„+“	Small increase
„–“	Small decrease
„– –“	Large decrease

NOTE The simulation feature should be handled with care to avoid unwanted behavior.

In the “Parameters” section the relevant parameters such as range, limits and flags can be changed if the corresponding checkbox is activated. The “Parameters” section is not in scope of a typically operator work and therefore not further explained in this document.

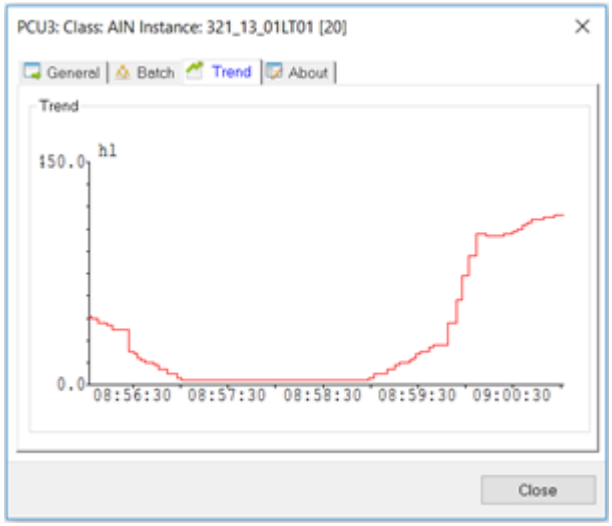
Tab “Batch”

The “Batch” tab is providing detailed information about the batch running on the sequence to which this ICM is assigned.

Tab “Trend”

The “Trend” tab is displaying a curve of the analogue value.

Figure 4-14



Tab “About”

In the tab "About", general configuration information is displayed (description, address, location).

Symbolic Representation in the Process Image

While the simulation is running, a red exclamation mark “!” is displayed to the right of the device symbol in the process picture.

Figure 4-15

Figure 4-16

4.5 Controller Faceplate

The faceplate is used to monitor and simulate PID- and Three-Step controllers.

The faceplate dialog provides five tabs:

- General
- Parameter
- Batch
- Trend
- About

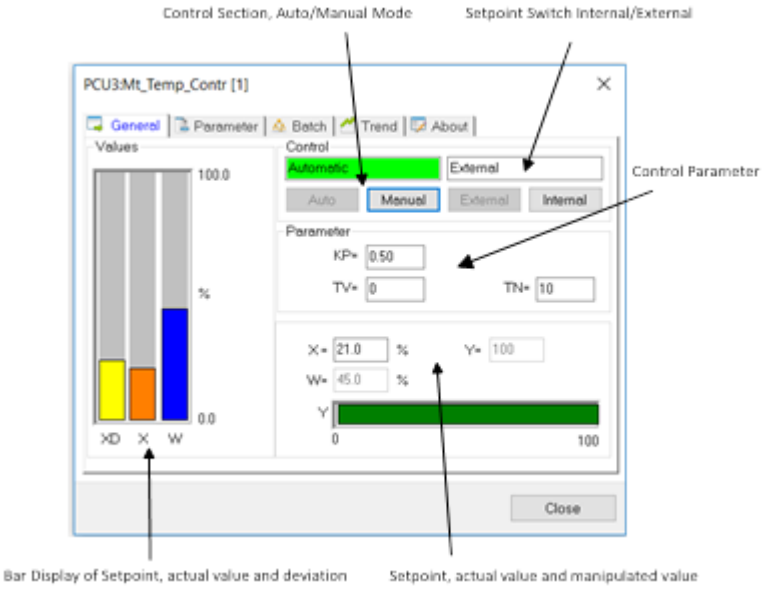
Tab "General”

In the tab "General" all the relevant control values and parameters can be displayed and set. In the faceplate, the following variable names are used:

Table 4-4

Name	Meaning
KP	Proportional gain
TV	Rate time
TN	Reset time
X	Actual value
Y	Process value (output)
W	Set point
XD	Deviation actual value/set point

Figure 4-17



The “Control” area in the right part of the faceplate is divided into four sections:

1. In the top left section, the buttons “Auto” and “Manual” toggle between automatic and manual operation.
2. In the top right section, the source of the PID set point is chosen. “External” will use the configured value “Source”. “Internal” enables manual control of the set point “W” (see 4).
3. In the “Parameters” section, the PID parameters “KP”, “TV”, and “TN” can be set.
4. In the bottom area, the set point “W”, actual value “X” and process output value “Y” are displayed. If the intern/extern selector switch at the top (see 1) is set to “Internal”, then the set point “W” can also be changed here.

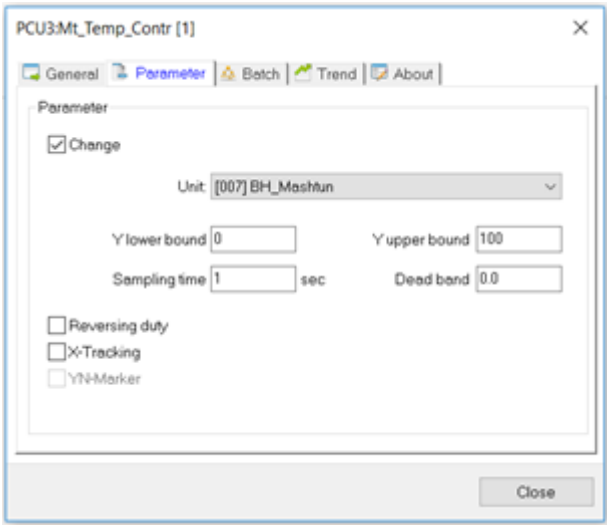
Tab "Parameter"

The “Parameter” Section is not in scope of a typically operator work. Controller parameters like limits, sampling, dead band, etc. can be changed here. The controller can be set to reverse and X-tracking.

If the YN flag is set the controller switches off and a fixed value defined in the parameter YNF is transferred to the output. In operation mode X-Tracking (XTR = "1") the internal target value is adjusted to the actual value of XIST. This renders possible a smooth transfer from external to internal tracking. If the “Reversing duty”

flag is set an increase of the actual value will result in a decrease of the output and vice versa.

Figure 4-18



Tab “Batch”

The “Batch” tab is providing detailed information about the batch running on the sequence to which this ICM is assigned.

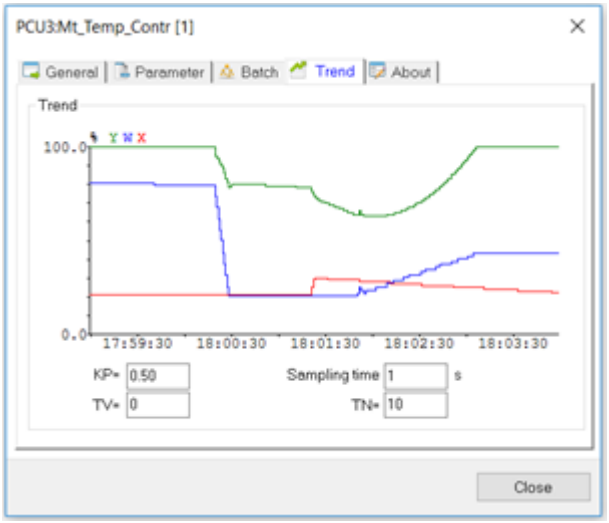
Tab “Trend”

The tab “Trend” displays trend curves for:

- Process output value “Y”,
- Set point “W”, and
- Actual value “X”

Furthermore, the controller parameters “KP”, “TV”, “TN” and the sampling time are displayed.

Figure 4-19



Tab “About”

In the tab "About", general configuration information is displayed (description, address, location).

Symbolic representation in the process picture

To display the current status of the device in the process pictures, the following icons are used:

Table 4-5

Icon	Controller State
	“Manual“
	“Internal“

4.6 Entity Faceplate

The Entity faceplate is providing the following features

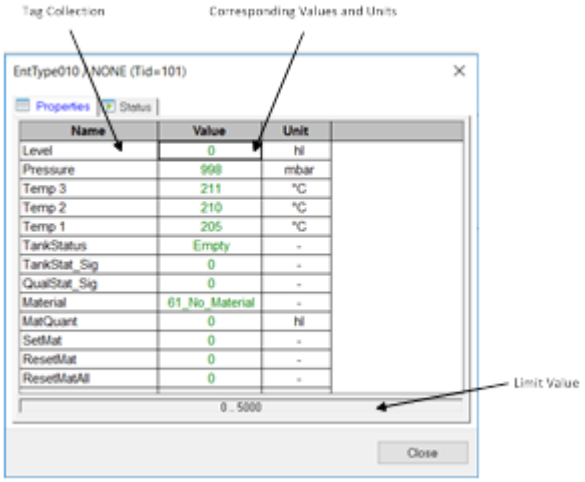
- Collection of important values via templates as one dataset
- Read-only or read-write
- Display of value, text or bit-related text
- Customized status display

The faceplate dialog provides two tabs:

- Properties
- Status

Tab "Properties"

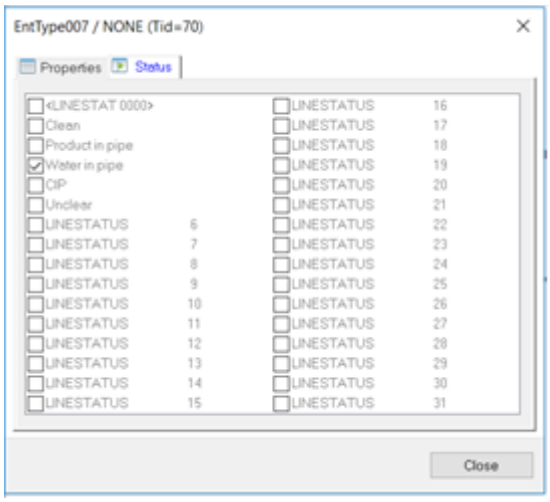
Figure 4-20



Tab "Status"

The Status tab is showing bit-related text:

Figure 4-21



4.7 Tank Faceplate

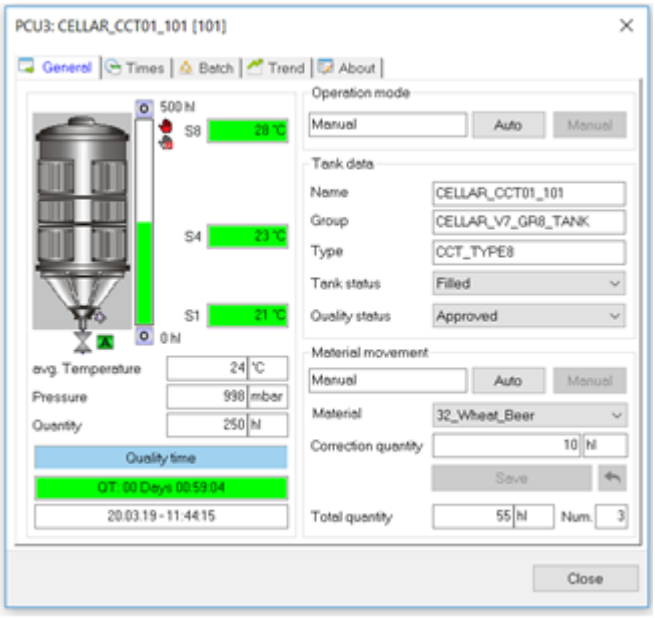
The faceplate manages the Tank status and provides runtime monitoring information's with interfaces and messages for process and quality status, including an operating and monitoring interface.

The faceplate dialog provides five tabs:

- General
- Times
- Batch
- Trend
- About

The figure below is showing an example of the tank faceplate.

Figure 4-22

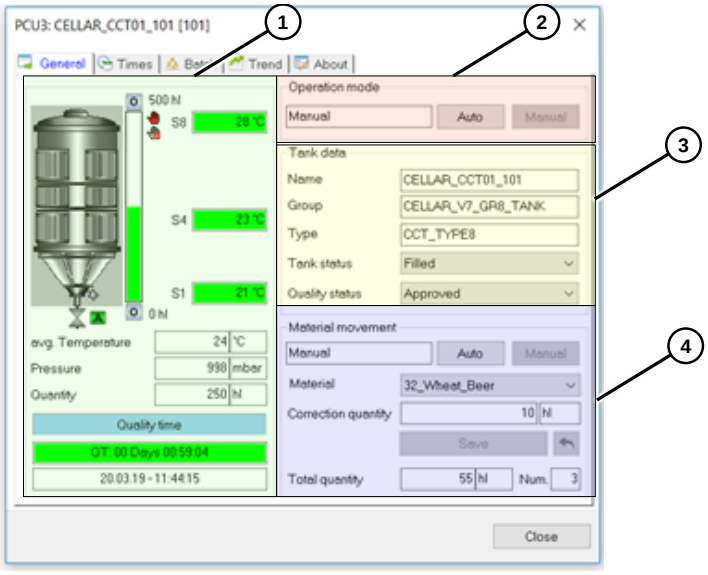


Tab “General”

This tab features four main sections:

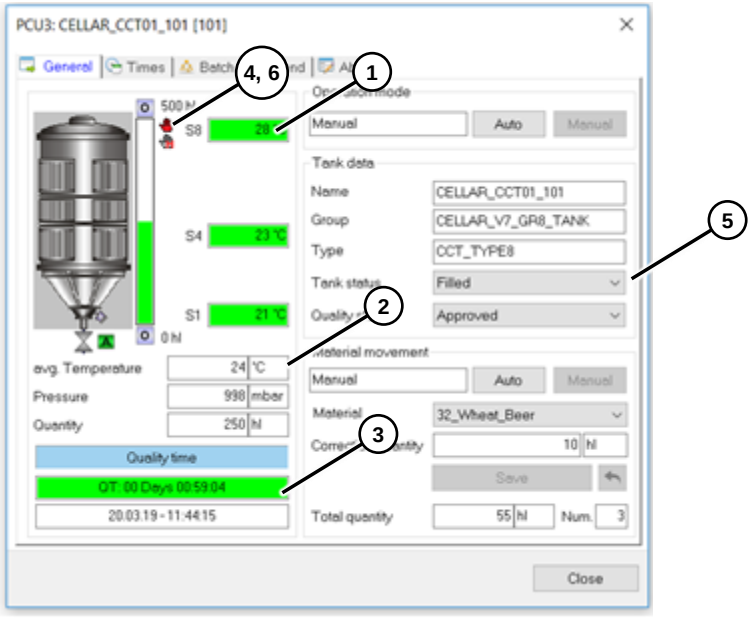
1. Actual value display
2. Control mode
3. Tank data section
4. Material movement section

Figure 4-23



The individual sections contain the following displays/control elements:

Figure 4-24



- Actual value display

1. Visualization of up to 8 temperature zones
2. Three standard values: avg. temperature of the temperature zones, pressure and quantity of the tank
3. Display for monitoring the remaining time of the material quality after a change of the quality and/ or tank status. Additionally, the start timestamp of the change is displayed.

- Control mode

4. Auto/Man operation mode
   In manual mode the quality and tank status of the tank data section could be changed.
   A red hand symbol is indicating that the operating mode is set to manual

- Tank data section

5. Tank description displaying the tank name, group and type data.
   Tank status and quality status information which influencing the Quality, Cleaning and Sterile monitoring timers

- Material movement section

6. In manual mode the material and the correction quality value could be set and the Save Button is operable. Otherwise this information will be provided by the automation system.
   A gray hand/ red M symbol is indicating that Operating mode is set to manual

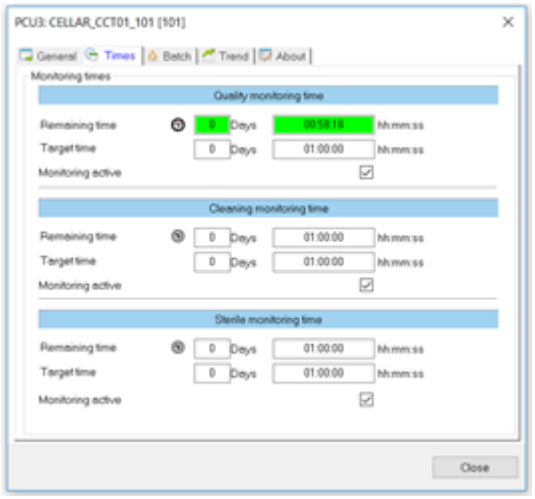
Tab “Times”

The monitoring times for the "Quality status" and for the status "Clean" and "Sterile" are displayed and could be activated in this tab.

Depending on the value of the tank status and quality status the according monitoring time will become active.

The target time is displaying the set point value how long the according state material is valid. The remaining time is displaying the actual value until the according state expires.

Figure 4-25



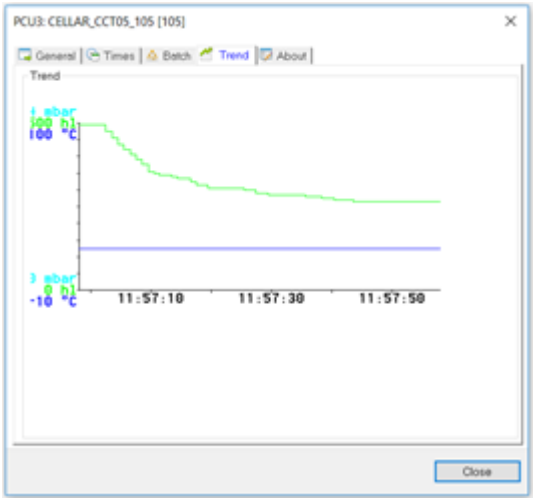
Tab “Batch”

The “Batch” tab is providing detailed information about the batch running on the sequence to which this ICM is assigned.

Tab “Trend”

The “Trend” tab could display tank values, temperature, pressure, quantity as curve display.

Figure 4-26



Tab “About”

If configured, the tab "About" is providing additional information’s, e.g. description, address and location information. Furthermore, the operator has the possibility to leave free configurable information’s by using the “Note” button.

4.8 Line Faceplate

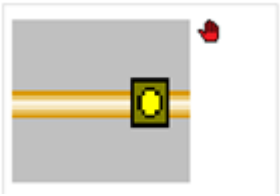
The Line faceplate is visualizing pipeline states and provides a runtime monitoring function with interfaces and messages for the process status, including an operator and monitoring user interface for this purpose. Furthermore, the operator has the possibility to leave free configurable information's by using the "Note" button.

Tab "General"

The "General" tab is providing the following functionalities:

- Displaying and switching the operating mode
- Displaying and switching the line status parameters, Name, Group and Type
- Displaying the process status, writeable in manual mode
  The manual mode is indicated by a red hand symbol next to the line icon in the faceplate.

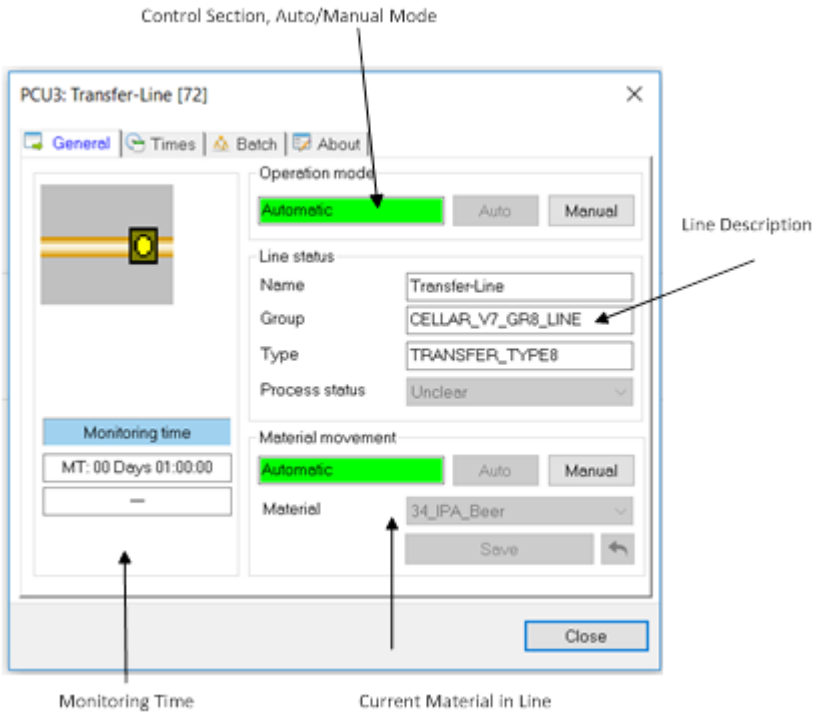
Figure 4-27



- Displaying the Monitoring time for the predefined process status
  During activated monitoring this field shown the remaining time for a predefined process status. The field below it contains the start time of this process status. After the monitoring time has expired, the field for the remaining runtime is colored red
- Displaying and selecting the material used for the Material Movement

NOTE After pressing the „Save" button, the material is set or changed in the dataset. The revert button is grayed out and the procedure cannot be undone.

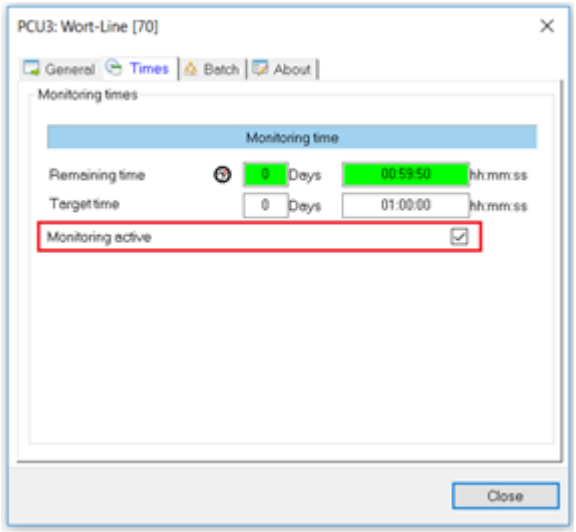
Figure 4-28



Tab "Times"

The monitoring time for the defined process status is displayed and activated in this view. Depending on the value of the process status and the checkbox “Monitoring active” the monitoring time will become active. The target time is displaying the set point value how long the according state is valid. The remaining time is displaying the actual value until the according state expires and become invalid. After the monitoring time has expired, the field for the remaining runtime is colored red.

Figure 4-29



Tab “Batch”

The “Batch” tab is providing detailed information about the batch running on the sequence to which this ICM is assigned.

Tab "About"

If configured, the tab "About" is providing additional information's, e.g. description, address and location information. Furthermore, the operator has the possibility to leave free configurable information's by using the "Note" button.

4.9 Unit Control Faceplate

The Unit Control faceplate can be used for the operation and monitoring of a sequence which is assigned to one recipe unit procedure (1:1 relation).

The faceplate is available in a small and large version.

The faceplate can perform the following functions for a unit:

Recipe selection, start, stop, step selection, hold, restart, manual/automatic, auxiliary equipment On/Off and operator prompt.

Additionally, separate windows for the Unit Set points and the ROP Set points can also be viewed and hidden.

Symbolic Representation in the Process-Image

The "Unit Control" can be represented symbolically in several ways.

- Line representation
- Block icon, Unit faceplate opens by clicking the corresponding icon
- Window representation, embeds the Unit Control directly in the process picture
- Small Representation

4.9.1 Unit Control Small

The small representation of the unit control is providing a quick overview of the assigned Unit (sequence). See figure below for more information.

Figure 4-30

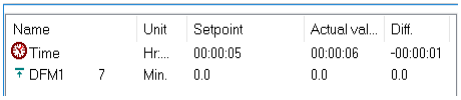
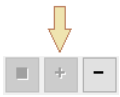
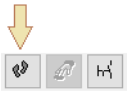
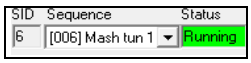
4.9.2 Unit Control Large - Line representation

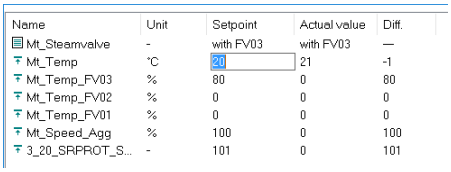
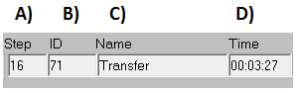
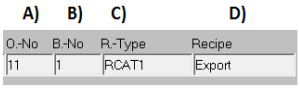
The line representation of a unit control appears as below:

Figure 4-31

From left to right, the individual control components have the following functions:

Table 4-6

Icon/Display	Function	Note
	Display sequence-related actual values /set points	
	Automatic/Manual Mode Switch	
	Start sequence	
	Stop sequence	
	Resume sequence	The sequence is resuming from a former Hold command.
	Hold sequence	The currently executed step is set to hold. The recipe unit procedure does not proceed to the next step. Depending on the configuration of the project Pumps and valves remain active.
	Manual Step-Selection	A dialog opens which allows the manual selection of the next step:
	Operator request acknowledge	A dialog opens which allows the acknowledgment of an operator request, see chapter. 5.3.4 for more information's.
	Switch additional Device on or off	
	Sequence name, number and status	Sequence status (idle, running, hold ...)
	Sequence displays	
		Auto / manual – mode
		Switch to next step / stop after current step finished
		Synchronization met / waiting
		Alternative met / not met
		Permanent condition missing
		User flag active / inactive
		Operator request is active
		EOP monitoring time expired

Icon/Display	Function	Note
		Recipe load error
		Error / Warning / Process Message active
	Step-related actual values/set points are shown	Possibility to change the set point values 
	Step-related information	A) Current number of recipe operation B) Absolute EOP number in the PLC C) Current Step Name (EOP name) D) Current Step running time
	Batch-related information	A) Current order number B) Current batch number C) Current recipe category name D) Current master recipe name

NOTE Changing the set points for the current batch will only affect the current batch. For the next batch, the values from the Master recipe will be used again.

Block Icon

To open the “Unit Control Large” faceplate, click on the sequence icon in one of the process pictures.

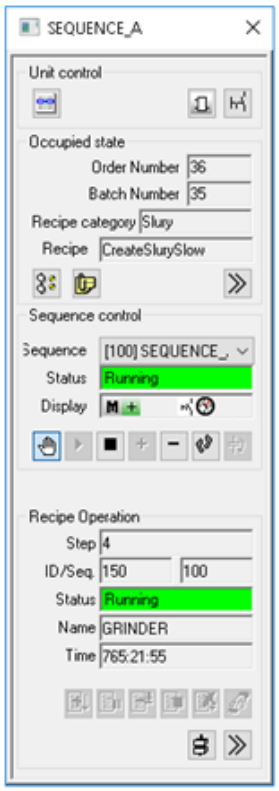
Figure 4-32

The Unit Control opens as window and displays the most relevant process information’s. Additionally, it allows the basic control of the unit. See next section for details.

Unit Control Large - Window representation

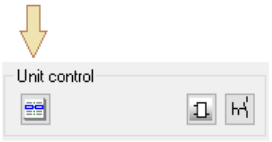
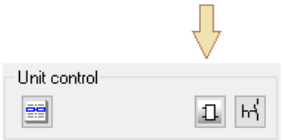
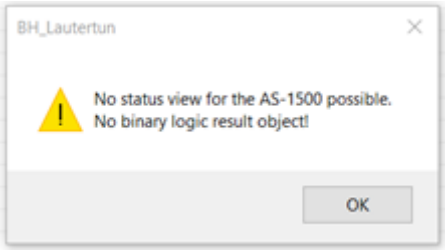
The line representation of a unit control appears as below:

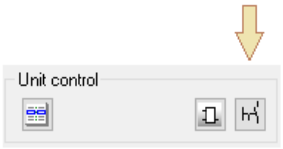
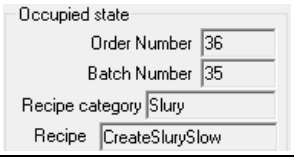
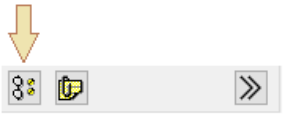
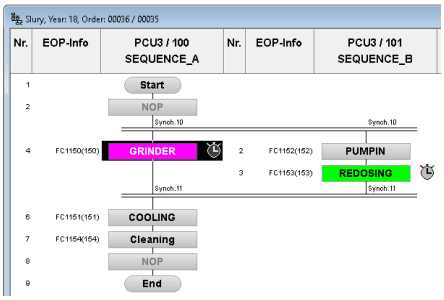
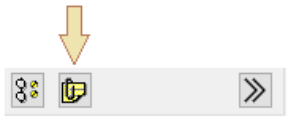
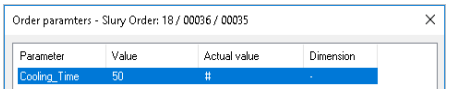
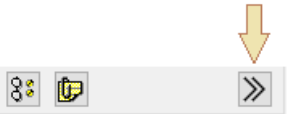
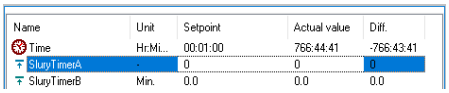
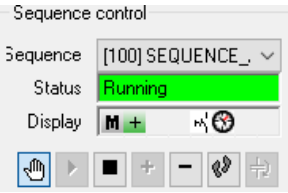
Figure 4-33

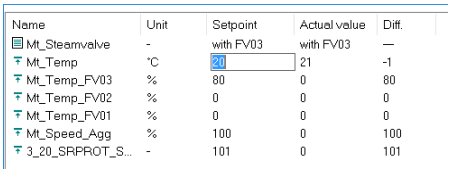


From left to right, the individual control components have the following functions:

Table 4-7

Icon/Display	Function	Note
	Opens the application “Sequence Control“	See chapter 5.3 for more information
	Permanent condition (Sequence Interlock)	Depending on the configuration a BLR Object or S7-Status Dialog is displayed which helps the operator to identify the root cause of the interlock, refer to chapter 3.12 for more details. Note: In case that the sequence is processed by a S7-1500 PCU and no BLR Object is configured the following message will be displayed: 

Icon/Display	Function	Note
	Switch additional device on or off	
	The order number, batch number, recipe and category of current batch running on the unit	
	Opens the application “Online recipe”	 See chapter 5.4 for more information
	Opens the order parameter list	 See chapter 5.2 for more information
	Sequence-related set points and actual values are displayed	 If Needed, set point value could be changed in this dialog for the online recipe.
	Sequence display and control	For element description see chapter 4.9.2
	Step display and control	Commands for recipe operation: Continue, Hold, Pause, Stop, Termination 
	Display of next-step-condition logic	Depending on the configuration a BLR Object or S7-Status Dialog is displayed which helps the operator to identify the root cause of the interlock, refer to chapter 3.12 for more details

Icon/Display	Function	Note
	Step related set points	Possibility to change the set point values 

NOTE Changing the set points for the current batch will only affect the current batch. For the next batch, the values from the Master recipe will be used again.

4.10 Date-Time Control

The Date-Time control is providing a clock which could be displayed in analogue or digital representation. Typically, the Date-Time control is located on the Top right Pane of the Process Screen.

Furthermore, it is possible to display/change the current BRAUMAT / SISTAR user by clicking on the User button of the control.

Figure 4-34

5 Batch and Order System

5.1 Introduction

The BRAUMAT / SISTAR system offers the Order Management for creating, starting and monitoring orders and batches.

5.2 Order Management

The Order Management has the task of processing a list of batches. This list can be created, either by the ordering system on the IOS, e.g. by the operator, or by a higher-level system (MES). Basic tasks of the Order Management are to schedule the orders, rearrange the order sequence, changing order parameters or changing the order sequence of the batches. In addition, the progress of batch processing can be tracked online, e.g. by jumping directly to the linked specific online recipe.

Alternatively, it is possible to directly start, control and monitor the recipes for individual Units with the usage of the Sequence Control.

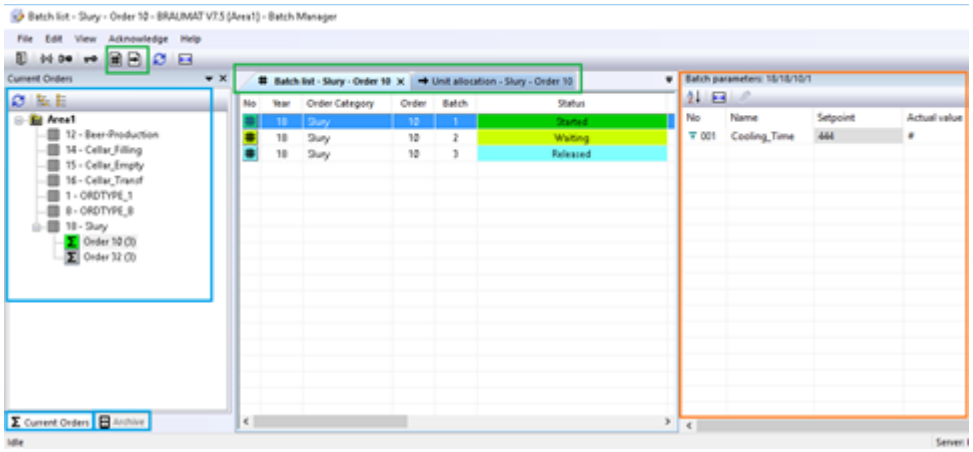
The Order Management can be found in the "Production" tab in the Application Center, indicated by the following icon:

Figure 5-1

5.2.1 Structure of the User Interface

The Order Management is divided into several views.

Figure 5-2



The Left Tree Pane (blue frame)

Gives an overview of all available order categories with their assigned orders. From this panel it is also possible to switch between current and archive view (see bottom).

The Middle Pane (green frame)

This is tab-oriented and can contain multiple worksheets. A worksheet shows the filtered batch list or the unit allocation to the batches as per the selection in the navigation area.

A new worksheet can be added by Select “Menu > File > New Batch List” or “New Unit allocation” or using the Toolbar Elements (green Frame).

- Selection root node "Production <AREA x>" → all batches of this AREA are displayed
- Selection order category → all batches/all orders of this order category are displayed
- Selection order → all batches of this order/these orders are displayed

Additionally, it is possible to move a batch to a new table position, e.g. to change the execution order of the created batches.

To do this, select a batch from the list. By dragging (left mouse button) the batch to the new table position, a dialog opens which presents the source and target position. By confirming the query, the selected batch is moved and the processing order will be changed.

The Right Pane (orange frame)

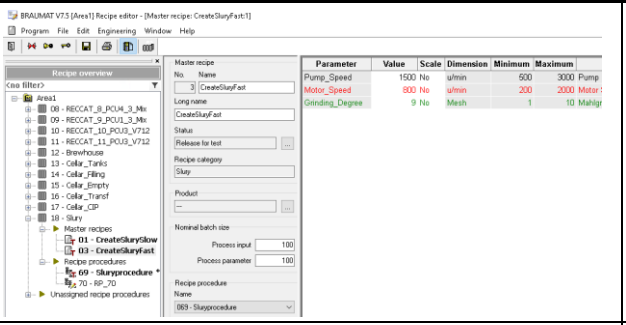
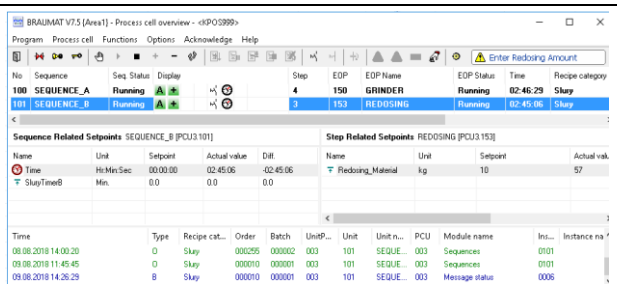
This is showing all Order Parameters of the selected batch.

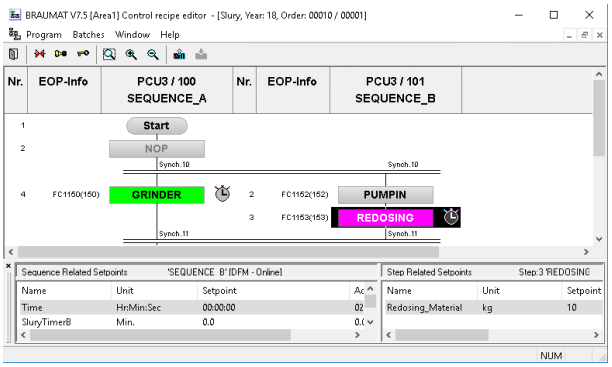
5.2.2 Open Order/Batch related Applications

Select one batch from the “Batch list” or “Unit list” to jump directly to further batch related applications which will provide further information’s and traceability regarding the running process.

From the “Menu > File” you can navigate directly to every order/batch related application.

Table 5-1

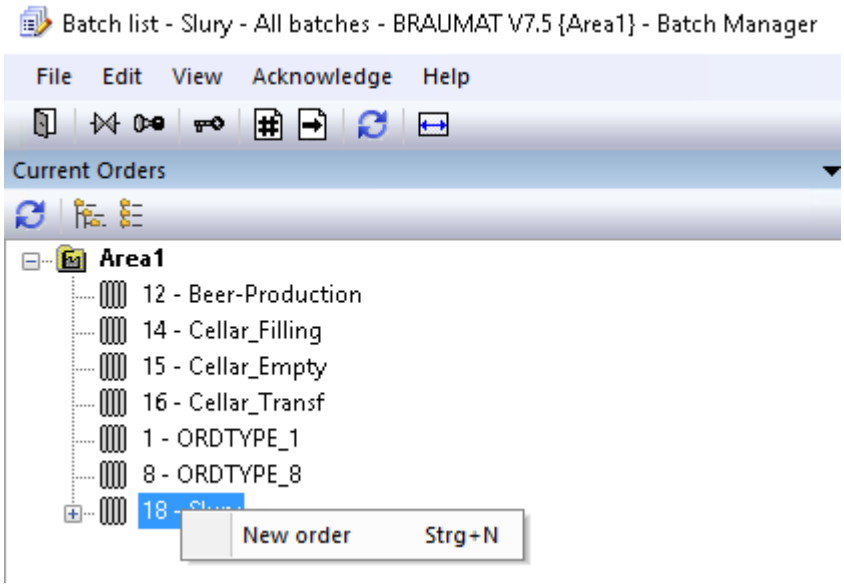
Application		Shortcut
Process Parameter Editor (Recipe Offline)		Strg+F7
Process Cell Overview (Sequencer), see Chapter 5.3		Strg+F8

Application		Shortcut
Control Recipe (Recipe Online), see Chapter 5.4		F9

5.2.3 Creating a new Order

The following procedure describes how to create a new order. The described procedure can vary depending on the on-site requirement. Open the Order Management and right click from the given Order Categories and select “New Order”. Alternatively select “Strg+N“ or use the menu edit.

Figure 5-3

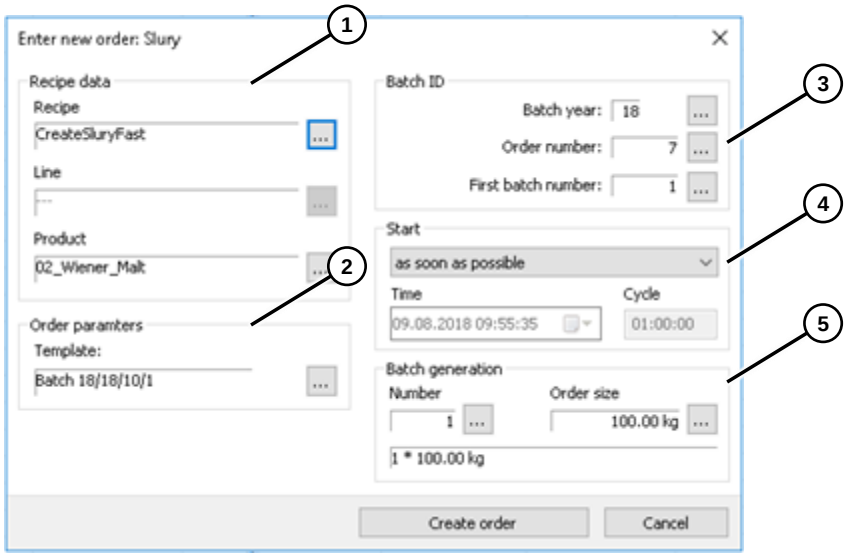


The “Enter New Order” Dialog appears where the order can be configured.

The Dialog is divided into several areas which are described afterwards.

The following figure is showing the “Enter New Order” Dialog.

Figure 5-4

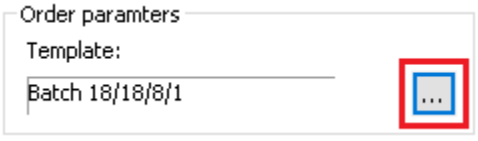


1. “Recipe Data”: In the “Recipe Data” area, the operator can select the recipe for the new order and if enabled the line and product
2. “Batch ID”: If enabled, the operator can define the year, order number and the first batch number for this order.
3. “Start”: If enabled, the operator can select the start options for the new order e.g. immediately after creation
4. “Batch Generation”: If enabled, the operator can define the amount of produced material (Order size) and/or the number of batches per order.

NOTE The calculations of how many batches per order are created by the system and the size of the individual batches are depending on configurable algorithms!

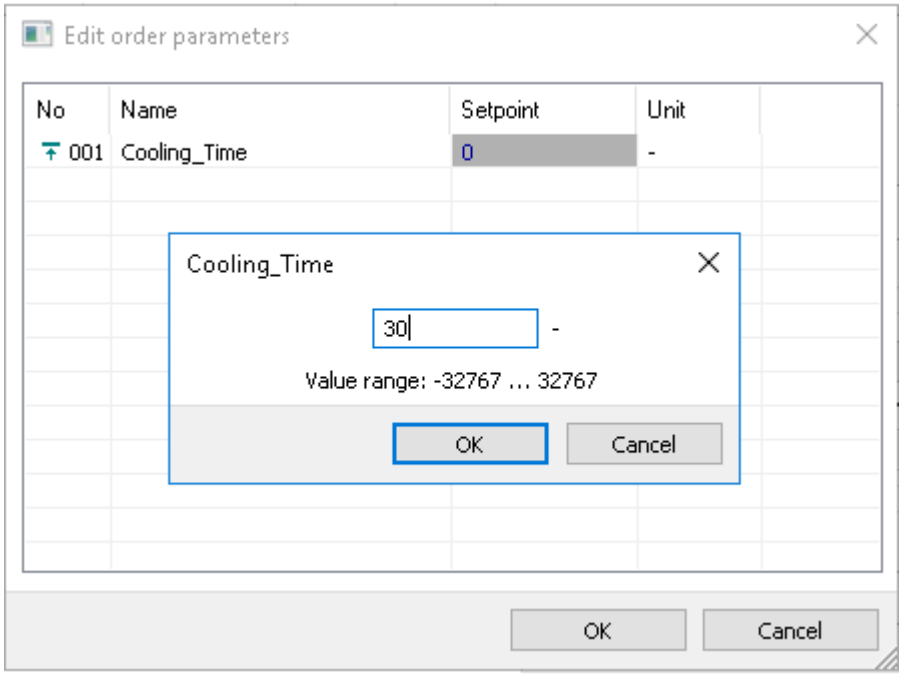
5. “Order Parameter”: If “Order Parameters” are configured for the recipe the values can be customized if needed.

Figure 5-5

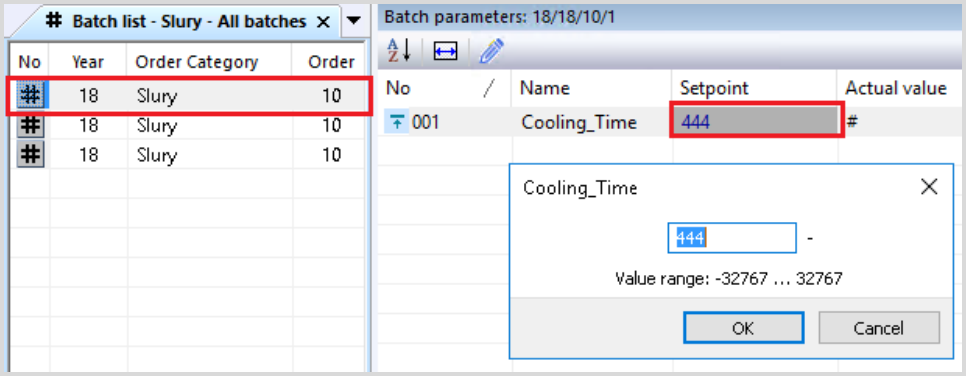


By clicking into the setpoint field a further Dialog opens where you can add the value.

Figure 5-6



NOTE If an order is divided into multiple batches the inserted value is used for all batches.



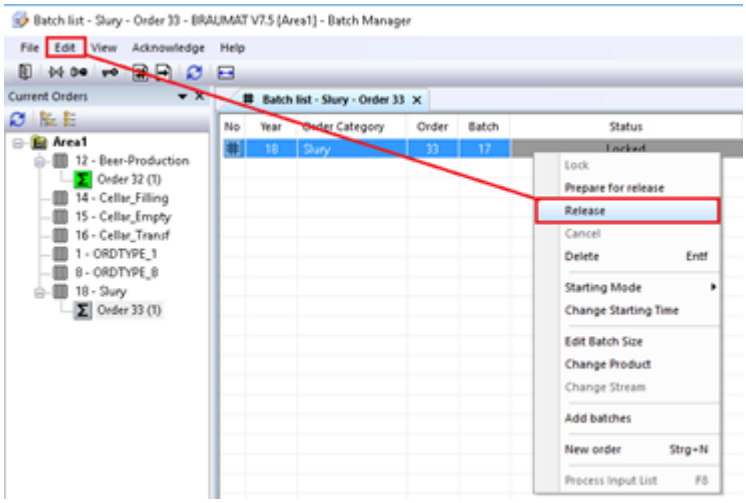
The values for each batch can be changed if needed as displayed on the right-side figure

5.2.4 How to release a Batch from a Batchlist

Depending on the project configuration of the “Default Batch Status”, an order can be “locked”, “ready for release” or “released”. If the batch state is “locked” or “ready for release”, the operator need to Release it first before the Order Management can queue the batch and start it.

To release a batch, you need to select it from the batch list first. From the context menu (right click) select release. Alternatively select “Edit > Release” from the Menu Bar.

Figure 5-7



5.2.5 How to start a Batch from a Batchlist

Starting batches depends on the configured start mode. The Order Management has no start or play button. The starting mode can be changed from the context menu (right click) as long as the status is not “Started” and the concerning starting modes are enabled for the Order Category.

In general there are four different starting modes available.

1. “As soon as possible”
   The batch is started as soon as the required “start unit” is free, in automatic mode, not stopped and not disabled and the batch is released. If several batches are released and are waiting for the same unit, the topmost batch in the list is started.
2. “By event”
   Order start is triggered by the Automation system.
3. “By time”
   The batch is started when the batch start time is reached or exceeded and the unit itself is not occupied.
4. After time/auto”
   This start mode is like start mode “by time” with the exception that the start times of the follow-on batches are automatically adapted if there are delays in starting the batch. This adaptation is only for batches with this start mode and batches that have the same “start unit”.

5.3 Sequence Control

The Application “Sequence Control” can be found in the "Production" tab in the Application Center, indicated by the following icon:

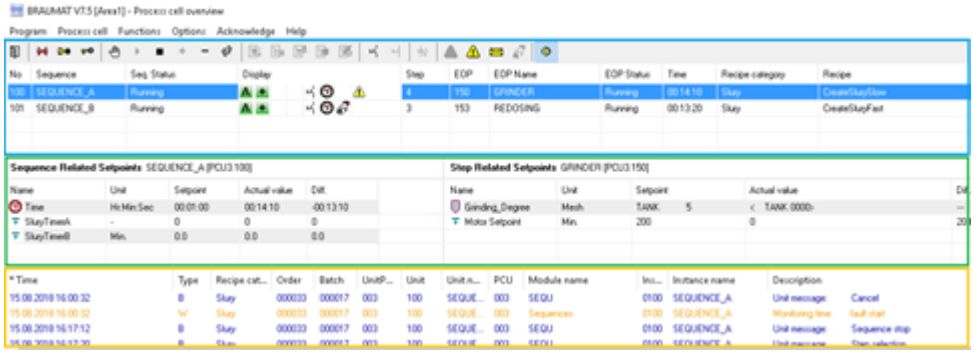
Figure 5-8

Basically the application “Sequence Control” is used to control and monitor the units in the process cells. With that the user can intervene in the current process and influence the different processes.

5.3.1 Structure of the User Interface

The Sequence Control is divided into three areas.

Figure 5-9



The Top Pane (blue frame)

This pane is displaying the sequence table which lists all sequences with additional information’s like sequence status, EOP status, recipe and order information.
From the “Menu bar > Options” it is possible to display only the running sequences.

The Middle Pane (green frame)

This pane is showing sequence and step related set point data.

The Bottom Pane (orange frame)

This pane is showing sequence related messages.

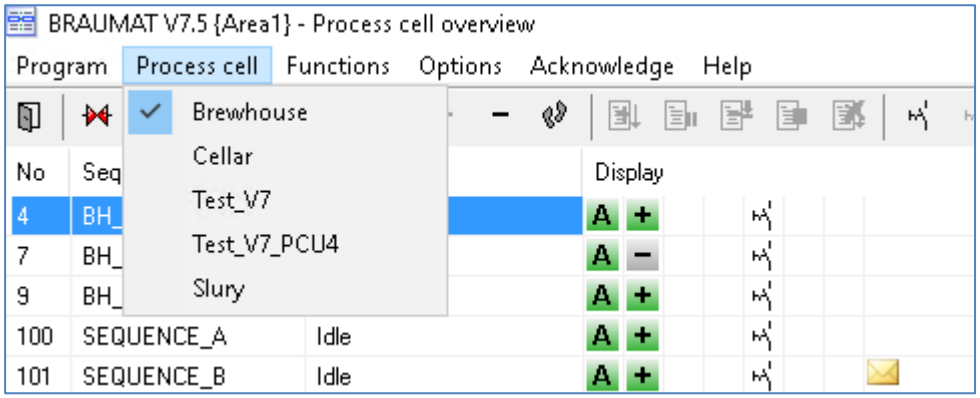
5.3.2 Start, Stop, Hold, Resume a Sequence

CAUTION	**If order parameters are used in the recipe then the default value is loaded when you start the recipe via the sequencer, e.g. Value “0”. This can lead to unwanted behavior!**

The following list gives an introduction of the basic operations for a sequence. All the tasks shown here can be also carried out from the Unit Control faceplate in Process Runtime.

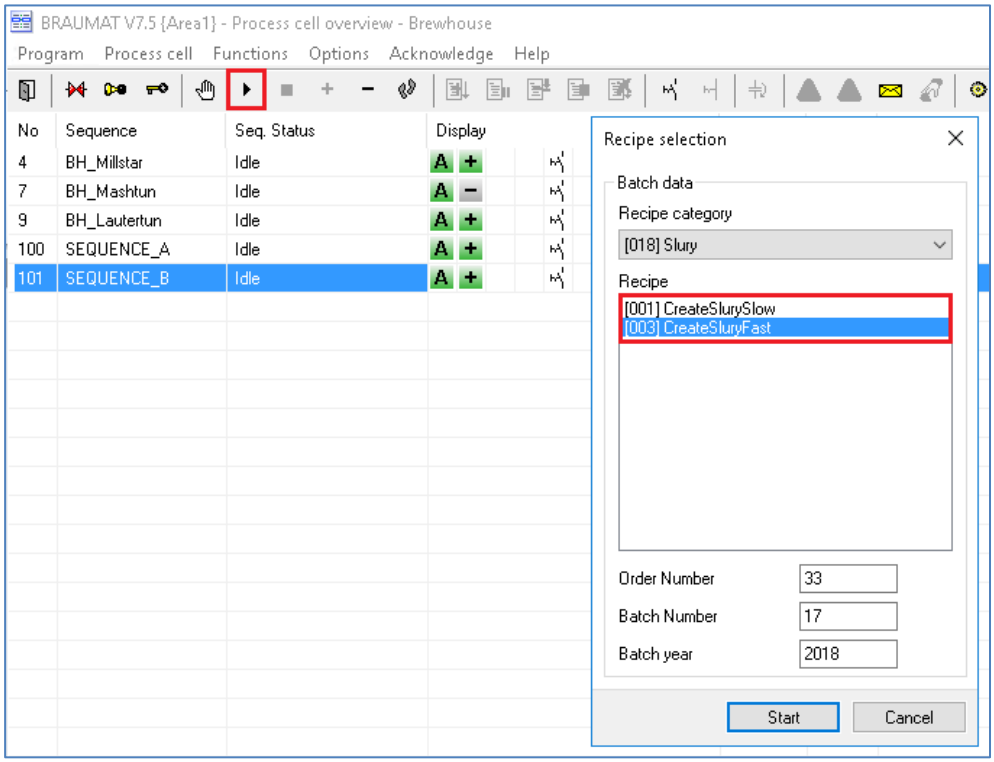
1. Select the desired Process Cell from the menu bar “Process-cell”.

Figure 5-10



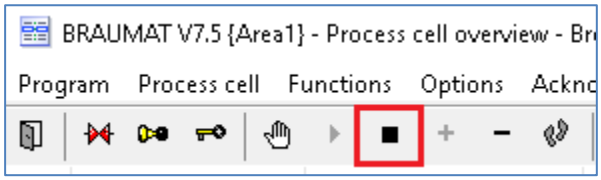
2. To start a sequence, select the desired sequence from the available process cells and press the “Start” button from the Toolbar. If more than one recipe is available for this sequence, a dialog box opens and the operator needs to select the recipe of interest.
   After you press the Start button the sequence will become active.

Figure 5-11



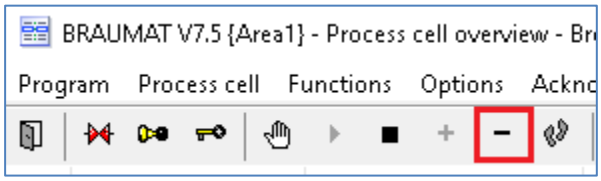
3. To abort a sequence, press the Stop button from the Toolbar.

Figure 5-12



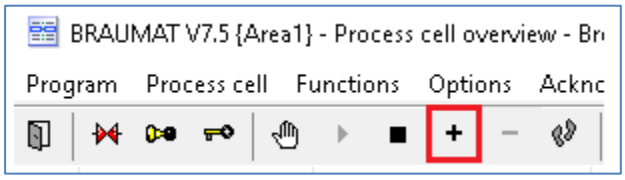
4. To hold a sequence, press the Hold button from the Toolbar (“-“ Symbol).

Figure 5-13



5. To resume a sequence, press the Resume button from the Toolbar (“+” Symbol).

Figure 5-14

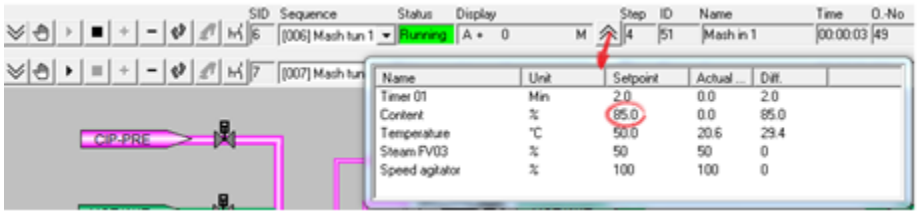


5.3.3 Changing Setpoint Values in the Online Recipe

With BRAUMAT / SISTAR it is possible to change setpoint values of the active step of the respective online recipe. To change setpoint values open the corresponding Unit Control faceplate or change the setpoint values directly from the Sequence Control Application. The change is valid only for this batch. For the next batch the original recipe parameter set point values are used again.

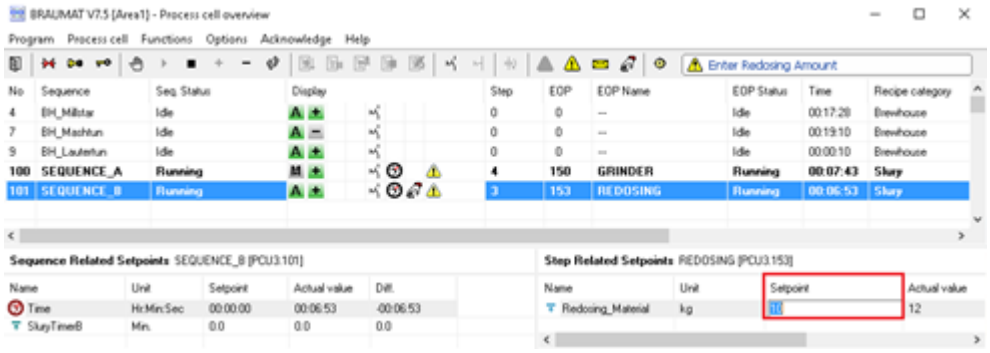
Change Setpoint Values from the Unit Control faceplate:

Figure 5-15



Change Setpoint Values from the Sequence Control Application:

Figure 5-16



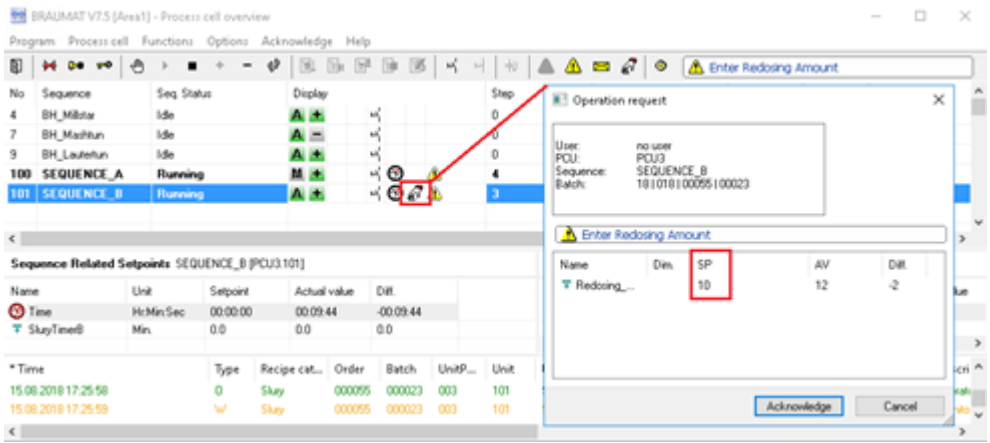
5.3.4 Operate and Acknowledge Operator Requests

In order to inform the plant operator about a manual operating instruction, the BRAUMAT / SISTAR System uses so called Operator Requests. The Operator Requests are indicated by a “Hand” Symbol in the Unit Control or Sequence Application.

Depending on the configuration of the Operator Requests, the operator must either acknowledge the dialog without entering a Setpoint Value or he must first entering a Setpoint Value and acknowledges the request afterwards.

The figure below is showing an example of an Operator Requests displayed in the Sequence Application.

Figure 5-17



5.3.5 Order and Batch Numbers

Order and batch numbers are needed to:

- plan a process (for example filtration)
- get a report as a step protocol
- Tracking and Tracing of Material

When a process is started by the batch list the system will automatically increase the batch number or order number (depending on the selected algorithm). One order can contain one or more batches with different batch numbers and can be therefore seen as a grouping element. In a Brewhouse for example, the batch

number can count up for one year and then restart. Order number can be automatically increased or derived from the calendar week.

If batches are started manually via Sequence Control or the Unit control faceplate or from inside the PLC with a special-order start block (“ASTA”) it is possible to use the same batch ID more than once. Although it may be necessary to manually restart a batch, e.g. after an error. This may lead to a situation that all of this the production data is assigned to the same batch.

Therefore, the manual assignment of Batch IDs must be done with a maximum attention.

A complete ID of a batch consists of the following parts:

- Site number
- Area number
- Recipe category
- Batch year
- Order number
- Batch number

This is because a BRAUMAT / SISTAR installation may span over multiple areas of a site and even more than one site.

NOTE If one of the above-mentioned ID parts is not considered when manually creating a batch, the generated batch data can only be identified clearly by their time stamps.

5.4 Online/Control Recipe

The task of the control recipe visualization function is to visualize the processing steps of control recipes which were generated by the recipe system and downloaded to the PCU. Based on the recipe procedures, the recipe system generates the control recipes by substituting the process/order parameters with the current master recipe/order parameters.

When the recipe procedure contains weighing recipe operations, the control recipe dynamically generates weighing and interim draining operations, depending on the volume of process input materials to be weighed.

The online recipe can be found in the "Production" tab in the Application Center, indicated by the following icon:

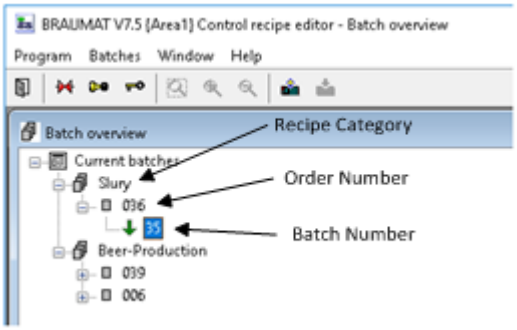
Figure 5-18

How to open the Online Recipe

The following options are available to open an online recipe.

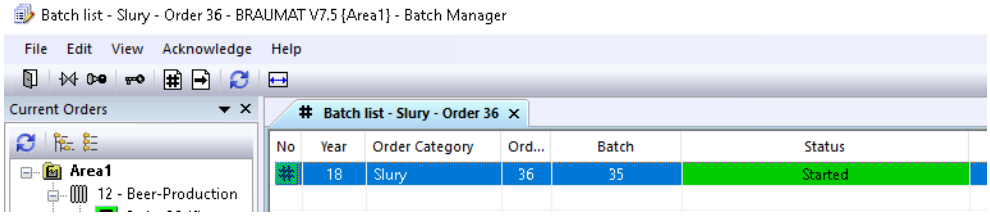
- Open the online recipe from the Application Center directly.

Figure 5-19



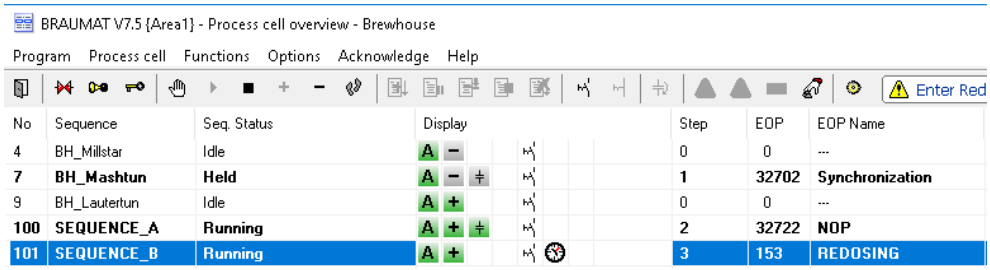
- Open the online recipe from Order Management.
  Select a running batch from the batch list and double-click on it or press “F9”.

Figure 5-20



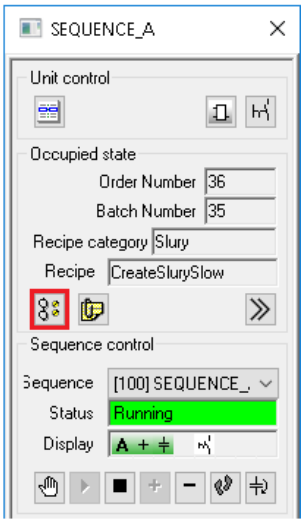
- Open the online recipe from the Sequence Control Application.
  Select a started sequence from the Process Cell List and press “F9”

Figure 5-21



- Open the online recipe from the Unit Control faceplate.
  Therefore press the button “Current recipe” displayed on the figure on the right side.

Figure 5-22



6 Graphic system – Display and Operation

6.1 Process Images, Visualization

The application “process diagrams” offer a plant overview based on the configured full graphic images by viewing process data from the Automation system. Via control elements, the user can control the running process and access the different sequences. The following chapters give an overview to the operator how the navigation can be done easily and efficiently.

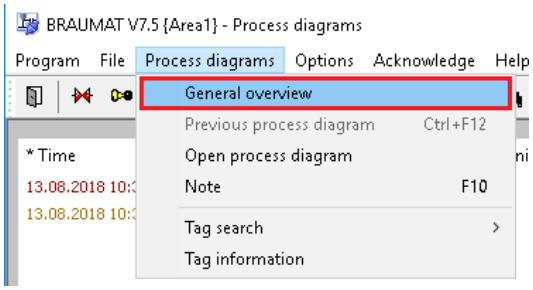
6.2 Navigation

6.2.1 General Navigation in the Process Diagrams Application

There are various means to navigate between the pictures of a project:

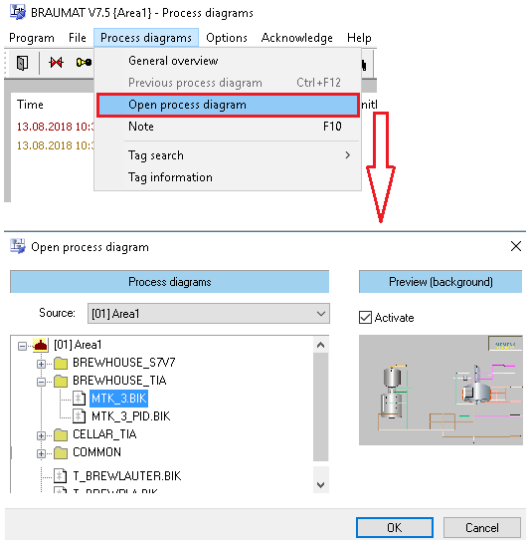
- From the Menu bar, click the “General Overview” menu to navigate to the start screen. Typically, the start screen is showing the whole Plant Overview, give a quick overview over the major elements and give the possibility to navigate quickly to the several areas.

Figure 6-1



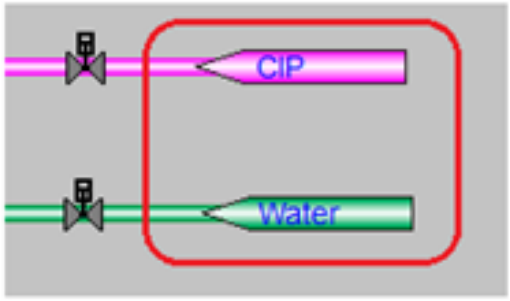
- From the Menu bar, click the “Open process diagram” menu to open the process picture of interest from the Picture Tree.

Figure 6-2



- If configured in the project, you can use the navigation buttons, displayed on the Figure on the right, to jump to the specific process picture.

Figure 6-3



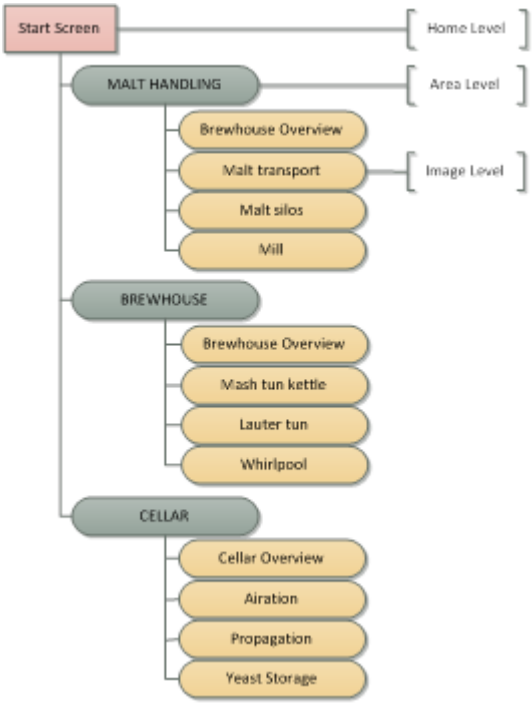
- To move back to the previously opened process picture, click on the icon highlighted to the right, or use the keys "Ctrl" + "F12".

Figure 6-4

6.2.2 Navigation Panel

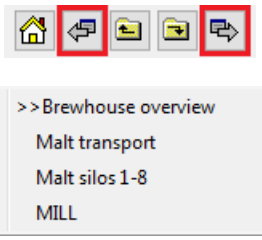
The system provides a panel faceplate which allows you to navigate through the process pictures and areas. Typically, the Navigation Panel is located at the bottom of the process screen, see chapter. 3.6. The following schema illustrates the hierarchical Process picture tree which is divided into 3 levels. With the navigation panel you can navigate through the Tree. Additionally, it is possible to open further BRAUMAT / SISTAR applications, e.g. the Trending System or Order Management.

Figure 6-5



The following table describes all elements from the navigation pane.

Table 6-1

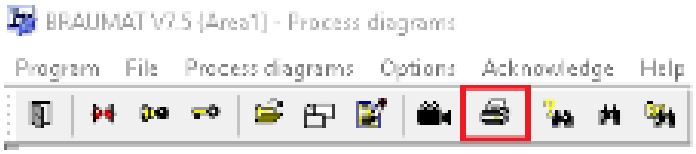
Icon	Action
	Navigate to the Start Picture: Left click the Home button from the Navigation Panel. The name of the start picture is displayed by right click the home button
	Navigate to previous/next PCell: Left click the “Previous” (arrow left) or “Next” (arrow right) button to navigate directly to previous or next PCell from the Hierarchy Tree. Right click to see all available PCell’s in the project. The actual displayed PCell is marked by 2 angle brackets
	Navigate to previous/next image: Left click the “Previous” (arrow left) or “Next” (arrow right) button to navigate directly to previous or next Process Image within the current PCell. Right click to see all available images within the PCell. The actual displayed picture is marked by 2 angle brackets

6.2.3 Printing of Process Images

To print the view of the currently opened process picture with the online values, do one of the following:

- Click on the highlighted printer symbol icon, press „CTRL + P“ on the keyboard,

Figure 6-6



or

- Select the menu item “File > Print“.

7 Logging system - Analysis of processes

7.1 Step Protocols

The application “Step Protocols” is used to display and print a list of step protocols. Chronologically the set points and actual values occurred during processing of the units such as

- times,
- quantities,
- temperatures, etc.
- information about the executed equipment operations

are stored.

The application can be found in the "Archives" tab in the Application Center, indicated by the following icon:

Figure 7-1

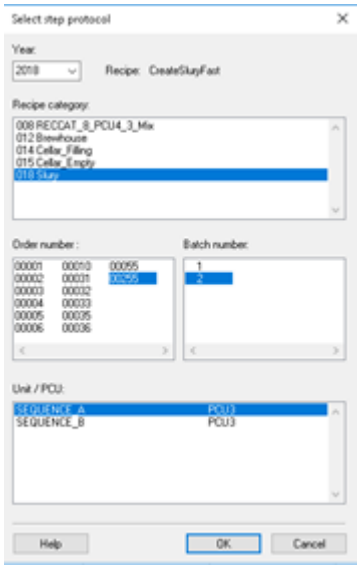
7.1.1 Open a specific protocol

To open a Step protocol select “File > Open” from the menu or click the corresponding button from the Toolbar.

In the dialog “Select step Protocol” the available step protocols can be selected by year, recipe category, order number, batch number and unit.

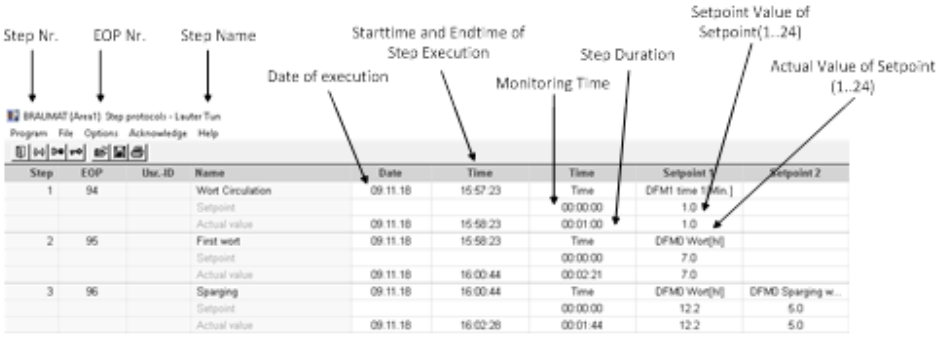
When all selections are made and the “OK” button is pressed the step protocol is displayed. The screenshot below is showing the “Select step Protocol” dialog.

Figure 7-2



The following figure is showing the elements of the Step Protocol:

Figure 7-3



NOTE The Step Protocol is displaying data for one Unit.

7.2 Batch Trends – Curve Output

The system can log measurements of specific values over a certain period, creating so-called “Trends”. These curves can be displayed with the application "Curve Output". The values which should be archived and displayed within the trend need to be defined by the engineering team in the application "Trending definition" from the tab “Engineering-Tools” first.

The application can be found in the "Archives" tab in the Application Center, indicated by the following icon:

Figure 7-4

7.2.1 Types of Trends

BRAUMAT / SISTAR supports three types of trend curves:

- Short term trends: User-selected collections of trend curves which are not stored on the hard disk. The values are stored in a cyclic buffer in the memory and will be overwritten permanently when the buffer exceeds.
- Weekly archives (stored on hard disk) are running cyclically in the scope of the current week.
- Batch archives (stored on hard disk) typically displaying trends in scope of a batch, e.g. the logging is enabled when the batch starts and disabled when the batch ends.

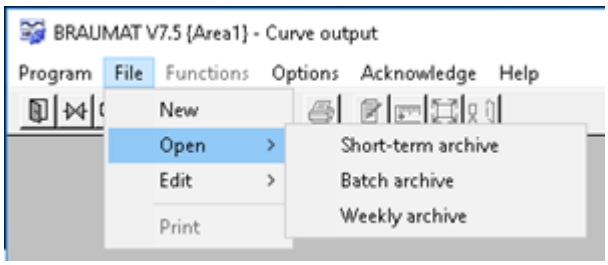
7.2.2 Features of the Trend display

- Each trend group file (a so called “Trend Picture”) may contain up to eight analogue and sixteen digital curves with their units in one picture. Each curve can be individually shown or hide.
- The operator can print views of the curves.
- A zoom function allows a deeper and more accurate analysis of the trend values.
- A ruler shows the exact process values and time.
- The scaling of the curve, physical units etc. are configured in the application "Trending definition".

7.2.3 Selection of Trends

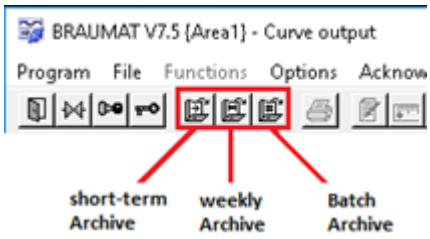
To display a trend open the “Batch Trends” application. From the menu select “File > Open” and the archive type of interest.

Figure 7-5



Alternatively you can use the corresponding buttons from the toolbar.

Figure 7-6



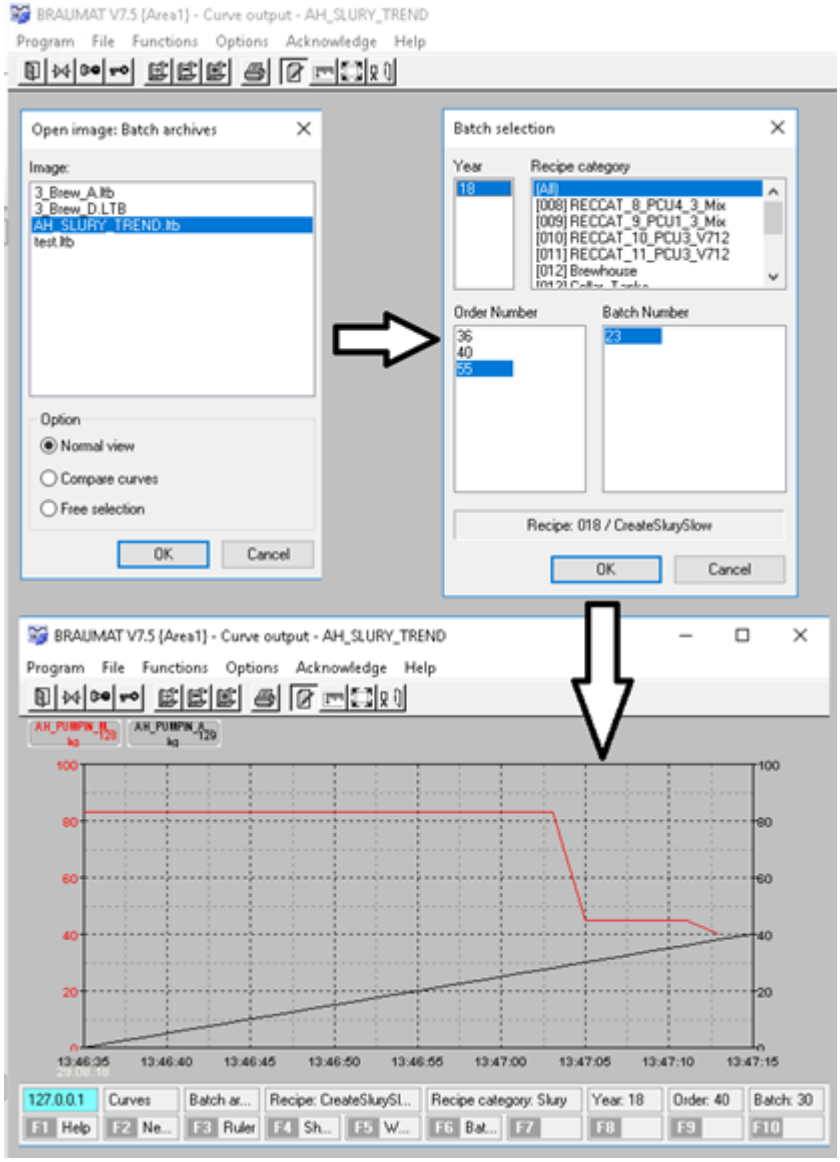
The “Open Image” dialog opens were the operator can select the image of interest and the options for display.

The following options are available:

- Normal View: The measured values are related to a batch ID. In a second step the user selects the batch ID.
- Compare Curves: The curve of the current batch is compared to the curve of a previously saved batch. Again, the user selects the batch ID in a second step.
- Free Selection: It is possible to visualize up to eight batch curves in a single display. The selection is specific to the measured value and will be used as reference for the selection “reference curves”.

The figure below is showing the scenario how to configure a normal view for a Batch Archive. Select the year, recipe category, order and batch number from the Batch Selection dialog and press the OK button afterwards.

Figure 7-7



7.2.4 Working with the Trend Display

The Trend Display is providing the following functionality

- Zoom In

To zoom into the Trend Area press and hold the left mouse button, drag the area of interest and release the mouse button.

NOTE The Ruler must not be activated to use the zoom function

- Show/Hide individual curves
  To show/hide individual curves just click on the curve name on the upper left pane of the Trend Display. To display all curves you can use the button from the toolbar.

Figure 7-8

- Ruler
  To enable/disable the Ruler functionality, just click on the button from the toolbar.

Figure 7-9

- Print
  To print out the collection, e.g. as a pdf file, just click on the printer button from the toolbar.

Figure 7-10

8 Message system

8.1 Alarm System

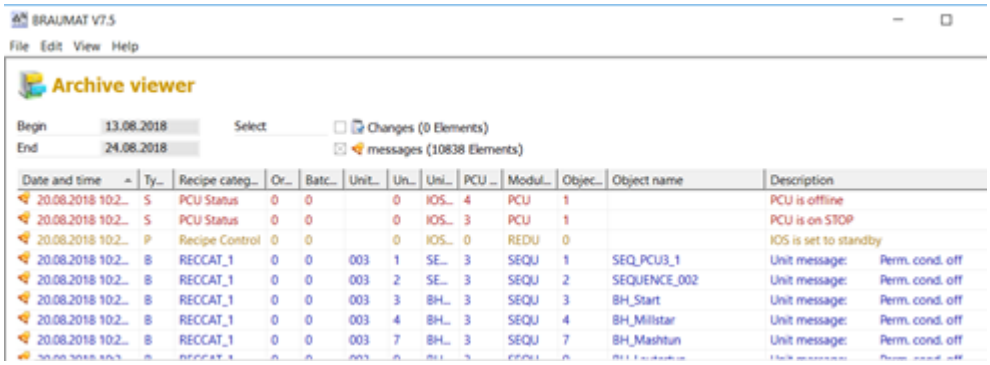
8.1.1 Overview

The Message and Alarm System provides information's about operating states and system or process faults within the process. This allows the operator to detect critical situations at an early stage and avoiding errors and failures.

For each message separate texts for incoming and outgoing messages are available. Additionally, the messages will be archived on the hard disk of the BRAUMAT / SISTAR Server. The messages and alarms can be displayed on several ways.

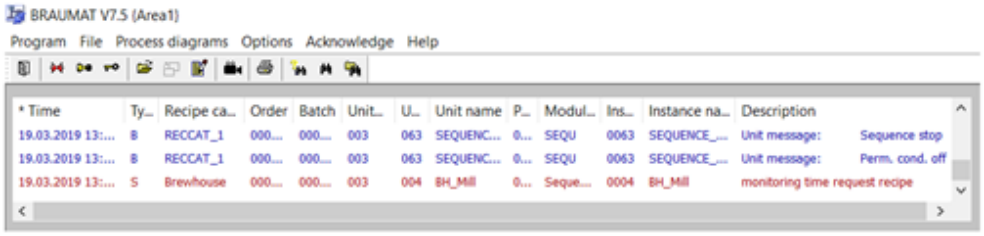
- The Application „Message archive“ is displaying archived messages.

Figure 8-1



- The Message Control faceplate is displaying messages in the process images.

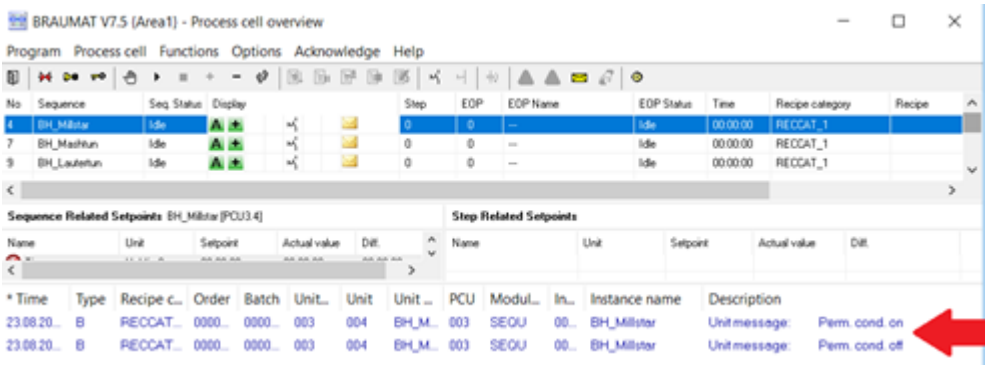
Figure 8-2



NOTE With the Message Control faceplate, it is possible to configure filter settings. Therefore, the output can vary in different projects depending on the project requirements.

- The application „Sequence Control“ is displaying Unit related Messages.

Figure 8-3



8.1.2 Message Classes and Types

There are different classes and types of messages in the BRAUMAT / SISTAR system available which are displayed in the following table:

Table 8-1

Message Class	Description	Message type	Description	Color
E	Error/failure	F	User fault message	Violet
		S	System fault message	Red
W	Warnings	W	Warning	Orange
M	Process Messages	M	User status message	Green
		B	Operator message	Blue
O	Operation Request	O	Operation Request	Dark green
	No Class	P	IOS Message	Light Brown

8.1.3 Reset Messages

The application “Sequence Control” can be used to reset the Error, Warnings and Process Messages, which are displayed in the following figure.

Figure 8-4

To reset the messages within the Process Picture the Unit Control faceplate can be used.

Figure 8-5

8.1.4 Loop in Alarm

You can use the following applications to jump directly from the message into the responsible source object in the process diagram (Loop in Alarm).

- Message faceplate from the Process Picture
- Application Sequence Control
- Application Message Viewer (Archive)

This can be done by double-click into the message of interest or by using right click and select “Goto Process Diagram”.

8.2 Message archive

The application allows you to display and print

- messages
- process operations
- changelogs
- configuration changes

within a selected time period. You can add your own filter criteria and column settings for searching and displaying the associated archive files for the selected type and period (based on days). It is also possible to sort the archive files by column within this context.

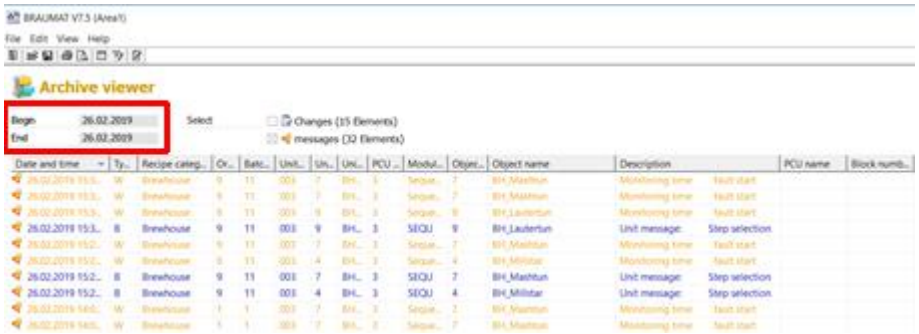
The currently selected settings for archive selection, column selection and sorting are saved for the next call of the application.

1. Open menu “Archives > Changes and messages"

Figure 8-6

2. From the Archive Viewer tick the “Messages” checkbox and specifying the report period by double-click the begin/end date fields in the main view or select the Open button from the toolbar.

Figure 8-7

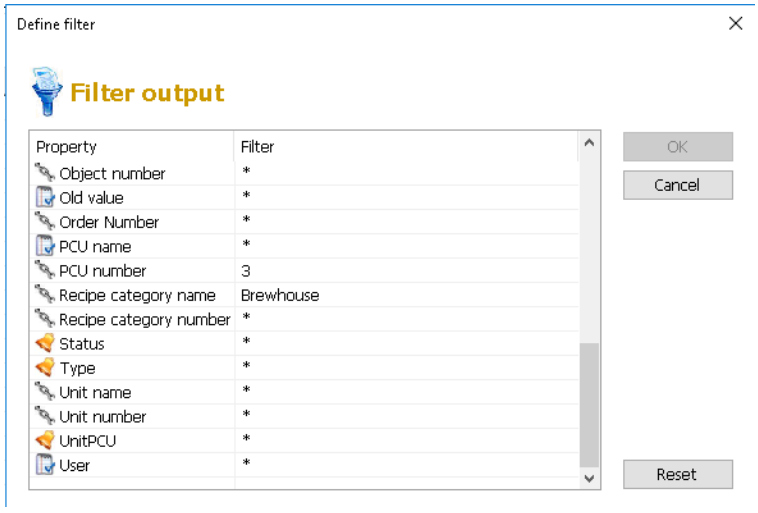


3. To filter the output data, select the “Filter Output“ button from the toolbar.

Figure 8-8

4. Set the filter of interest and click OK.

Figure 8-9



NOTE The batch number must be padded with leading zeroes. E.g. to filter for the batch number “3” enter “000003”.

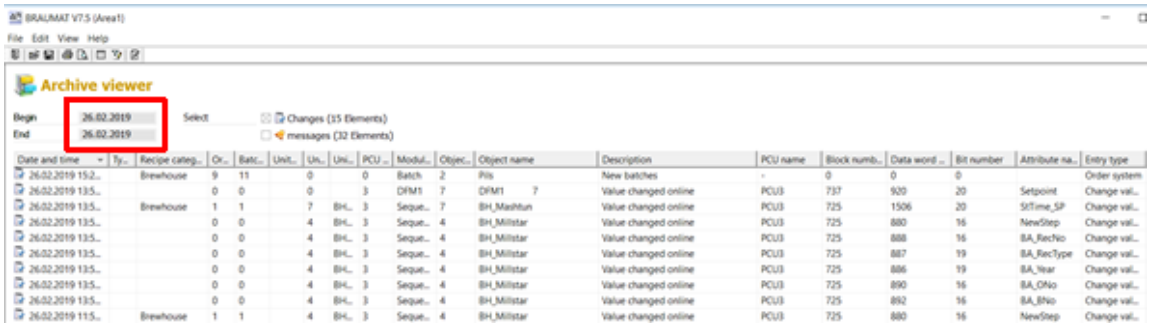
8.3 Change Protocol

All user activity is logged together with the user ID in the change protocol.

The Change Protocol can be opened from the Message Viewer like the Message Archive, see above.

From the Archive Viewer select “Changes” instead of Messages and specify the report period by double-click the begin/end date fields in the main view or select the Open button from the toolbar. To filter the output data, select the “Filter Output“ button from the toolbar.

Figure 8-10



9 Replay Mode

9.1 Introduction

The main scope of the Replay mode is to identify error statuses that occurred in the past. Those events can be totally and conveniently observed and localized in terms of their origins and their potential effects.

9.2 Starting the Replay Mode

The Replay Mode can be started from the Process diagrams application.

In the title bar navigate to Options and activate the Replay Mode. Alternatively, you can activate/deactivate the Replay Mode from the symbol bar by clicking on the camera button.

Figure 9-1

After the Replay mode was activated, an additional operator panel is displayed at the bottom edge of the process diagram that allows the following input:

- Preselection of the replay time (date, time)
- Slider for fast changing of the replay time (min:sec)
- Entry of the replay interval (in sec where n = 1 ... 60)
- Stop / Pause buttons
- Jump Forward/Backward buttons

Figure 9-2

9.3 How to Preselect the Starting point for the Replay Mode

Additionally, the Replay Mode is intended to help the operator to identify exceptional statuses or events quickly. Therefore, it is necessary to establish a simple and intuitive connection between the specific event (signal/status in the process diagram or message in the message window or message archive) and the replay time.

The next chapter describes typically uses cases how to preselect the Replay Mode with the time stamp when the specific event occurred, e.g. an Alarm Message.

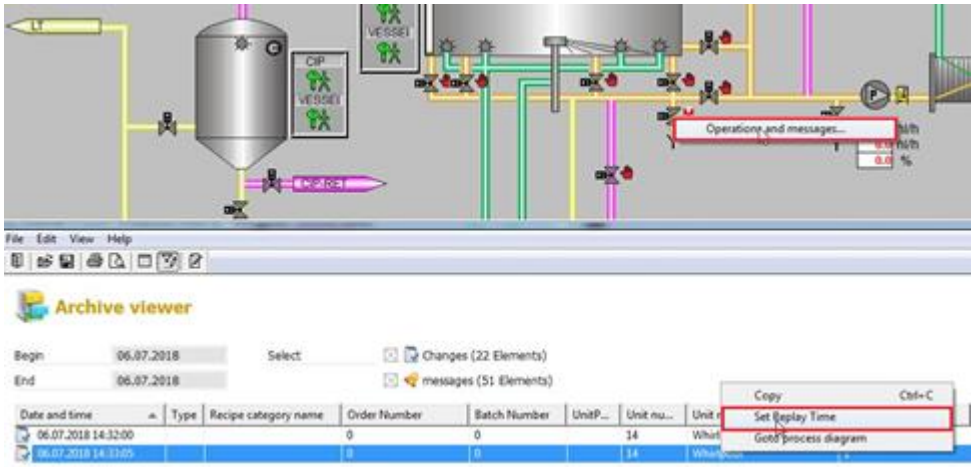
9.3.1 Setting the Replay Time via process picture

1. Select the object of interest from the process picture, e.g. a valve or pump.
2. Right click on the object and select “Operations and Messages”.

The archive viewer appears and is showing messages of the selected object in the scope of current day. For changing the display period see .8.2.

3. Select the message of interest, right click and select “Set Replay Time”.

Figure 9-3



9.3.2 Setting the Replay Time via message system

Similar to the previous use case it is possible to set the Replay Time from a specific message in the message archive directly, see also chapter 8.2 Message archive

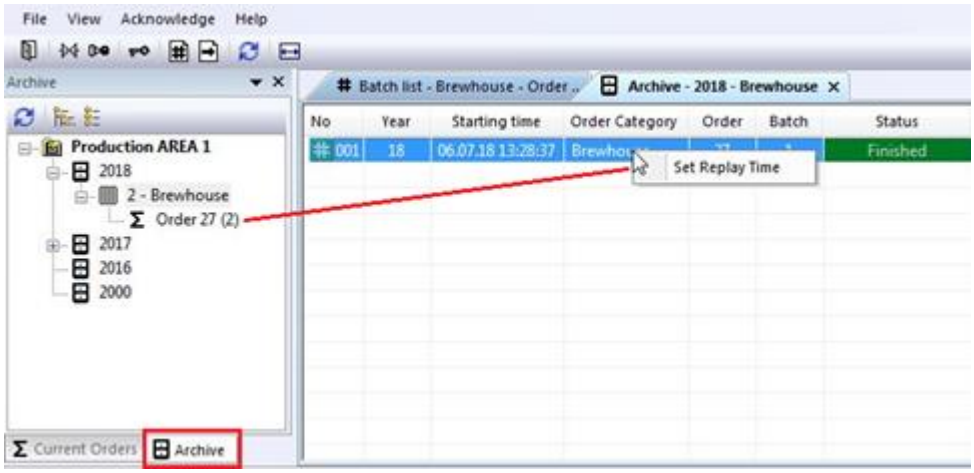
1. Open the Archive Viewer and define your display period by select “File > Open”.
2. Define additional filter settings if needed by select “View > Filter settings”.
3. Select the message of interest, right click and select “Set Replay Time”.
4. Setting the replay time from a specific message in the message view control.
5. Select the message of interest, right click and select “Set Replay Time”.

Figure 9-4

9.3.3 Setting the Replay Time via batch archive

1. Open the “Order Management” from the Application Center
2. From the left navigation pane select the “Archive” List from the bottom to display all finished batches.
3. Select the “Year” and the Order Category of interest
4. Select the Order of interest, right click and select “Set Replay Time”

Figure 9-5



10 Route Control System

10.1 General information

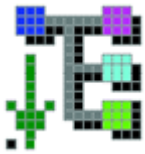
The route control system (“RCS”) is primarily a tool by which the planning, processing and the diagnosis of routes can be performed in environments with many different routes, like in the tank farm of a brewery. It allows controlling and monitoring in an easy and transparent manner.

10.2 Switch RCS servers

In a redundant RCS server environment, only one RCS server could be active at one time. The server can be set to “Active” like the recipe server.

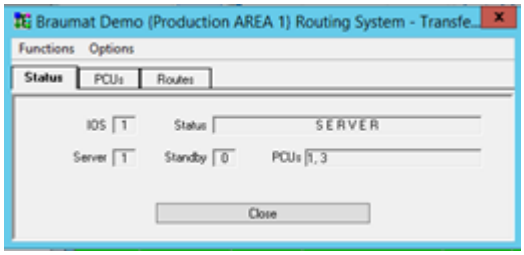
In order to switch over from one server to another, the menu “Program > Activate Route Control of PCU-Server” should be selected. You can also click the icon from the PCU-Server toolbar which is displayed in the figure below.

Figure 10-1



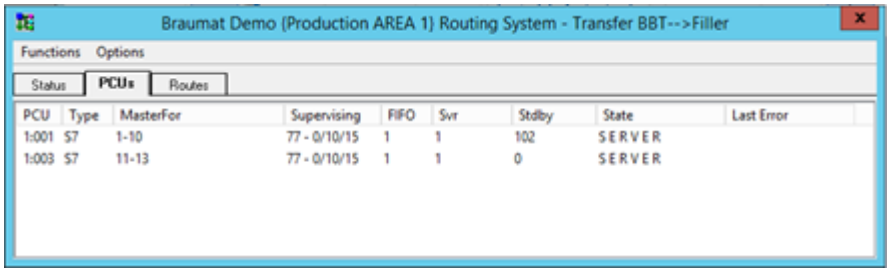
The RCS server status (active/passive) is displayed through an icon in the PCU Server. The RCS server is starting up properly, if all connections are established for each PCU. This can be checked with the PCU-Server, navigate to "Options" ► “route-control".

Figure 10-2



By selecting the tab "PCU" all configured connections are displayed.

Figure 10-3



All PCUs must be in the state "server" to be able to receive telegrams. If this is not the case select the command “Restart” from the menu "Functions".

NOTE If the PCU was in "stop" mode or the power supply was off a restart of the PCU-Server is always required.

10.3 RCS Online

The RCS Online application consists of two sections

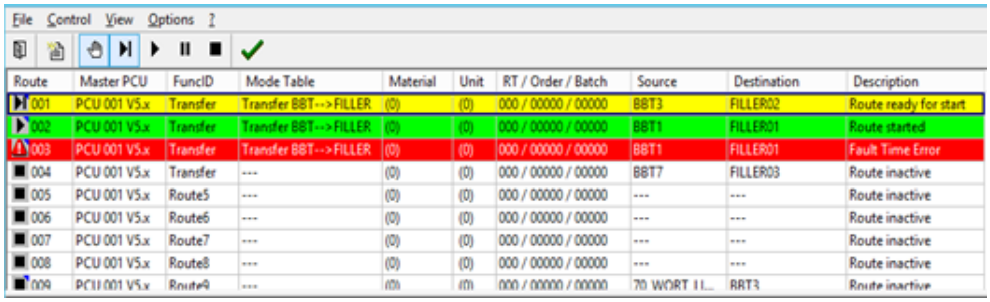
- The Route view offers an overview of Routes which are created in the engineering tool
- The view of the participating elements or request details of the selected Route.

Route view

Route view displays all projected routes and their current states.

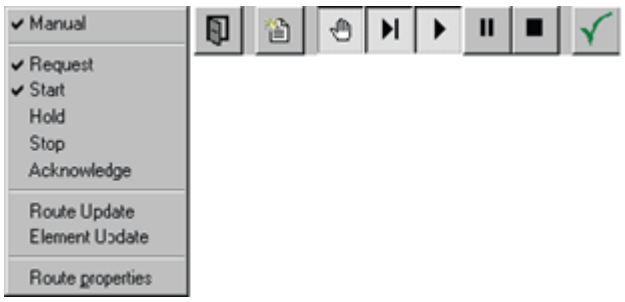
- Inactive: white
- Requested: yellow
- Active: green
- Error: red

Figure 10-4



The selected Route can be controlled manually with the buttons from the toolbar or from the menu “Control”

Figure 10-5



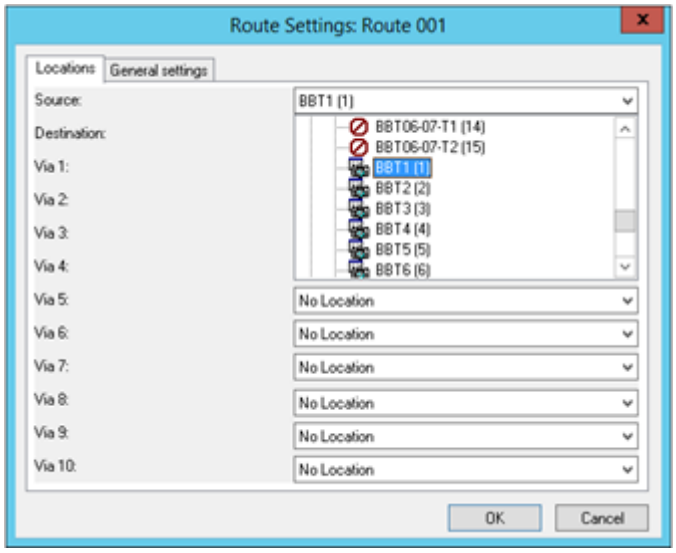
Route Settings

Open the property dialog from the menu “Control > Route Settings”.

NOTE Changes via the property dialog will only be allowed if the Route is in manual mode and not requested or active.

On this tab, parameters for source, via 1…10 and destination are located. The display of the locations results in a tree view, which views the plant hierarchy and distinguishes between Process Cell/Unit-related locations and so-called general locations.

Figure 10-6



Details view

The second part provides information about the elements and their states of the selected route in “Elements View”.
The “Modes View” is providing information’s regarding the configured modes and their respective states.

Figure 10-7

Elements | Modes

Name	PCU	No.	Mode	Mode No.	Partial Route	Op. Mode	Feedback	Command
81_10_01P01	PCU 001 V5.x (1)	100	Baseposition	1	BBT06-07-T1-->T1-FILLER	Auto	OFF	OFF
81_10_01P01	PCU 001 V5.x (1)	100	Pump	7	BBT06-07-T1-->T1-FILLER	Auto	OFF	ON
81_10_01XV09	PCU 001 V5.x (1)	777	Baseposition	1	BBT01-->BBT01-T1	Auto	CLOSE	CLOSE
81_10_01XV09	PCU 001 V5.x (1)	777	Source open	3	BBT01-->BBT01-T1	Auto	CLOSE	OPEN
81_10_01XV10	PCU 001 V5.x (1)	778	Baseposition	1	BBT01-->BBT01-T1	Auto	CLOSE	CLOSE
81_10_01XV11	PCU 001 V5.x (1)	779	Baseposition	1	BBT01-->BBT01-T1	Auto	CLOSE	CLOSE
81_10_01XV11	PCU 001 V5.x (1)	779	Source open	3	BBT01-->BBT01-T1	Auto	CLOSE	OPEN
81_10_01XV11	PCU 001 V5.x (1)	779	Baseposition	1	BBT01-T1-->BBT02-03-T1	Auto	CLOSE	CLOSE
81_10_01XV12	PCU 001 V5.x (1)	780	Baseposition	1	BBT01-->BBT01-T1	Auto	CLOSE	CLOSE
81_10_01XV13	PCU 001 V5.x (1)	781	Baseposition	1	BBT01-->BBT01-T1	Auto	CLOSE	CLOSE
81_10_02XV11	PCU 001 V5.x (1)	792	Baseposition	1	BBT02-03-T1-->BBT04-05-T1	Auto	CLOSE	CLOSE
81_10_03XV11	PCU 001 V5.x (1)	805	Baseposition	1	BBT02-03-T1-->BBT04-05-T1	Auto	CLOSE	CLOSE
81_10_04XV11	PCU 001 V5.x (1)	818	Baseposition	1	BBT04-05-T1-->BBT06-07-T1	Auto	CLOSE	CLOSE
81_10_05XV11	PCU 001 V5.x (1)	831	Baseposition	1	BBT04-05-T1-->BBT06-07-T1	Auto	CLOSE	CLOSE
81_10_06XV11	PCU 001 V5.x (1)	844	Baseposition	1	BBT06-07-T1-->T1-FILLER	Auto	CLOSE	CLOSE
81_10_07XV11	PCU 001 V5.x (1)	857	Baseposition	1	BBT06-07-T1-->T1-FILLER	Auto	CLOSE	CLOSE
81_10_07XV15	PCU 001 V5.x (1)	861	Baseposition	1	BBT06-07-T1-->T1-FILLER	Auto	OPEN	CLOSE
81_10_07XV15	PCU 001 V5.x (1)	861	Route	2	BBT06-07-T1-->T1-FILLER	Auto	OPEN	OPEN
91_10_01XV11	PCU 001 V5.x (1)	864	Baseposition	1	BBT06-07-T1-->T1-FILLER	Auto	CLOSE	CLOSE

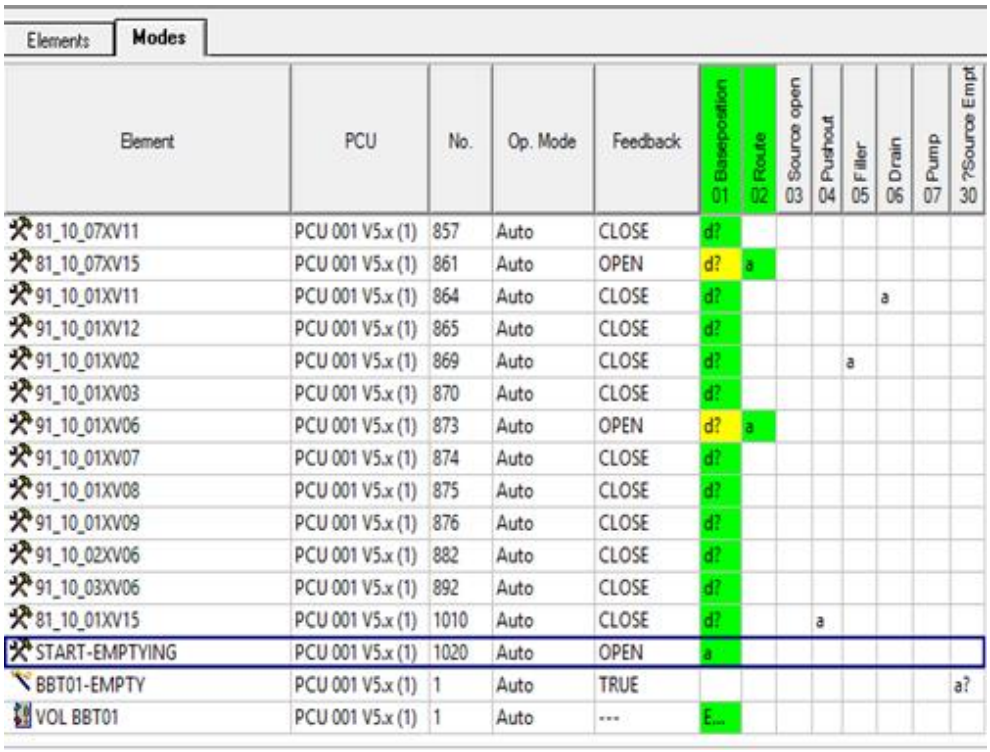
The symbols used for the Element types are described in the following table.

Table 10-1

Symbol	Element Type
	Control
	Sensor
	Parameter
	Link

In manual mode, activation and deactivation of modes is possible.

Figure 10-8

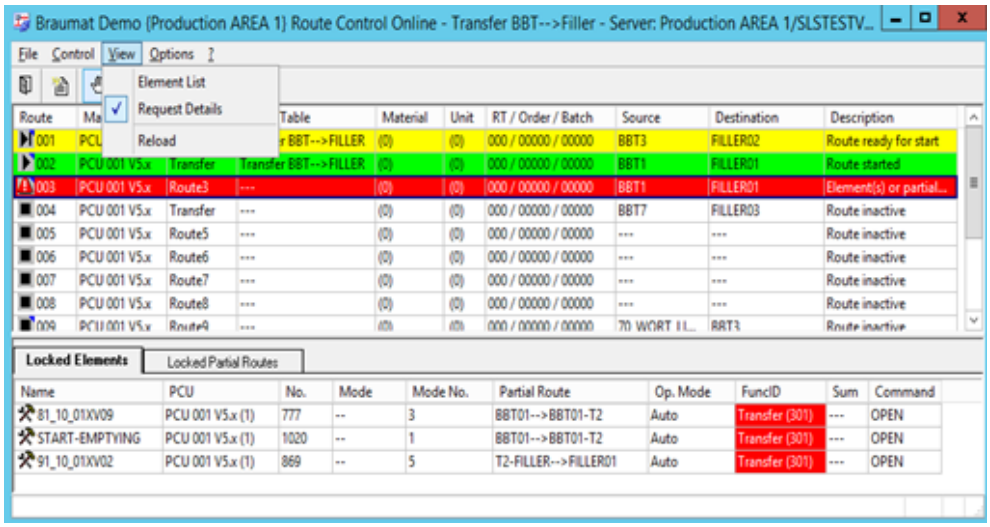


Element	PCU	No.	Op. Mode	Feedback	Baseposition 01	Route 02	Source open 03	Pushout 04	Filler 05	Drain 06	Pump 07	?Source Empt 30
81_10_07XV11	PCU 001 V5.x (1)	857	Auto	CLOSE	d?							
81_10_07XV15	PCU 001 V5.x (1)	861	Auto	OPEN	d?	a						
91_10_01XV11	PCU 001 V5.x (1)	864	Auto	CLOSE	d?					a		
91_10_01XV12	PCU 001 V5.x (1)	865	Auto	CLOSE	d?							
91_10_01XV02	PCU 001 V5.x (1)	869	Auto	CLOSE	d?				a			
91_10_01XV03	PCU 001 V5.x (1)	870	Auto	CLOSE	d?							
91_10_01XV06	PCU 001 V5.x (1)	873	Auto	OPEN	d?	a						
91_10_01XV07	PCU 001 V5.x (1)	874	Auto	CLOSE	d?							
91_10_01XV08	PCU 001 V5.x (1)	875	Auto	CLOSE	d?							
91_10_01XV09	PCU 001 V5.x (1)	876	Auto	CLOSE	d?							
91_10_02XV06	PCU 001 V5.x (1)	882	Auto	CLOSE	d?							
91_10_03XV06	PCU 001 V5.x (1)	892	Auto	CLOSE	d?							
81_10_01XV15	PCU 001 V5.x (1)	1010	Auto	CLOSE	d?			a				
START-EMPTYING	PCU 001 V5.x (1)	1020	Auto	OPEN	a							
BBT01-EMPTY	PCU 001 V5.x (1)	1	Auto	TRUE								a?
VOL BBT01	PCU 001 V5.x (1)	1	Auto	---	E...							

Diagnostic for route request errors

The cause of request errors is displayed in the view of request details.

Figure 10-9



10.4 RCS Faceplate (for route control)

The faceplate is used to display and control the status and operation of the routes for one function ID.

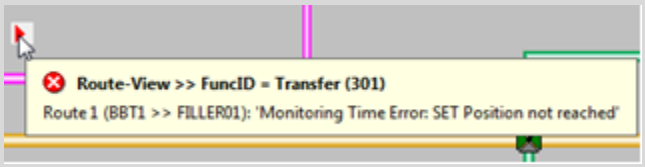
Icon representation of the RCS Faceplate in process picture

The current status of the route is indicated by a symbol in the detailed view:

Table 10-2

Icon	Route state
	Route is in state "idle" (inactive)
	Route is requested (the route is checked)
	Route is ok and active (control elements are checked and activated)
	Route is in stop (route is still active, outputs are not active)
	Route is active, but an error has occurred
	Route is in manual mode

NOTE Hover with the mouse pointer over the RCS icon to receive a tool tip with detailed information about the current element.



RCS Faceplate dialog view

This faceplates dialog view consists of three sections, from top to bottom:

- Route view
- Element view
- Message view

Figure 10-10

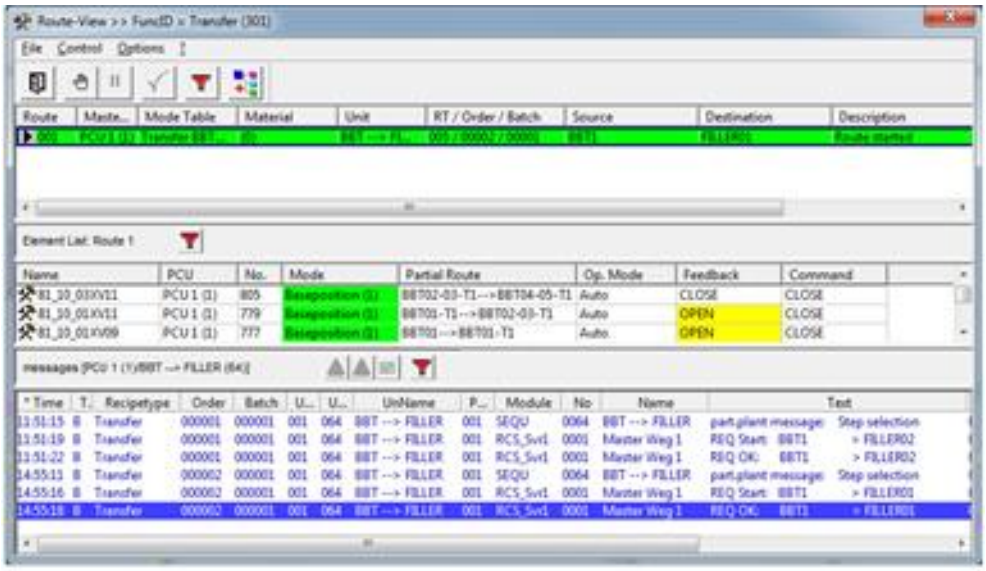
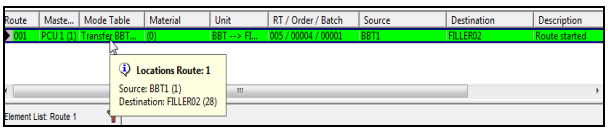
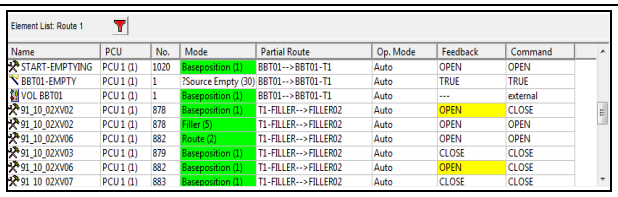
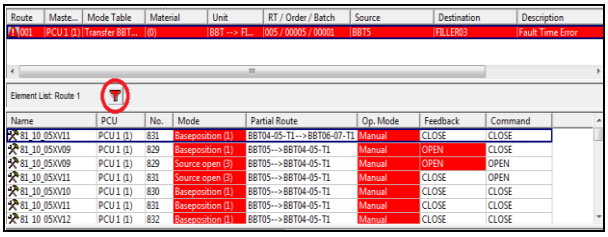
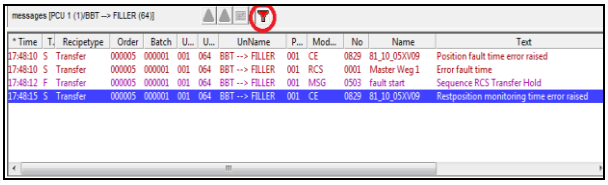


Table 10-3

View	Screenshot	Note
Route view		In this view the active routes are displayed. The full name of the element, name of source and destination are displayed as tool tips.
Element view		The element view is like the element view of RCS-online tool.

View	Screenshot	Note
Element view (filtered output)		For diagnostic a filter can be set to display only the faulty elements. Click the funnel icon on the window.
Message view		In the message window alarms are shown that originated in the plant section of the selected route. Filtering by clicking on the funnel icon reduces the displayed error messages again.

10.5 RCS Troubleshooting

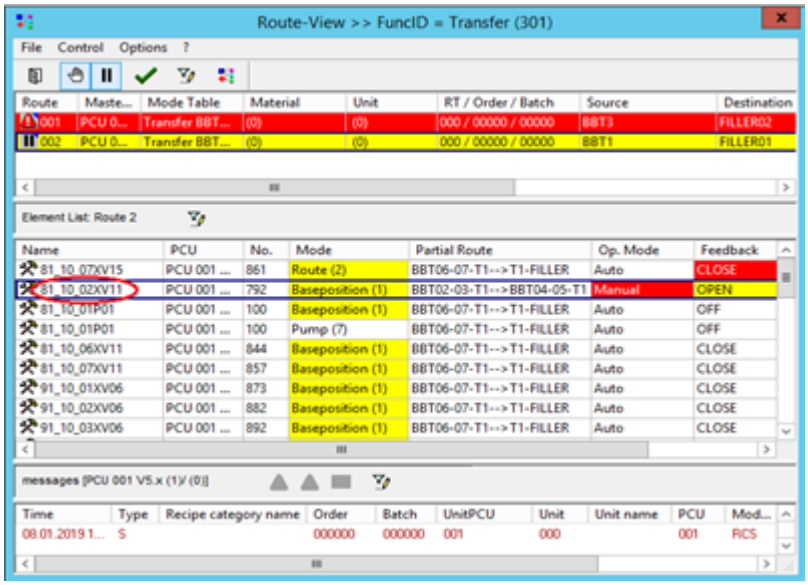
This section deals with problems which can occur in connection with step processing.

10.5.1 Process hangs because of Route Errors

NOTE If a plant unit does not step to the next step although the error is acknowledged, then probably the activated route is not working properly.

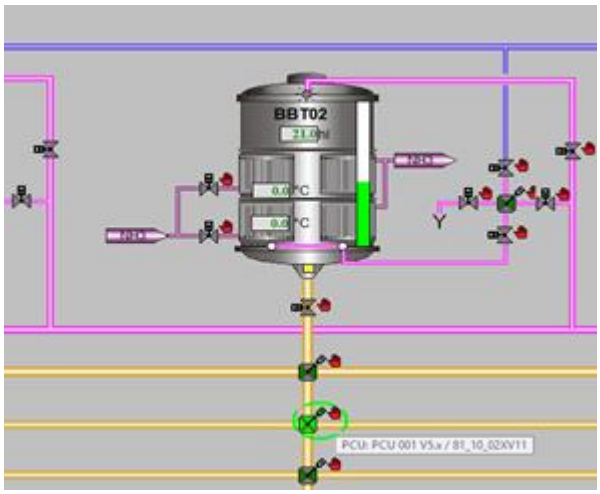
Open the RCS-faceplate dialog and navigate to the faulty route element.

Figure 10-11



A double click on the faulty route element will directly open the process picture where the element is located. From there the operator can analyze the Control Element.

Figure 10-12

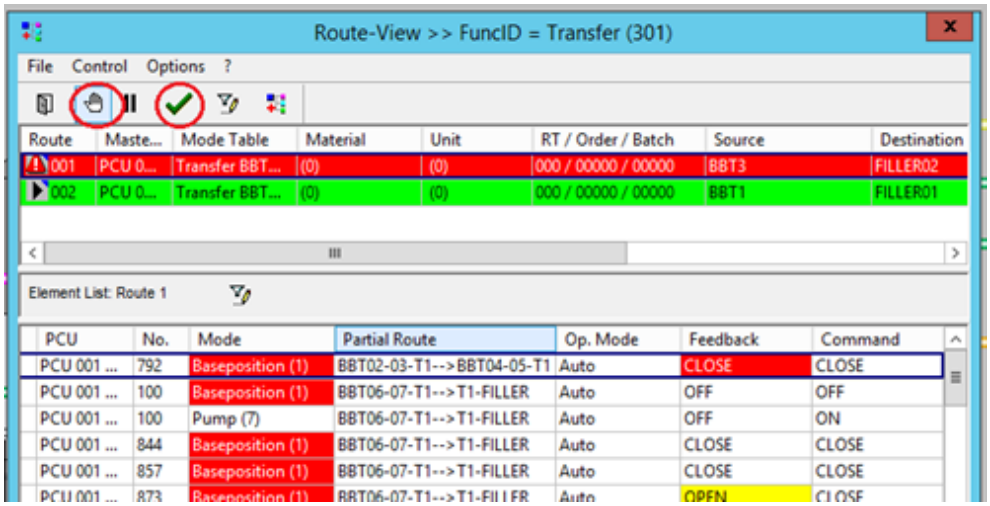


10.5.2 Acknowledge Alarms of RCS

NOTE The route error must be acknowledged after correction of the faulty element.

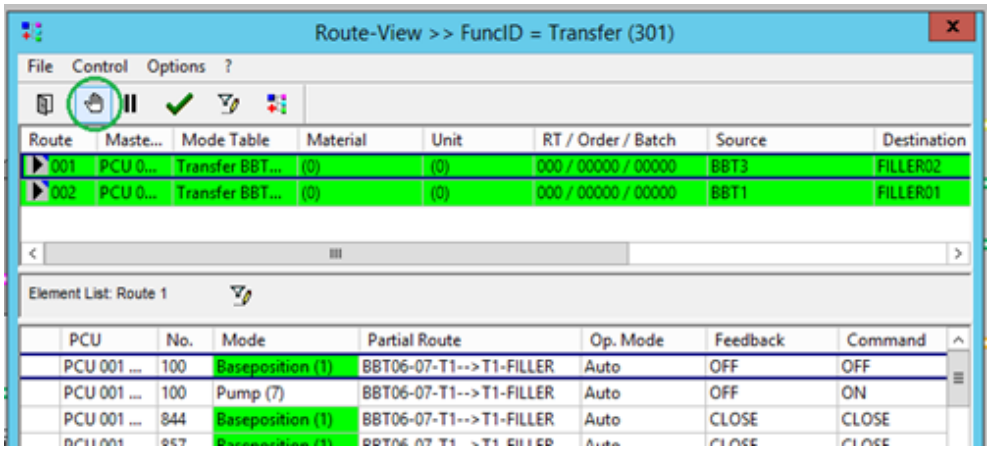
Set the route to manual mode and acknowledge the error.

Figure 10-13



The Route will be restarting after the error was acknowledged and can be switched to automatic again.

Figure 10-14



11 Troubleshooting

This section gives you a few hints to solve simple troubles which may occur during operating of the process.

11.1 Problems starting a Unit

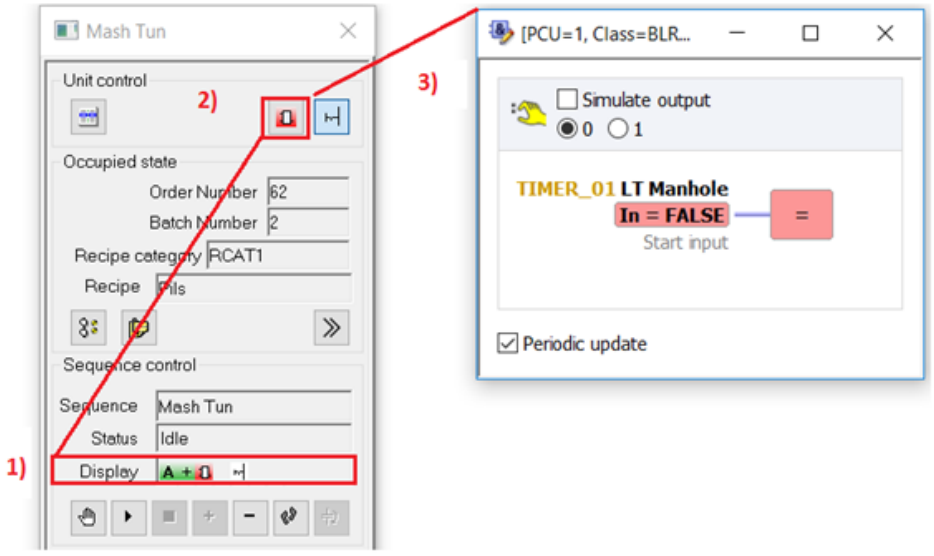
If the sequence of a plant unit doesn't start up properly check the following points:

- The sequence-status must be "A" (automatic) and "+" (step forwarding active). (see note 1 in the figure below)
- In case that an order parameter is used in the recipe, the sequence can only be started from the order system. When trying to start the sequence directly a "Recipe load" error will appear in the message system.
- The permanent condition must be ok. If the object is displayed in red. The system is locked and can't be started.

Figure 11-1

When pressing the button "permanent condition" (see note 2 in the figure below) the "Binary Logic Result" dialog opens (see note 3 in the figure below) which is displaying the reason of the lock.

Figure 11-2



11.2 Sequence Control Issues

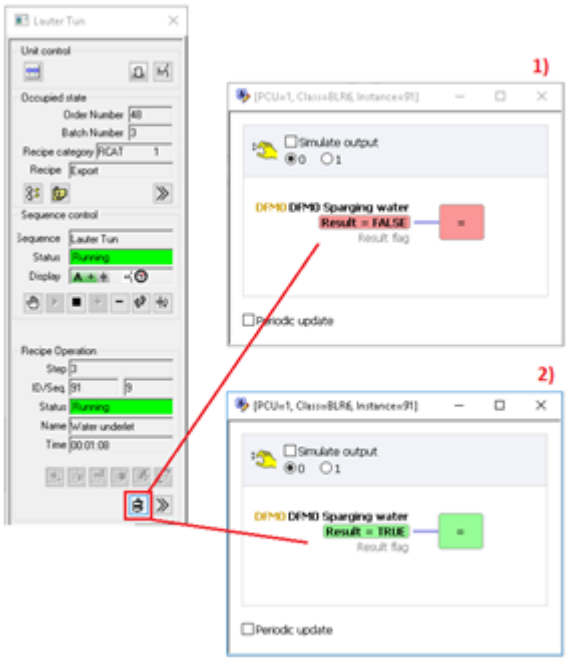
If the program doesn't proceed with the next step, the operator should check if all transition conditions, the so called "Next Step Condition" are successfully fulfilled. Typical errors are quantities which are not yet reached their set point values,

Synchronization Lines which are not yet reached or tanks which are not yet empty, etc. Depending on the configuration of the project the following procedure differs.

- In case that the Next Step Condition was engineered with a binary logic result object you can use the following procedure.
  - Open the corresponding Unit faceplate and press the button “Next Step condition”, the BLR dialog opens
  - Check which logically element was not fulfilled the condition

The example below is illustrating the scenario. In the example 1) the dosing of “Sparging water” is not finished yet. Therefore the “Next Step Condition” is not valid. In the example 2) the dosing of “Sparging water” is finished and the “Next Step Condition” is valid.

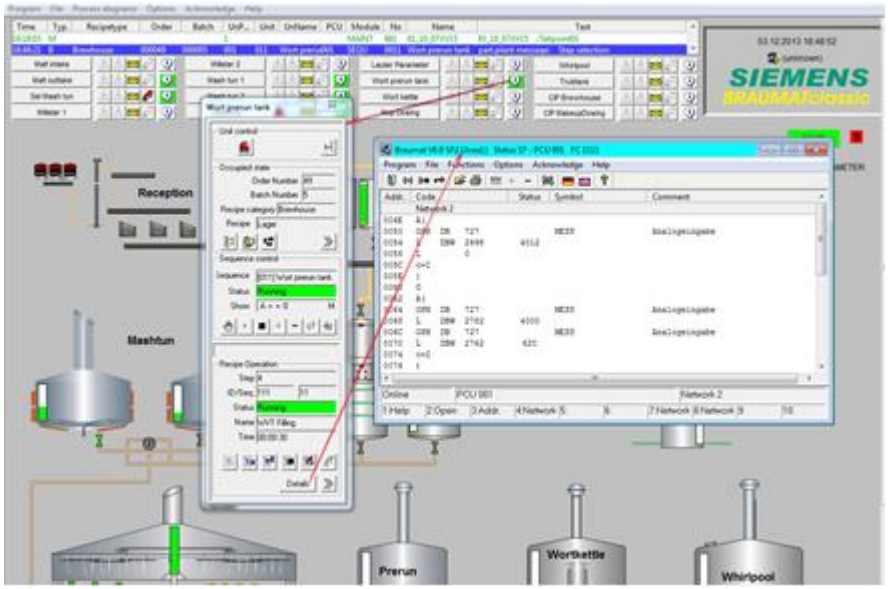
Figure 11-3



- In case that the automation layer was engineered with Step 7 classic and no “Binary Logic Result” Object was configured as next step condition, you can use the following procedure to identify why the next step condition will not become active.
  - Activate the S7-Code viewer of the relevant basic operation with the "Detail" button in the Unit faceplate.
  - Use the "+" button to go to the last network.
  - The display shows the relevant commands for the transition condition.

The example below is illustrating the scenario.

Figure 11-4



In case that the Next Step Condition is fulfilled but does not proceed the Sequence, the operator can check the following items from the list below:

- Is any transition condition (temperature, time) not fulfilled?
  - Chose the sequence and select “Program”, “Step-on-condition” or press F4 to see the transition conditions.
- Is there an operator request pending?
- Is the program waiting for another sequence (synchronization line)?
  - Check the corresponding icon in the Sequence Control Faceplate as displayed in Figure 11-5
  - Or check the corresponding online recipe.
    - Select the correct sequence from the Sequence Control and press F9.
    - Or press the corresponding Button from the Faceplate.

The graphical recipe will come up and synchronizations are displayed.

Figure 11-5

- Are there relevant entries in the Alarm list?
- Is the sequence in "automatic" mode?
  - The automatic mode of the sequence must be set to “A” in the column "Status”.
- Is the Step set to hold, indicated by status “A –“?
  - In that case the “Status” column must be set to "+".
- Are there any error messages from one of ICM's used in this area?

11.3 Troubleshoot Recipe Server

In case of a redundant server configuration there is an “active” and a “passive” recipe server. The recipes are stored on both servers but only one server will download the control recipes to the PCU when starting an unit. A recipe-load error may occur if both recipe servers having the status “passive”. In that case the recipe server can set to status “active” manually.

To identify and change the state of the recipe navigate to the PCU Server and check the corresponding symbols in the toolbar.

NOTE The PCU Server must not be closed. Otherwise the connection to the process will be lost!

The PCU Server can be found in the Taskbar indicated by the following symbol

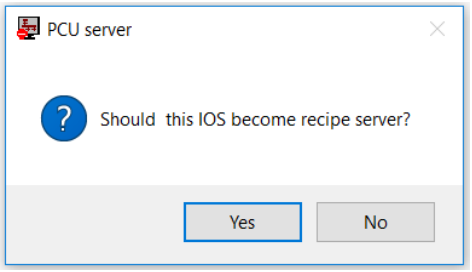
Figure 11-6

By clicking on the symbol, the PCU Server Dialog appears on the foreground.

Figure 11-7

The icons are explained in the following table

Table 11-1

Icon	Note
	The recipe server has the state “active”.
	The button to activate the Recipe Server is grayed out in that case.
	By pressing the button “Activate the Recipe Server” a further dialog opens. By pressing the “Yes” Button the Recipe Server will become “Active” 

NOTE If configured an automatic switch-over of the recipe servers occurs when the active server fails.

Troubleshooting

The recipe server can only operate properly when all of the following conditions are met, see also Figure 11-4.

- All connections must be established for each PCU in the PCU-Server. (To verify this, switch the PCU-server with the pull-down menu to "View", "coupling-status".)
- The connection state for the PCUs is green.
- The network cables must be connected properly.
- The PCU must not be in state "STOP".

12 Appendix

12.1 Service and Support

Industry Online Support

Do you have any questions or need assistance?

Siemens Industry Online Support offers round the clock access to our entire service and support know-how and portfolio.

The Industry Online Support is the central address for information about our products, solutions and services.

Product information, manuals, downloads, FAQs, application examples and videos – all information is accessible with just a few mouse clicks at:
https://support.industry.siemens.com

Technical Support

The Technical Support of Siemens Industry provides you fast and competent support regarding all technical queries with numerous tailor-made offers – ranging from basic support to individual support contracts. You send queries to Technical Support via Web form:
www.siemens.com/industry/supportrequest

Service offer

Our range of services includes, inter alia, the following:

- Product trainings
- Plant data services
- Spare parts services
- Repair services
- On-site and maintenance services
- Retrofitting and modernization services
- Service programs and contracts

You can find detailed information on our range of services in the service catalog:
https://support.industry.siemens.com/cs/sc

Industry Online Support app

You will receive optimum support wherever you are with the "Siemens Industry Online Support" app. The app is available for Apple iOS, Android and Windows Phone:
https://support.industry.siemens.com/cs/ww/en/sc/2067

12.2 Related literature

Table 12-1

	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Download page of this entry https://support.industry.siemens.com/cs/ww/en/view/80142364

12.3 Change documentation

Table 12-2

Version	Date	Modifications
V1.0	01/2014	First version
V1.1	03/2019	Second Version adopt to BRAUMAT / SISTAR V7.5
V2.0	07/2019	Various changes