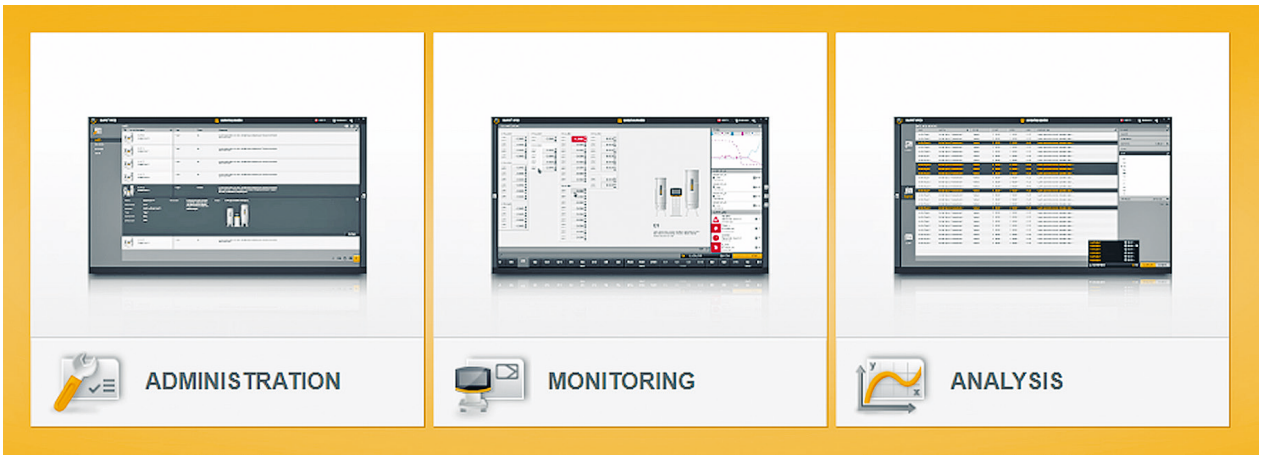
Operating Instructions

BioPAT® MFCS 4

Software



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Contents

1 About these Instructions

These operating instructions provide you with all the information necessary to install, configure, and operate the BioPAT® MFCS 4 program.

These operating instructions must be read, understood, and applied by all personnel working with the program.

Please read the operating instructions carefully and completely before using this program. These operating instructions are part of the program.

A printout of these operating instructions can be ordered in return for payment.

Please contact your local Sartorius sales office (www.sartorius.com).

The program installed on a computer is used together with Sartorius devices. This description is based on the current version of the program and the current versions of the devices.

The program is available in a basic version that can be extended with program modules depending on the configured device being used. The additional program modules are available upon request. Please contact your local Sartorius sales office (www.sartorius.com).

The illustrations of the program in these operating instructions were created with the “English” language settings (for language settings, see Chapter “5.4 [SETTINGS] Menu”, page 71).

1.1 Accompanying Documents

- ▶ In addition to these instructions, observe the following documents:
  - BioPAT® MFCS 4 Calculation Module Operating Instructions
  - BioPAT® MFCS 4 Charting Module Operating Instructions
  - BioPAT® MFCS 4 Sample Data Module Operating Instructions
  - BioPAT® MFCS 4 Recipe Control Module Operating Instructions
  - BioPAT® MFCS 4 OPC Client Module Operating Instructions
  - BioPAT® MFCS 4 OPC Server Module Operating Instructions

1.2 Validity

The operating instructions apply for use in combination with the following devices:

- Only DCU4 devices with Firmware 4.8 or higher are supported.
- Devices connected via the serial interfaces RS-232 and RS-422 are **not** supported.

▶ To connect additional devices: Contact Sartorius Service (see Chapter “9 Sartorius Service”, page 193).

1.3 Target Groups

These instructions are written for the following target groups. The target groups must have acquired the knowledge indicated below.

Target group	Knowledge and qualifications
User	The user is familiar with how to operate the product and with the associated work processes. The user is familiar with the hazards that may arise when working with the product, and is able to avoid these hazards. The user has received training on how to operate the product.
Administrator	The administrator is responsible for integrating the product into a network or a production process. The administrator is responsible for the reliable functioning of the product. The administrator has received training on how to operate the product.
Operator	The operator of the product is responsible for complying with the safety and occupational health requirements. The operator must ensure that all personnel working with the product have access to the relevant information and have received training on working with the product.

1.4 Symbols Used

Text statements in these operating instructions to which you should pay particular attention as they represent an indication and a direct warning of dangers are marked as follows:

NOTICE
This indicates a hazard with a low risk which could result in property damage if not avoided.

The following symbols are also used:

- – Texts that follow this symbol are lists.
- ▶ Texts that follow this symbol describe activities that are to be performed in the specified order.
- ▷ Texts that follow this symbol describe the result of an action.
- [ ] Reference to operating and display elements

2 Basic Principles of Program Use

2.1 Legal Information

2.1.1 Operating Instructions

These operating instructions or parts thereof must not be reproduced or transmitted to others in any form. All rights reserved by Sartorius Stedim Systems in accordance with copyright laws. The operating instructions are intended for use by the purchaser only. Transfer to third parties, whether free of charge or in return for payment, is not permitted.

2.1.2 BioPAT® MFCS Program

The program contained on the BioPAT® MFCS DVD is the property of Sartorius Stedim Systems GmbH. Sartorius Stedim Systems GmbH possesses the copyright for the BioPAT® MFCS program and will hold you accountable for any and all damages arising through copyright violations on your part.

The license agreement for the BioPAT® MFCS program will be displayed when you install the program (see Chapter 2.4.2, page 12).

License Agreement

In particular, the following shall apply:
- With the exception of a backup copy, the program may not be reproduced, changed, reverse engineered, or modified by recompiling.
- The program must not be used on more than one computer or virtual machine at a time.
  If you would like to use the software on a multi-user system, please contact your local Sartorius sales office (www.sartorius.com) to obtain a multi-user license.
- The software is intended for use by the purchaser only. Transfer to third parties, whether free of charge or in return for payment, is not permitted.

Demo Version

When provided with a demo version at no charge, the purchaser/user only has the right to the simple, non-exclusive use of the software in trial mode. If the purchaser/user uses the demo version in normal business operations without permission, all liability on the part of Sartorius Stedim Systems for any loss or damage associated with the software is completely excluded.

If you experience problems with the enclosed program, please contact Sartorius Service (see Chapter “9 Sartorius Service”, page 193).

No liability is accepted for the software of other developers provided on the DVD-ROM or program already installed on your system.

Users shall be liable for the improper use of said program.

2.1.3 Trademark Rights

The product name "BioPAT®" is a registered trademark of Sartorius Stedim Biotech.

Microsoft® product names and the Windows Logo are registered trademarks of the Microsoft Corporation®.

Other product names mentioned in these operating instructions may be trademarks or registered trademarks of the respective companies and are hereby acknowledged.

2.2 Safety Instructions

NOTICE

Property Damage due to Improper Use of the Program

Changes to the program through recompiling, incomplete, or faulty inputs may lead to incorrect product tests and/or incorrect reports. Incorrect tests and incorrect reports can result in property damage.

- Do not carry out any recompiling of the program. If any modifications to the program are required, these should only be carried out by Sartorius employees.
- Please read the operating instructions before using the program.
- Only use the program as described in the operating instructions.
- The installation instructions and operating instructions should be stored such that they are always accessible to all individuals who work with the program.
- The program can be operated correctly only on computers which fulfill the minimum requirements (see Chapter 2.5.2, page 12).
- The user must be qualified to handle the device used and be aware of the hazards which are potentially associated with the process (see operating instructions of the device used).

2.3 Intended Use

The intended use of the software requires that you

- install the program on your system in accordance with the installation instructions,
- have read the operating instructions,
- use the program only as described in the operating instructions,
- only control the devices and components approved by Sartorius with the program.

Improper Use

You are deemed to be using the program improperly if

- you change it through recompiling,
- you use it in ways other than those described in the operating instructions.

2.4 Scope of Delivery

2.4.1 Data Carriers

2.4.1.1 Installation File

The installation file of the BioPAT® MFCS program is located on a DVD. The DVD can be ordered together with or purchased separately from a BIOSTAT®, SARTOFLOW®, CERTOMAT®, or FlexAct® device.

2.4.1.2 Configuration File

The configuration file for the corresponding device is located on a separate CD. The configuration file contains all of the information on how to configure the device used.

The setup of the "DEVICES" and "UNITS" is described in detail in Chapter "5 ADMINISTRATION Function Pane", page 39.

When a previous version (e.g., MFCS/win) is updated, the configuration file is already on your system (file path "<Drive>:\MFCS_win\Database\ MFCSCONF.MDB"), where it can be loaded.

For more detailed information on this, please refer to the "Transfer Configuration" section in the "MFCS/win 3.1 System Manager's Handbook."

2.4.2 Download via the Internet

The installation file of the BioPAT® MFCS program can be downloaded at "http://www.sartorius.com/biopatmfcs."

2.5 Requirements

2.5.1 Operating Personnel

- The operator must have technical knowledge in biotechnology
- The operator must have experience in dealing with the program functions and elements of the user interface of the operating system.

2.5.2 Hardware/Operating System

To install and run the BioPAT® MFCS 4 program, the minimum requirements listed in the tables below must be met.

Single User Installation (Client and Server)

Category	Minimum requirement
Processor/clock rate	4-core processor/2.5 GHz
RAM	8 GB
Hard drive space	250 GB (recommended)
Network adapter	1 x LAN adapter, RJ-45, 1 Gbit

Category	Minimum requirement
Graphics card	DirectX 10, 1 GB RAM (recommended)
Screen resolution	1366 x 768 (1920 x 1080 recommended), 100% scaling and arrangement
Operating system	Windows 8.1 64-bit, Windows 10 64-bit

Client Installation

Category	Minimum requirement
Processor/clock rate	4-core processor/2.5 GHz
RAM	4 GB
Hard drive space	50 GB
Network adapter	1 x LAN adapter, RJ-45, 1 Gbit
Graphics card	DirectX 10, 1 GB RAM (recommended)
Screen resolution	1366 x 768 (1920 x 1080 recommended), 100% scaling and arrangement
Operating system	Windows 8.1 64-bit, Windows 10 64-bit

Server Installation

Category	Minimum requirement
Processor/clock rate	8-core processor/2.5 GHz
RAM	16 GB
Hard drive space	250 GB
Network adapter	1 x LAN adapter, RJ-45, 1 Gbit
Operating system	Windows Server 2016, Windows Server 2019

Terminal Server Installation

Category	Minimum requirement
Processor/clock rate	4-core processor/2.5 GHz
RAM	16 GB + 2 GB per session
Hard drive space	250 GB
Network adapter	1 x LAN adapter, RJ-45, 1 Gbit
Client screen resolution	1366 x 768 (1920 x 1080 recommended), 100% scaling and arrangement
Operating system	Windows Server 2016, Windows Server 2019

2.5.3 Additional Program

Program Help

To use the program help, you must install program that can display PDF files. Suitable program is Adobe Reader, for example.

Data Export

The stored process data can be exported in the format of a CSV file and further edited using spreadsheet program. Suitable program is Microsoft® Excel, for example.

Database (Backup & Restore)

You can install SQL Server Management Studio to create a backup or restore a backed up database. The program is located on the installation DVD.

2.6 Program Description

The BioPAT® MFCS program is SCADA (Supervisory Control and Data Acquisition) software for batch-oriented cultivation or filtration processes.

The following list shows some of the most important functions:

- Installation environments:
  - Use of the program on an single-user computer or in a Windows network
  - Installation of the program in a virtual environment
  - Installation of the program in a terminal server environment (e.g., Microsoft Remote Desktop Services or Citrix XenApp)
- Data acquisition, control, and monitoring of bioprocesses
- Configuration of up to 24 process units
- Suitable for use with shakers, bioreactors, crossflow and FlexAct® systems
- User-friendly and intuitive graphical interface
- Dynamic language switching for cooperation in international teams
- Grouping of process units enables clear comparisons and universal actions
- Synchronization with process events in the trend split view
- Comfortable and effective working with user-specific templates
- Multi-monitoring for displaying the application on multiple screens
- Simple and flexible data export as a CSV file
- Comprehensive search and filter options with favorites function
- Printing of lists for system documentation and configuration
- Generation of random process values with one simulation device
- Transmission of controller setpoints enables remote control of devices
- Selection between equidistant or event-based data storage

2.7 Program Setup and Operation Procedure

This section provides an overview of the program setup and operation procedure. There are four steps to carry out when installing the BioPAT® MFCS program for the first time:

Step	Action	Chapter
1	Default settings and installation: – Define default settings for the operating system of the MFCS computer – Define default settings on the device (e.g., IP address) – Install the BioPAT® MFCS program	Chapter "3 Default Settings and Installation", page 16
2	BioPAT® MFCS program setup: – Basic system settings – Set up the communication level for the "Devices" connected device – Set up the "Units" process level	Chapter "5 ADMINISTRATION Function Pane", page 39
3	Display and recording of process values and higher-level control of the device: – Create batch processes – Select control modules for trend monitoring – Trend display settings	Chapter "6 MONITORING Function Pane", page 74
4	Analysis of batch processes: – Display batch processes – Export batch process data	Chapter "7 ANALYSIS Function Pane", page 152

If the default settings and installation have already been carried out, start with Step 2.

3 Default Settings and Installation

3.1 Default Settings

3.1.1 Operating System Configuration

Sartorius Stedim Systems recommends installing the BioPAT® MFCS program on a newly installed operating system to avoid any compatibility issues that may occur with previously installed program.

Before installing the BioPAT® MFCS program, you must configure the settings for your operating system.

The operating system settings are checked during installation. Incorrect settings in the operating system will lead to error messages or the installation being aborted.

The following tasks must be completed in the operating system:

Tasks	Chapter, Page
Disable the power-saving mode of the network card	3.1.1.1, 17
Determine the network IP address	3.1.1.2, 17
Define the screen settings	3.1.1.3, 18
Set the computer name	3.1.1.4, 18
Configure the Windows Firewall	3.1.1.5, 18
Configure Windows Update	3.1.1.6, 19
Power options	3.1.1.7, 20

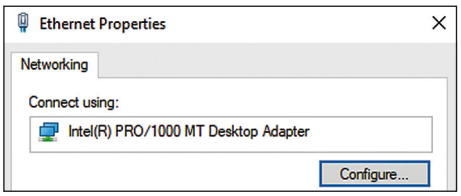
3.1.1.1 Disabling the Power-Saving Mode of the Network Card

If the power management function of the network card is available, the power-saving mode must be deactivated.

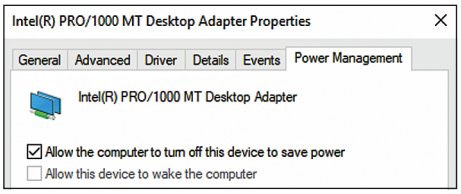
Qualification Required: Administrator

Procedure

▶ Open the configuration menu of the network card.



▶ Click on the [Configure] button.
▶ Select the [Power Management] tab.



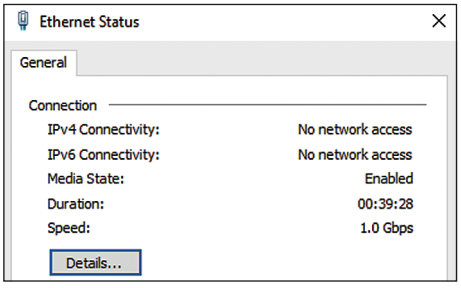
▶ Disable the option [Allow the computer to turn off this device to save power].

3.1.1.2 Determining the Network IP Address

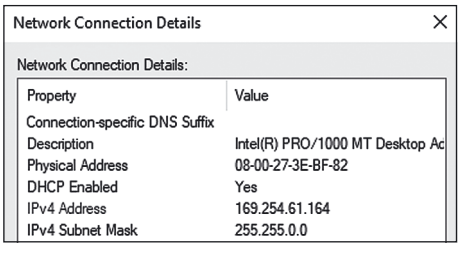
Communication between the BioPAT® MFCS program and a DCU device takes place via a network connection. Before the network connection between the computer and the DCU device is established, the IP address of the computer's network card must be determined.

Qualification Required: Administrator

Procedure



▶ View the details of the network card. To do this, click on the [Details] button.
▶ Click on the [Details] button.



▷ The IPv4 address is included among the details that are displayed.

3.1.1.3 Defining the Screen Settings

Qualification Required: Administrator

Screensaver

Given the security regulations and the FDA requirements in 21CFR Part 11, we recommend that if a screensaver is used it be protected by a password.

Procedure

- ▶ If a screensaver is used, protect it with a password.
- ▶ If the screensaver is to remain activated: Do **not** use processor-intensive screensavers supplied by other manufacturers, as these might lead to the loss of data when running a batch process.
  - ▶ Replace processor-intensive images.

Screen Resolution

The minimum requirement for the screen resolution for the program is 1366 x 768 pixels. The recommended screen resolution is Full HD (1920 x 1080).

Procedure

- ▶ Check the screen resolution setting. If necessary: Change the screen resolution.

Scaling

The scaling of the screen display must be set to 100%.

Procedure

- ▶ Check the scaling of the screen display. If necessary: Set the scaling to 100%.

3.1.1.4 Computer Name

The computer name is part of some BioPAT® MFCS configuration settings and is used by default to identify printouts.

Qualification Required: Administrator

Procedure

- ▶ Observe your company's guidelines for assigning names.

3.1.1.5 Windows Firewall

The Windows firewall is activated by default for the "Public network" and "Domain" network profiles.

Qualification Required: Administrator

Requirements

- The Windows Firewall is switched on.
- Computer in a corporate network: Printer and file sharing must be enabled for the "Domain" network profile.

Procedure

▶ If the MFCS server (server installation) is accessed by separately installed clients (client installations): Create the firewall rule on the computer with the server installation (see the following table for settings).

Step	Setting
Inbound rules	New rule
Rule type	Program
Program	Program path for the directory configured by default "C:\Program Files\Sartorius\BioPAT_MFCS\Services\Sartorius.Sscada.SL.WCFHostService.exe." The installation location was selected during program installation and may differ from the program path specified above.
Action	Allow connection
Profile	Domains, private, and public
Name	Name of the firewall rule

▶ If the MFCS server (server installation) is **not** accessed by a separately installed client (client installation): Adjust the firewall settings in accordance with the corporate network.

3.1.1.6 Windows Update

The Windows Update function is set by default to "Install updates automatically". With this setting, the updates are automatically downloaded to the computer when it is connected to the Internet and then installed.

This can result in:
- the program files which are used jointly with Windows becoming modified, which may lead to malfunctions in the BioPAT® MFCS program.
- the computer suddenly rebooting after an update. The ongoing recording of a batch process will be interrupted.

If the Windows Update function is set to manual, pending updates are displayed. The user can select updates individually and start the update and installation procedure at a time when no batch processes are being recorded.

Qualification Required: Administrator

Procedure

▶ Set the Windows Update function to manual update search.

3.1.1.7 Power Options

The batch processes are recorded by the BioPAT® MFCS program. Depending on the type of process, the batch process may run over a prolonged period.

Power profiles allow for reduced power consumption by scheduling the deactivation of individual computer components or of the system.

The appropriate power profile helps you prevent recording from being interrupted because individual computer components or the system as a whole has shut down.

Qualification Required: Administrator

Procedure

▶ Check the power profile. If necessary: Disable standby mode and sleep mode.

3.1.2 Configuring the IP Address on the Device

Communication between the device and the BioPAT® MFCS program takes place via a network connection. Before the network connection between the device and the computer is established, the IP address of the device's network card must be determined and configured.

Qualification Required: Administrator

Procedure

▶ To configure the IP address on the device: See the instructions for the device.
▷ The IP address of the device must match the 1st, 2nd, and 3rd parts of the computer's IP address. The number in the 4th part of the IP address of the device must be different from that of the 4th part of the IP address of the computer.

3.2 Installation

Installation Types

The program can be installed using two different installation types:

- Installation of the MFCS server and the MFCS client on a computer (single-user installation)
- Separate installations of the MFCS server and one or more MFCS clients on computers in a Windows network.
  - 90-day demo version: Up to 30 MFCS clients can be connected to the MFCS server at the same time.
  - One MFCS client can be connected to exactly one MFCS server.
  - The program versions of the MFCS server installation and the MFCS client installation must be identical. If necessary, the MFCS client installation must be upgraded to the version of the MFCS server installation.

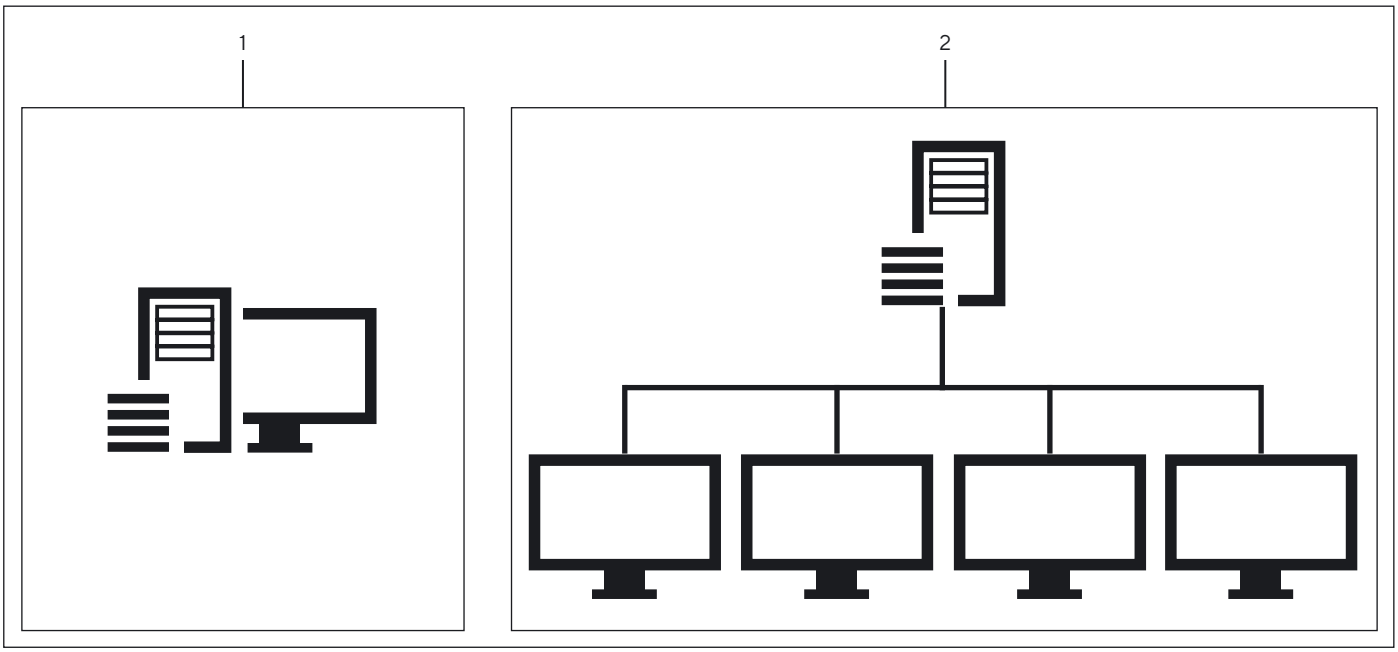


Fig. 3-1: Installation types, separate installation with 4 MFCS clients (example)

Pos.	Symbol	Description
1		Installation of the MFCS server and MFCS client on a computer (single-user installation)
2		Separate installations of the MFCS server and the MFCS client(s) on computers in a Windows network.
		MFCS server installation on a server computer in a Windows network
		MFCS client installation on a client computer in a Windows network

Installation Method

The program can be installed using two different methods:
- [Express] installation method: The program is installed with the default settings.
- [Advanced] installation method: The program is installed with user-defined settings.

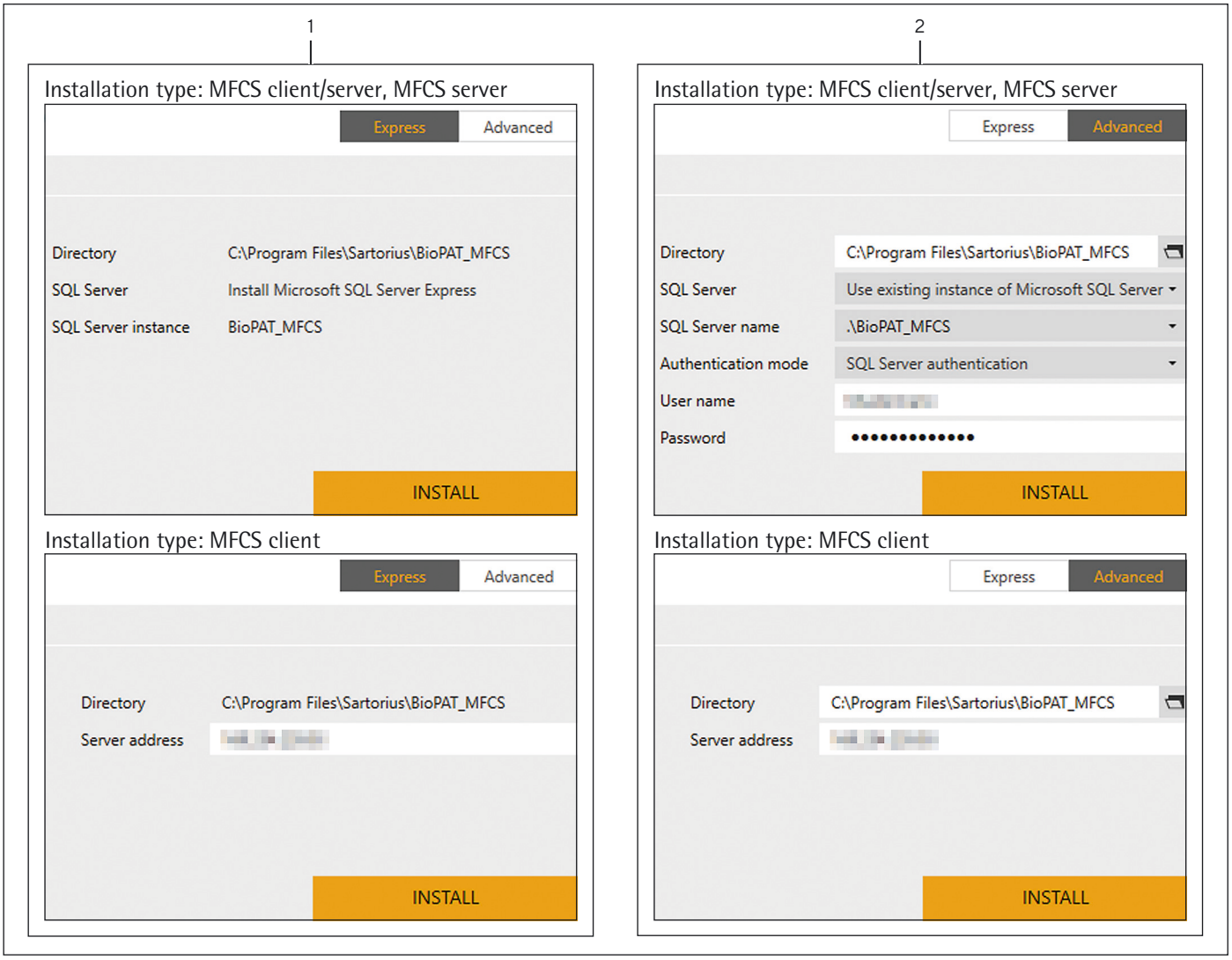


Fig. 3-2: [Express], [Advanced] configuration menus depending on the installation type

Pos.	Field	Description
1		[Express] installation method: Settings and input screen
2		[Advanced] installation method: Settings and input screens
	Directory	– Displays the configured directory of program files. – Selects the directory of the program files.
	SQL Server	– Reinstalls Microsoft SQL Server. – Uses an existing instance of a Microsoft SQL Server installation
	SQL Server instance	Displays the default instance name “BioPAT_MFCS.”
	SQL Server name	For entry of a modified instance name
	Server address	For entry of the IPv4 address or the host name of the server (computer with server installation)

Pos.	Field	Description
	Authentication mode	Displays the authentication mode and selects the authentication mode.
	User name	If “SQL Server authentication” is selected: for entry of the user name
	Password	If “SQL Server authentication” is selected: for entry of the password
	INSTALL	Starts the installation.

3.2.1 Installing the Program

Requirements

- The hardware requirements are met.
- The settings for the operating system have been configured.
- Login is carried out by means of a user account with administrator rights.

Procedure

▶ Call up the “Sartorius_BioPAT_MFCS_Setup_4.x.x” set up file from the installation medium and double-click.
▷ After displaying the greeting, the following window appears:

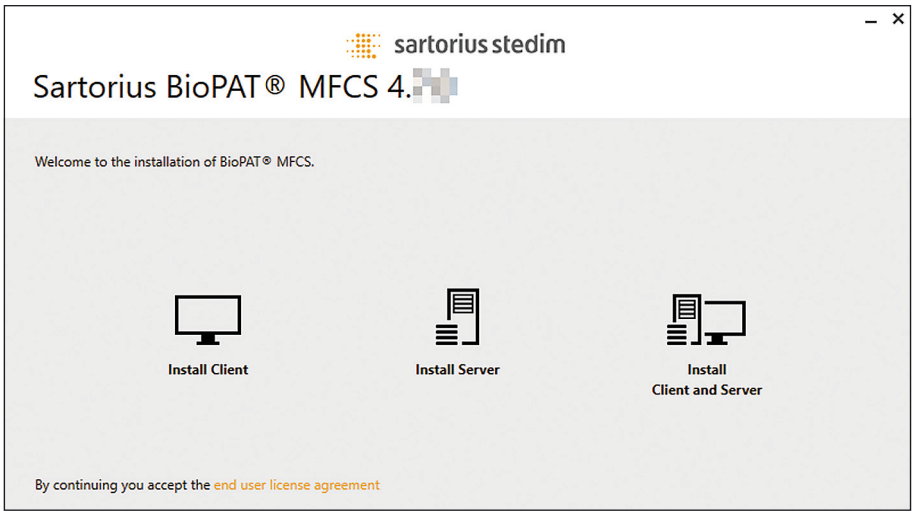


Fig. 3-3: Selection window for installation type

▶ Select the installation type.
  ▶ To install the MFCS server and the MFCS client on a computer: Click on the [Install Client and Server] button.
  ▶ To install the MFCS server: Click on the [Install Server] button.
  ▶ To install the MFCS client: Click on the [Install Client] button.
▷ The system requirements are checked.
  ▷ If the recommended hardware requirements are **not** met, the following message appears in the selection window (example).

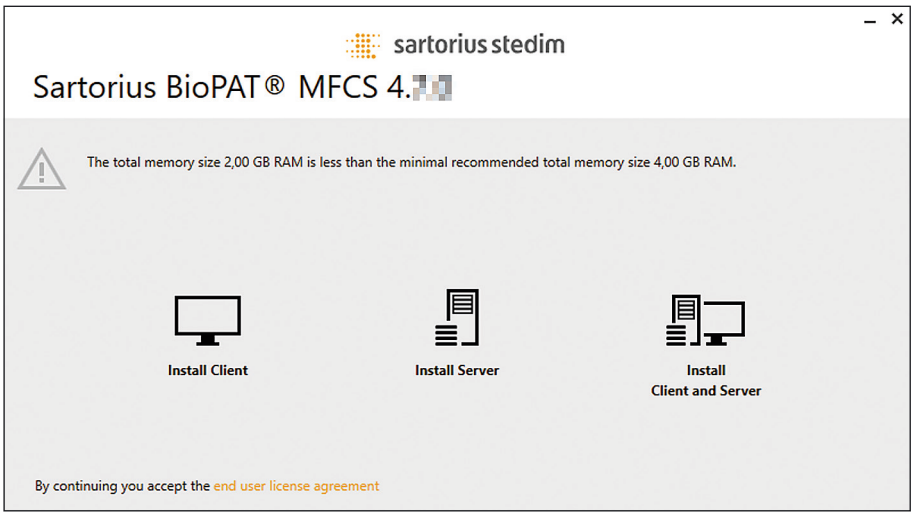
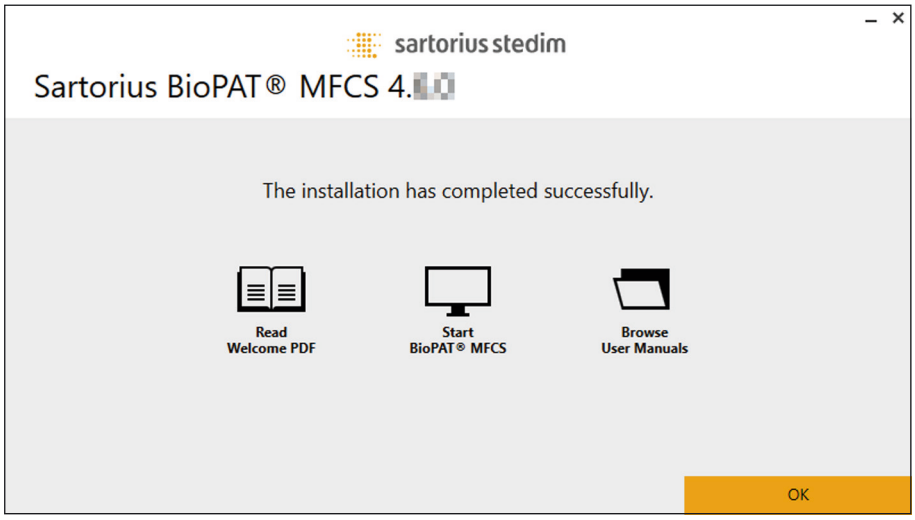


Fig. 3-4: Message in the selection window regarding hardware recommendations (example)

  ▷ Example: The installed RAM is lower than the recommended minimum amount of 4 GB. For simple requirements (demo version) the RAM is initially sufficient.
  ▷ However, this can cause problems with a production system and if the software is later expanded to include additional functions.
  ▶ To proceed with the installation: Click again on the button with the selected installation type.
▷ The window for selecting the installation method appears. The [Express] installation method with default settings is preset.
▶ To install the program with the default settings: Click on the [INSTALL] button.
  ▶ If the request for user account control is shown: Confirm the request with [Yes] and follow the remaining instructions.
▶ To install the program with user-defined settings: Click on the [Advanced] button.
  ▶ Apply the user-defined settings.
  ▶ Click on the [INSTALL] button.
  ▶ If the request for user account control is shown: Confirm the request with [Yes] and follow the remaining instructions.

▷ The installation procedure for the program components appears.
▷ The successful installation is displayed.



▶ Complete the installation procedure. If necessary:
  ▶ Complete the installation procedure immediately. To do this, click on the [OK] button.
  ▶ Open the PDF with the general program information (e.g., information on published versions). To do this, click on the [Read Welcome PDF] button.
  ▶ Open the folder in which the Operating Instructions are saved. To do this, click on the [Browse User Manuals] button.
  ▶ Start the program. To do this, click on the [Start BioPAT® MFCS] button.

3.3 Using the Program

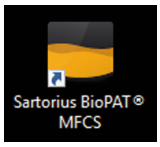
When you start the program, you have the choice of carrying out the licensing process for the program or testing the program for 90 days as a demo version.

3.3.1 Testing the Program as a Demo Version

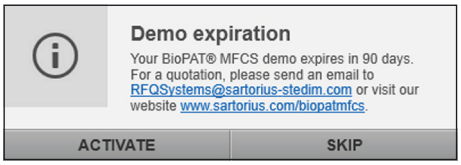
The demo version is fully functional for 90 days with all functions. After 90 days the program is terminated and any batch processes that have started are automatically stopped.

- In demo mode, up to
  - 24 units can be created and configured.
  - 30 client/server connections can be used at the same time.
- The selection window is displayed in demo mode every time the program is started, when the program closes and every 24 hours.
- Make sure that you stop any batch processes that have been launched within these 90 days and back up and/or export the recorded data (see Chapter 6.4, page 96 and Chapter 7.4.2, page 158).
- License the program within 90 days to be able to continue using the program.
- If you upgrade from an installed demo version to a higher demo version (e.g., from Version 4.6.0 to Version 4.7.0), the demo period is reset to 90 days.

Procedure



▶ Double-click the program icon on the desktop.



▷ The selection window for the type of program use appears.
▶ Click on the [SKIP] button.
▷ The program is started as a demo version and the program interface is displayed (see Chapter 4.1, page 32).

3.3.2 Program Licensing

The program and additional modules are activated with the aid of license keys. The license keys are available after purchasing the program or after purchasing additional modules. The program and modules can be used for an unlimited period of time (“Lifetime” licensing model). The Service and Support License represents an exception to this rule. The Service and Support License runs for a limited period and must be renewed after it has expired.

3.3.2.1 Licensing of Additional Client/Server Connections

Additional client/server connections can be used for an unlimited period of time.

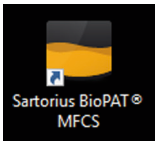
An older program version which has already been licensed and activated and which does **not** include this function can be updated to a version that does include it. The 90-day demo mode is **not** activated for this function, however. The function must be enabled with an additional license key.

The maximum number of simultaneous client/server connections
- is displayed after licensing/activation and after restarting the client in the [ABOUT] window as license information for the program core (BioPAT® MFCS).
- is restricted to one client/server connection provided that **no** license key has been entered for client licensing.

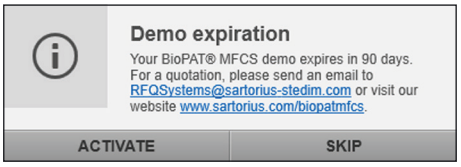
3.3.2.2 Registering the Program

If you have **not** activated the program yet, it must be registered first.

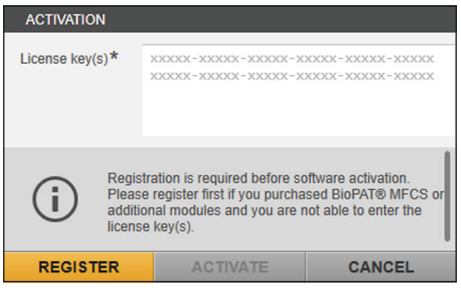
Procedure



▶ Double-click the program icon on the desktop.

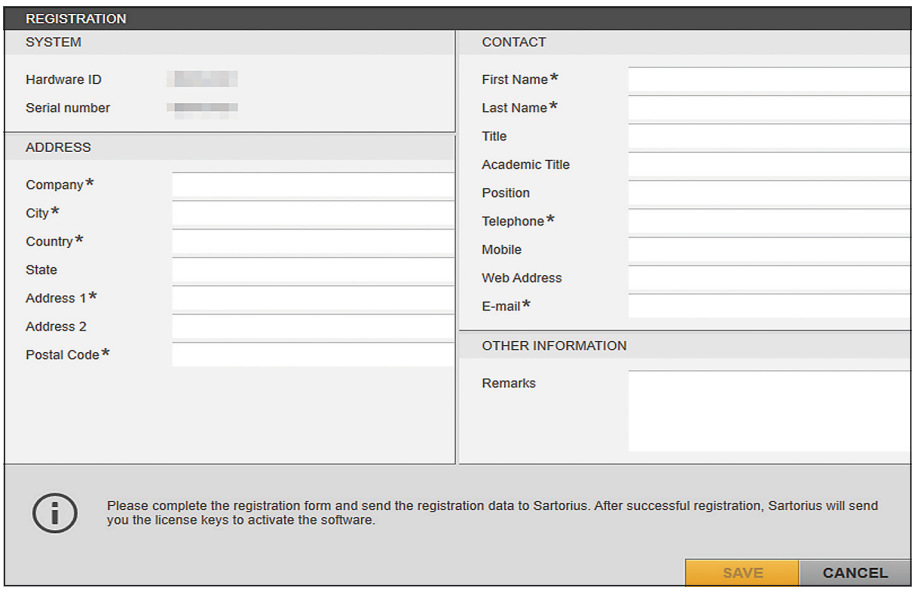


▷ The selection window for the type of program use appears.
▶ Click on the [ACTIVATE] button.



▷ The [ACTIVATION] window appears.
▶ Click on the [REGISTER] button.

▷ The [REGISTRATION] input window appears:



▶ Enter the registration data (* required information).
▶ Click on the [SAVE] button.
▶ Send the generated text file with the registration data to mfcs.software@sartorius.com.
▷ The license key(s) will be made available to the license holder within a short space of time and the program can be used as a demo version.

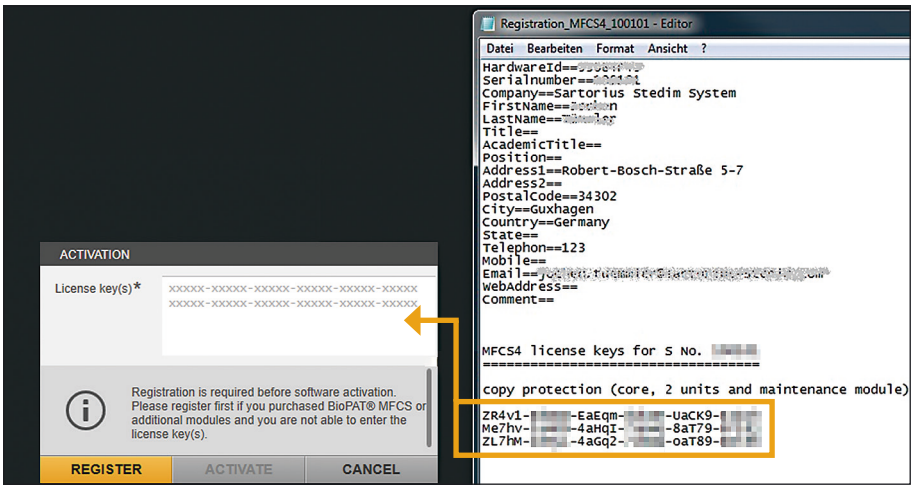
3.3.3 Activating Program and Modules

Requirements

One or more license keys are available.

Procedure

▶ On the start screen, click on the [BioPAT® MFCS] information pane.
▷ The [ABOUT] selection window appears.
▶ Click on the [ACTIVATE] button.
▷ The [ACTIVATION] input window appears.
▶ Select the license keys in the text file and paste them into the [License Key(s)] input field using the copy and paste function.



▷ Once you have entered one or more correct license key(s), the [ACTIVATE] button is active.
▶ Click on the [ACTIVATE] button.
▷ After restarting the program, the program and the licensed modules are activated. The program interface appears.

3.4 Program Updates

A program update usually includes improvements such as:
- new functions,
- optimized program speeds,
- corrected minor program errors.

The current program version can be requested via the regional service.

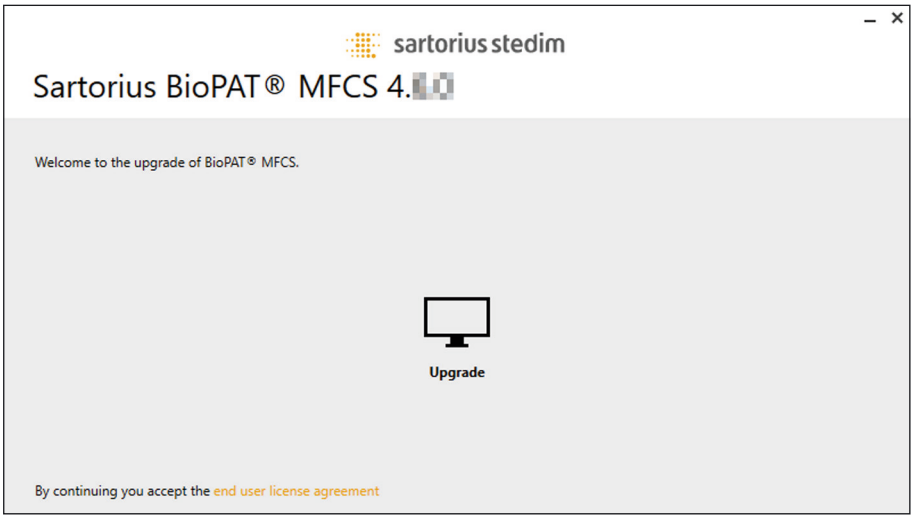
3.4.1 Installing Program Updates

Requirements

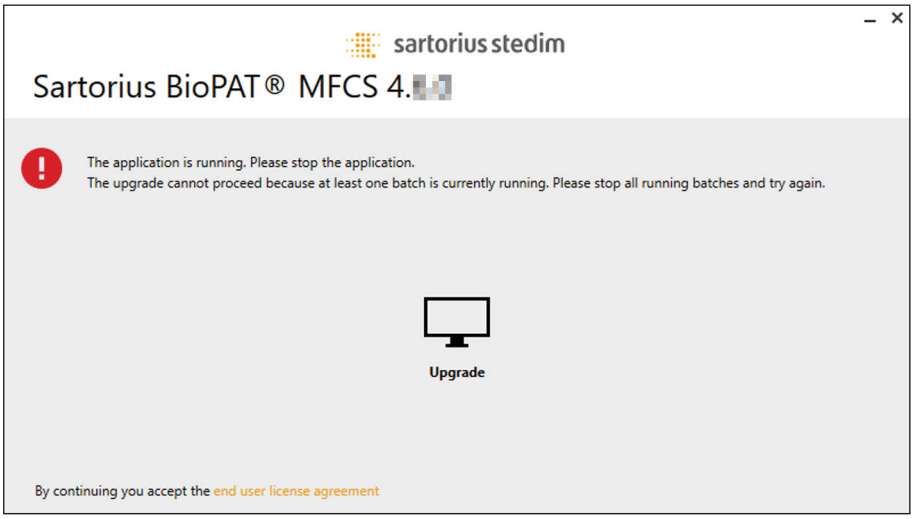
- The installation medium with the setup file “Sartorius_BioPAT_MFCS_Setup_4.x.x” is connected to the computer.
- The “Sartorius BioPAT® MFCS” program **must not** be started.
- A batch **must not** be started.
- The program must be activated with a valid Service & Support License. If the program is **not** activated with a valid Service & Support License, the installation is aborted.
- The “Distributed Transaction Coordinator” service must be started (start services, see Chapter “8.2.2 Error Message Relating to Default Settings”, page 191).

Procedure

▶ Double-click on the “Sartorius_BioPAT_MFCS_Setup_4.x.x” setup file.
▷ The installation screen for the program update appears.

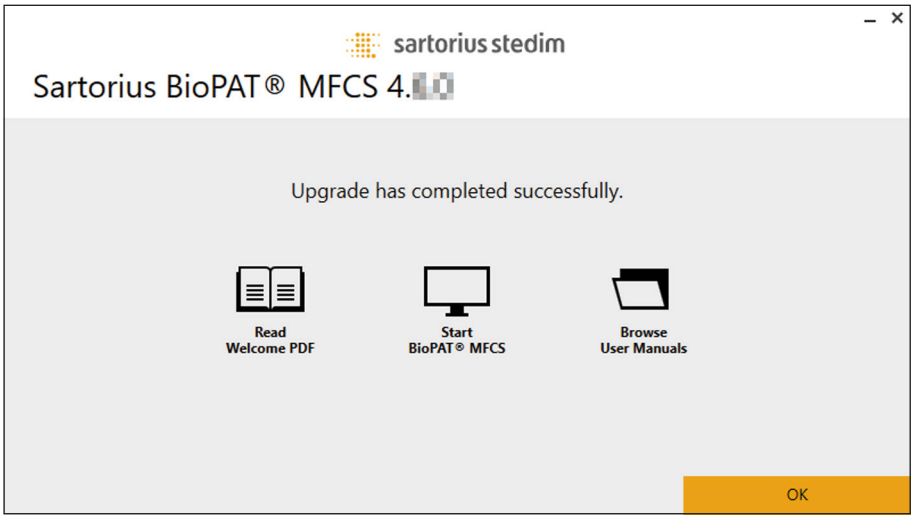


▶ Click on the [Upgrade] button.
  ▷ If all the requirements are met, the program is installed.
  ▷ If one or more of the requirements are not met, an error message appears, see example:



- ▶ Follow the instructions in the error message.
- ▶ To continue the program update immediately after eliminating the cause(s): Do **not** close the window, rectify the cause(s) and click on the [Upgrade] button.
- ▶ To carry out the program update at a later time: Close the window, rectify the cause(s) and restart the program update.

▷ The successful program update is displayed.



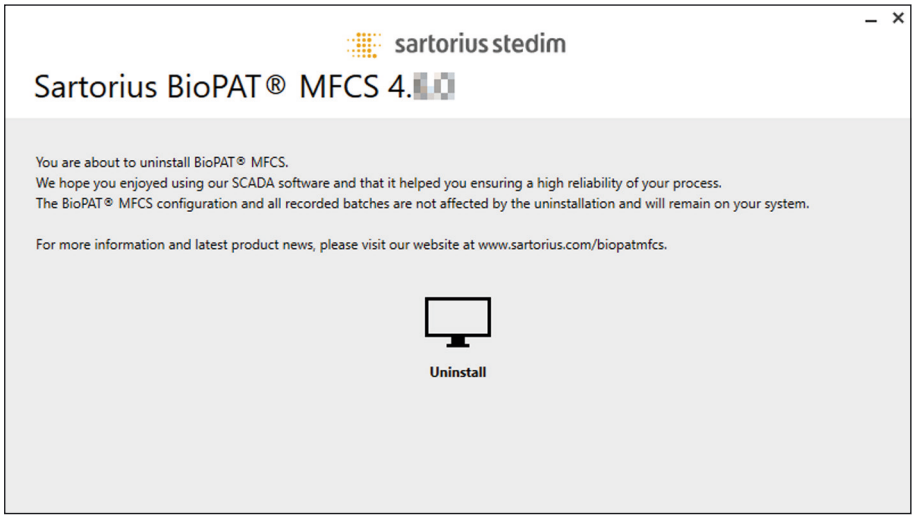
- ▶ Complete the program update. If necessary:
  - ▶ Complete the program update immediately. To do this, click on the [OK] button.
  - ▶ Open the PDF with all general program information (e.g. Release Notes information). To do this, click on the [Read Welcome PDF] button.
  - ▶ Open the folder in which the Operating Instructions are saved. To do this, click on the [Browse User Manuals] button.
  - ▶ Start the program. To do this, click on the [Start BioPAT® MFCS] button.

3.5 Uninstalling the Program

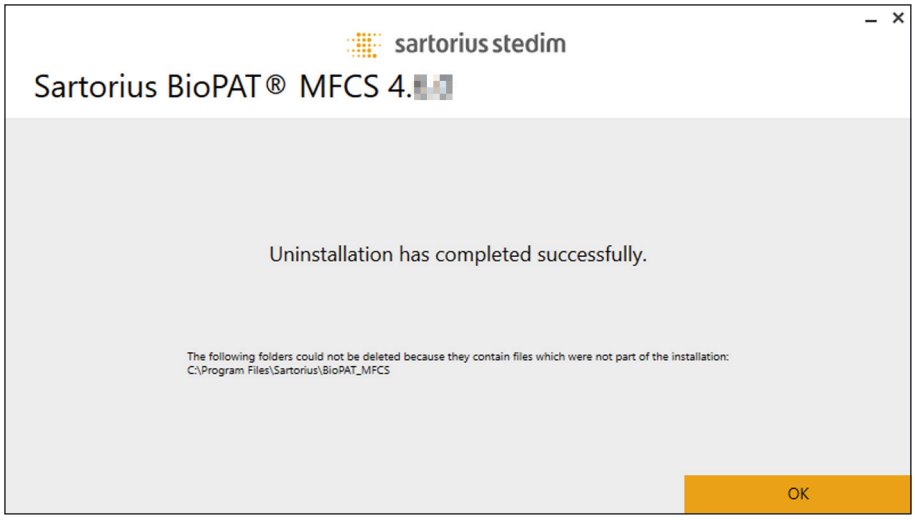
If the BioPAT® MFCS program is uninstalled, the directories, program files, and registry entries for the BioPAT® MFCS program are removed. The BioPAT® MFCS configuration and all recorded batches are **not** removed.

Procedure

- ▶ Open the Control Panel (see Chapter 3.1.1.1, page 17).
- ▶ In the Control Panel selection window, click on [Uninstall a program].
- ▷ The selection window with the installed program appears.
- ▶ Double-click on the [Sartorius BioPAT MFCS] program entry.
- ▷ The following window appears:



- ▶ Click on the [Uninstall] button.
- ▶ If the request for user account control is shown: Confirm this request with [Yes].
- ▷ The uninstallation procedure for the program appears.
- ▷ The successful uninstallation is displayed.



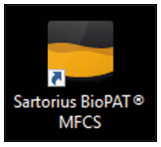
- ▷ The files and folders added by the user in the installation directory are **not** removed.
- ▶ Remove the files and folders manually.
- ▶ Click on the [OK] button.
- ▷ The BioPAT® MFCS program is uninstalled.

4 User Interface

4.1 Program Start

When you start the program for the first time after licensing, the start screen appears.

When you start the program again, the user interface opens on the last screen that was active when the program was closed.



Manual

▶ Double-click the program icon on the desktop.

Automatic

▶ Copy the program icon from your desktop to the [Autostart] folder.
▷ The next time you log on, the program will start automatically.

4.2 Start Screen

When the BioPAT® MFCS 4 software is started, the start screen appears first, from which various functions can be selected:

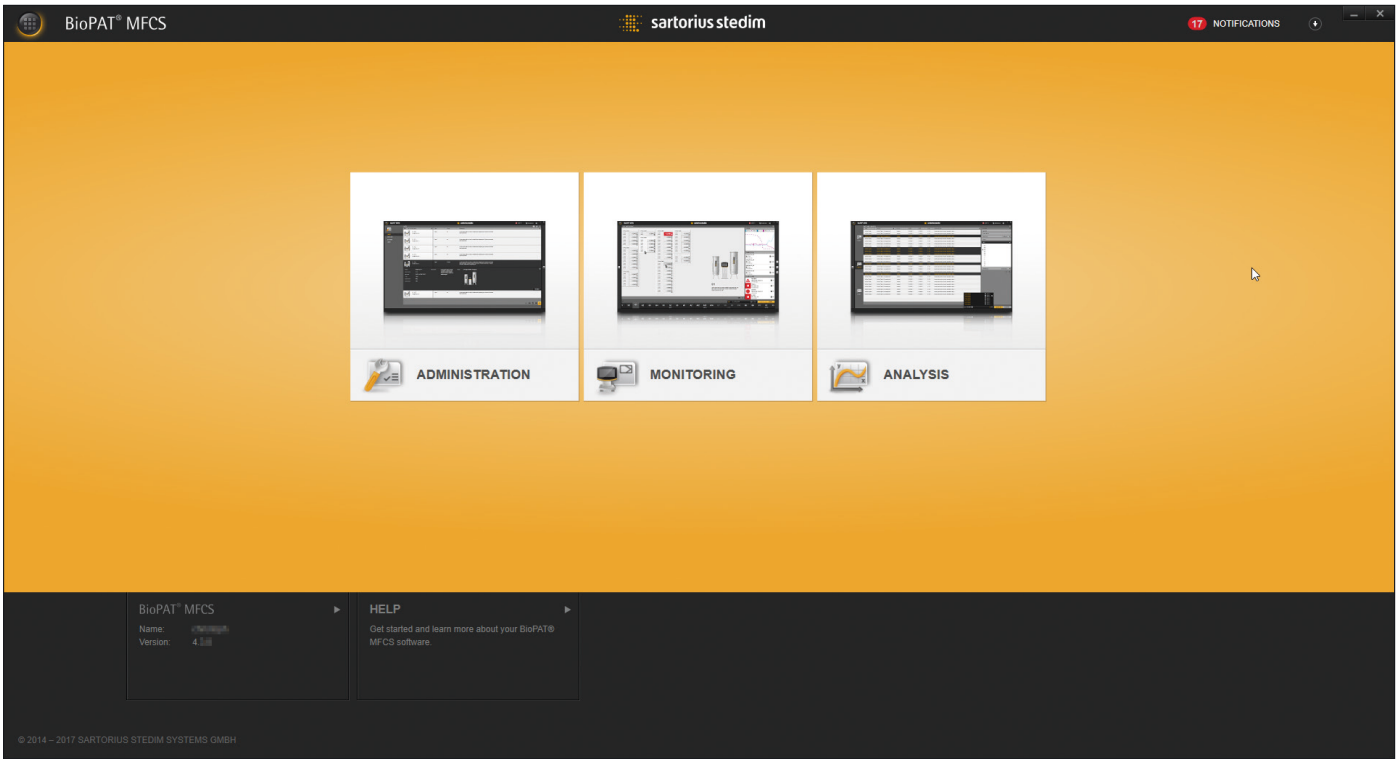


Fig. 4-1: BioPAT® MFCS 4 start screen

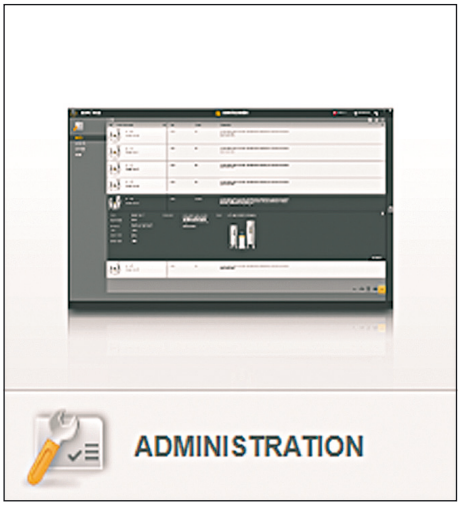
The start screen takes you to the three function panes: [ADMINISTRATION], [MONITORING], and [ANALYSIS]. You can also access to the information areas and the program help.

Procedure

▶ To return from every subpage to the start screen: Click on the [Start Screen] button.

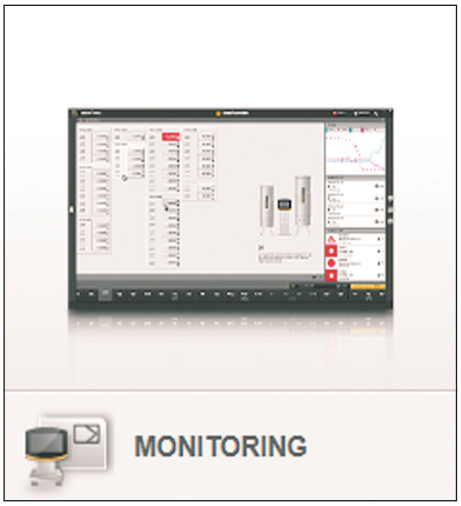
▶ To return from the start screen to the subpage: Click on the [Start Screen] button.

4.2.1 Function Panes on the Start Screen



[ADMINISTRATION] function pane

In the [ADMINISTRATION] function pane, you can configure your MFCS system. The following functions are available:
- Creating and updating configuration data
- Installing and configuring new devices and units
- Adding or removing control modules
- Checking general system settings



[MONITORING] function pane

In the [MONITORING] function pane, you can monitor the processes of your device. The following functions are available:
- Starting and stopping data recording
- Generating and modifying trends
- Monitoring and supervising control modules
- Manually recording setpoints
- Enabling/disabling controllers

[ANALYSIS] function pane

In the [ANALYSIS] function pane, you can display and export the recorded data. The following functions are available:
- Displaying historical process data
- Exporting and saving process data in a folder
- Searching and filtering records

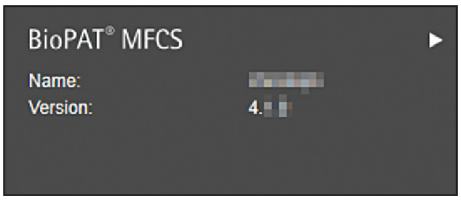
4.2.2 Information Panes on the Start Screen

The [BioPAT® MFCS] information pane gives you information about:
- Name of the user who is currently logged on
- Software version

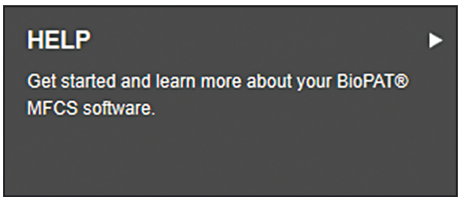
The [HELP] information pane takes you to a PDF document of these instructions. This enables you to access information about functionalities and operating options directly on your screen.

Accessing information panes

Procedure



▶ To activate BioPAT® MFCS and additional program modules and to receive further information: Click on the [BioPAT® MFCS] button.



▶ To access the PDF document: Click on the [HELP] button.

4.3 Navigation Aids

The navigation aids help you quickly toggle from one neighboring function pane to another and return to the start screen rapidly. You can select both the previous and next function pane via the keys positioned on the right and left edge of the screen. The start screen can be selected from any program page by clicking on the [Start Screen] button.

The navigation aids and their functions are shown in the following table:

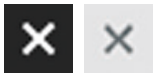
Symbol	Description
	Start Screen
	[ADMINISTRATION] function pane
	[MONITORING] function pane
	[ANALYSIS] function pane, [EXPORT] menu
	[ANALYSIS] function, [CHART] menu
	[ANALYSIS] function pane, [ALARMS] menu

Additional navigation aids may be added, depending on which module is enabled (see the operating instructions for the module in question).

4.4 Selection Keys

The selection keys and their functions are shown in the following table:

Selection key	Function
	Help
	Update
	Add
	Edit
	Delete

Selection key	Function
	Details
	Export
	Import
	Change list sorting
	Settings
	Multi-monitor
	Normal view
	Save
	File location, load template
	Reset
	Favorites
	Number of alarms, process alarms during a batch process: – Shows the total number of current alarm messages. – Press to view the alarm window.
	Alarm history
	Close, remove
	Replace element
	Set process time to zero
	Connection test
	Zoom out, maximize timeline in the trend and chart graphic

Selection key	Function
	Reset vertical zoom, maximize value bar in the chart graphic
	Linkage, timelines (split trend display) are linked.
	Synchronization, timelines (split trend display) are synchronized.
	Checkbox with checkmark: List entry is selected.
	Checkbox without checkmark: List entry is deselected.
	Print
	Printer settings
	Collapses the menu display, example: [TRENDS] preview menu
	Expands the menu display, example: [TRENDS] preview menu
	Expand
	Collapse
	Hide: Hides the preview window and expands the active menu window.
	Show: Shows the preview window and minimizes the active menu window.
SAVE	Saves the settings and closes the window.
APPLY	Saves the settings and window remains open.
CANCEL	Opens a prompt asking whether the changes should be discarded. The prompt is confirmed with [YES]/[NO].
CLOSE	Closes the window.
START	Starts the batch process.
STOP	Ends or pauses the batch process.

4.5 System Information on the [BioPAT® MFCS] Information Pane

From the start screen, you can access the [ABOUT] window via the [BioPAT® MFCS] information pane (see Chapter 4.2.2, page 34):

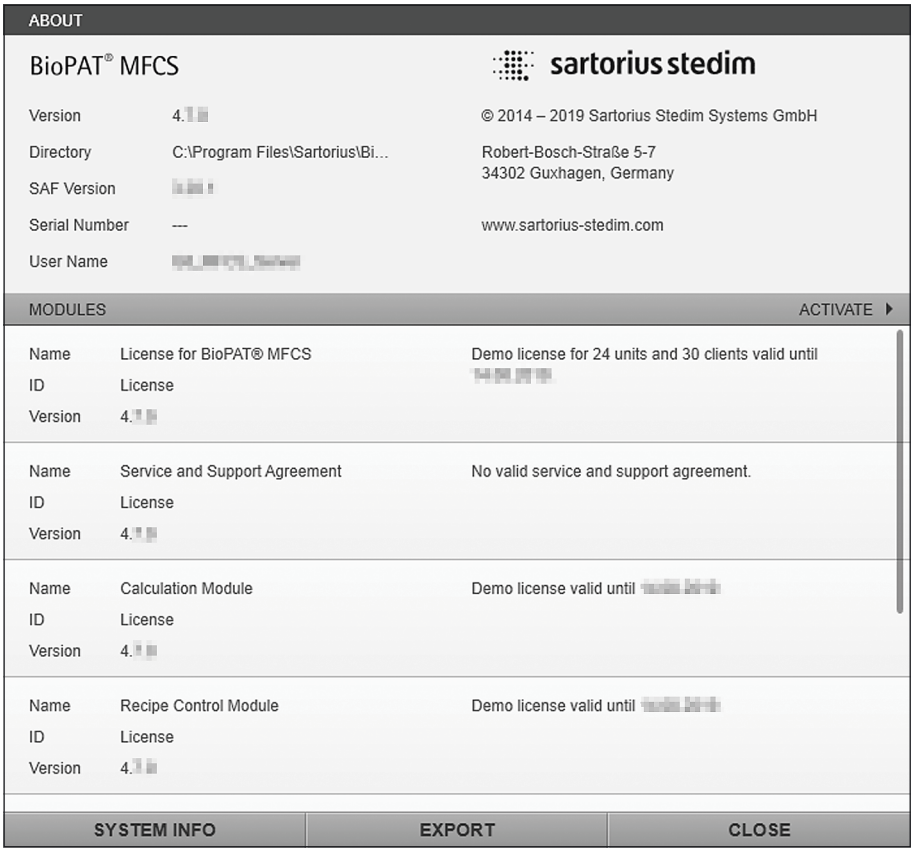


Fig. 4-2: [ABOUT] selection window

Field	Description
Version	Version number of the software
Directory	Save location of the software on your PC
SAF version	Version of the Sartorius Application Framework (SAF)
Serial number	Serial number of the BioPAT® MFCS 4 software
User name	Name of the user working with the program
MODULES	List of the MFCS modules that have been installed and licensed
ACTIVATE	License and activate additional program modules
SYSTEM INFO	Show system information for the PC
EXPORT	Export information about the BioPAT® MFCS 4 installation
CLOSE	Close selection window

5 ADMINISTRATION Function Pane

In the ADMINISTRATION function pane you can configure your MFCS system.

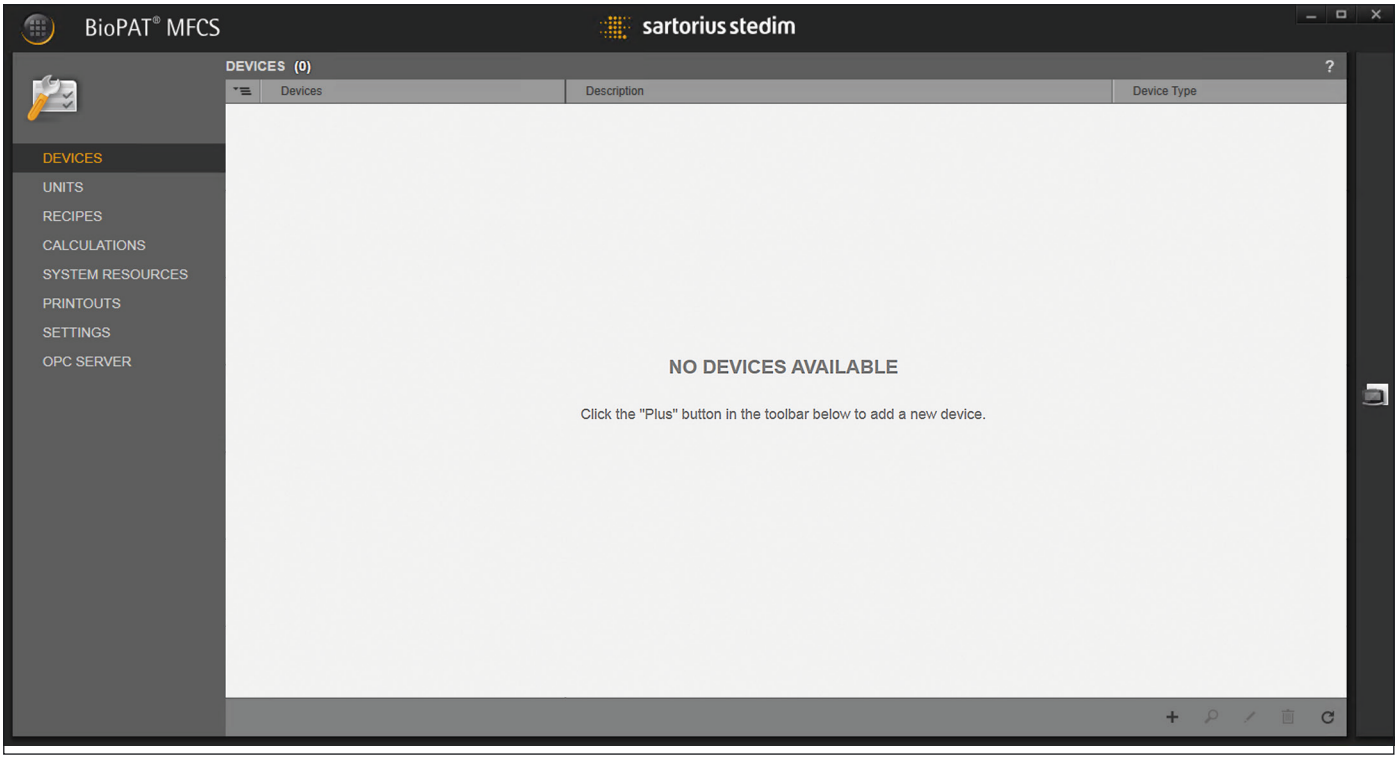


Fig. 5-1: ADMINISTRATION function pane (example)

The MFCS system is configured at three levels:
- Communication level
- Process level
- System level

Communication Level

[DEVICES] menu: At the communication level, you can configure the MFCS system with a device. A device is set up in the system for this purpose.

Process Level

- [UNIT] menu: The control modules involved in the process are assigned to the device. The process level is set up with a unit (process unit) for this purpose.
- [RECIPES] menu (optional module): Batch processes can run automatically with linked recipes. A recipe is created for this purpose.
- [CALCULATIONS] menu (optional module): Extended process management strategies can be implemented using linked calculations. Formulas are created and linked with variables for this purpose.
- [SYSTEM RESOURCES] menu: Cross-system resources are stored in the system resources.

System Level

- [PRINTOUTS] menu: The complete configuration of the system can be printed out as a PDF document (several PDF documents).
- [SETTINGS] menu: Basic system and user settings are configured in the system settings.

Steps for Initial Setup

After you have started the BioPAT® MFCS program for the first time, the communication level, the process level, and the system level are set up.

Step	Description
1	Set up the communication level (see Chapter 5.1, page 40)
2	Set up the process level (see Chapter 5.2, page 48)
3	Set up the system level (see Chapter 5.3, page 68)

5.1 Device Management

The following figures show the input screens for device settings. The input screens appear whenever you create a new device or modify the parameters of an existing device.

5.1.1 [GENERAL SETTINGS] Input Screen

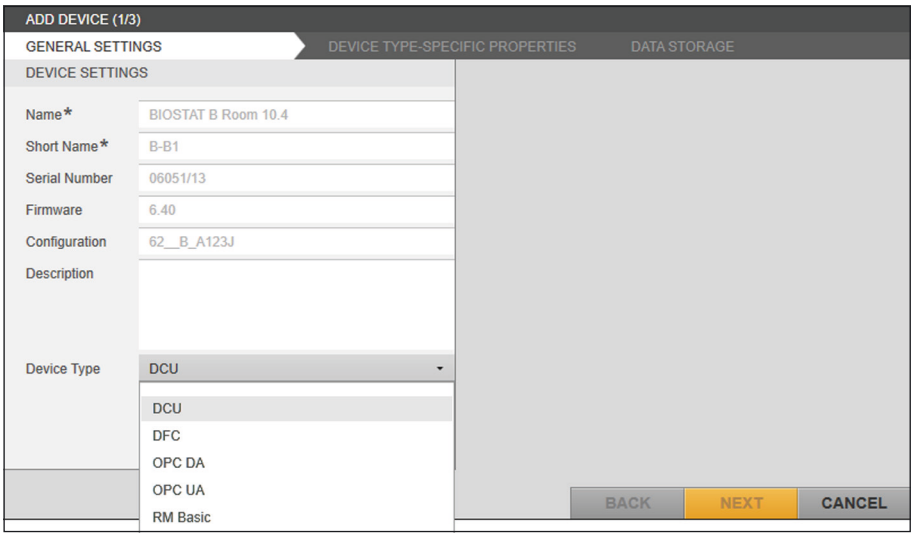


Fig. 5-2: [GENERAL SETTINGS] input screen

[DEVICE SETTINGS] Input Field

Field	Description
Name*	Name (max. 48 characters)
Short Name*	Abbreviated name (max. 4 characters)
Serial Number	Serial number (max. 16 characters)
Firmware	Firmware version (max. 16 characters)
Configuration	Version of the configuration (max. 16 characters)
Description	Description (max. 255 characters)
Device Type	Communication protocols between MFCS and the device

* Required information

5.1.2 [DEVICE TYPE SPECIFIC PROPERTIES] Input Screen

The [DEVICE TYPE SPECIFIC PROPERTIES] input screen depends on the device used and the corresponding communication protocol.

The following table lists the assignment of the devices to the corresponding communication protocols.

Device Type	Supported devices
DCU	All network-compatible DCU devices with firmware version 4.8 or higher
DFC	All network-compatible DFC devices: – BIOSTAT® Aplus – BIOSTAT® Bplus – BIOSTAT® Cplus with serial number lower than 7000
OPC DA	Server/client with OPC DA communication*
OPC UA	Server/client with OPC UA communication*
RM Basic	All BIOSTAT® RM Basic devices with firmware version 2.0 and 2.1.
Simulation	Virtual device for the simulation of random process values

* The OPC DA client function is available via an optional program module.

Overview of Input Screens

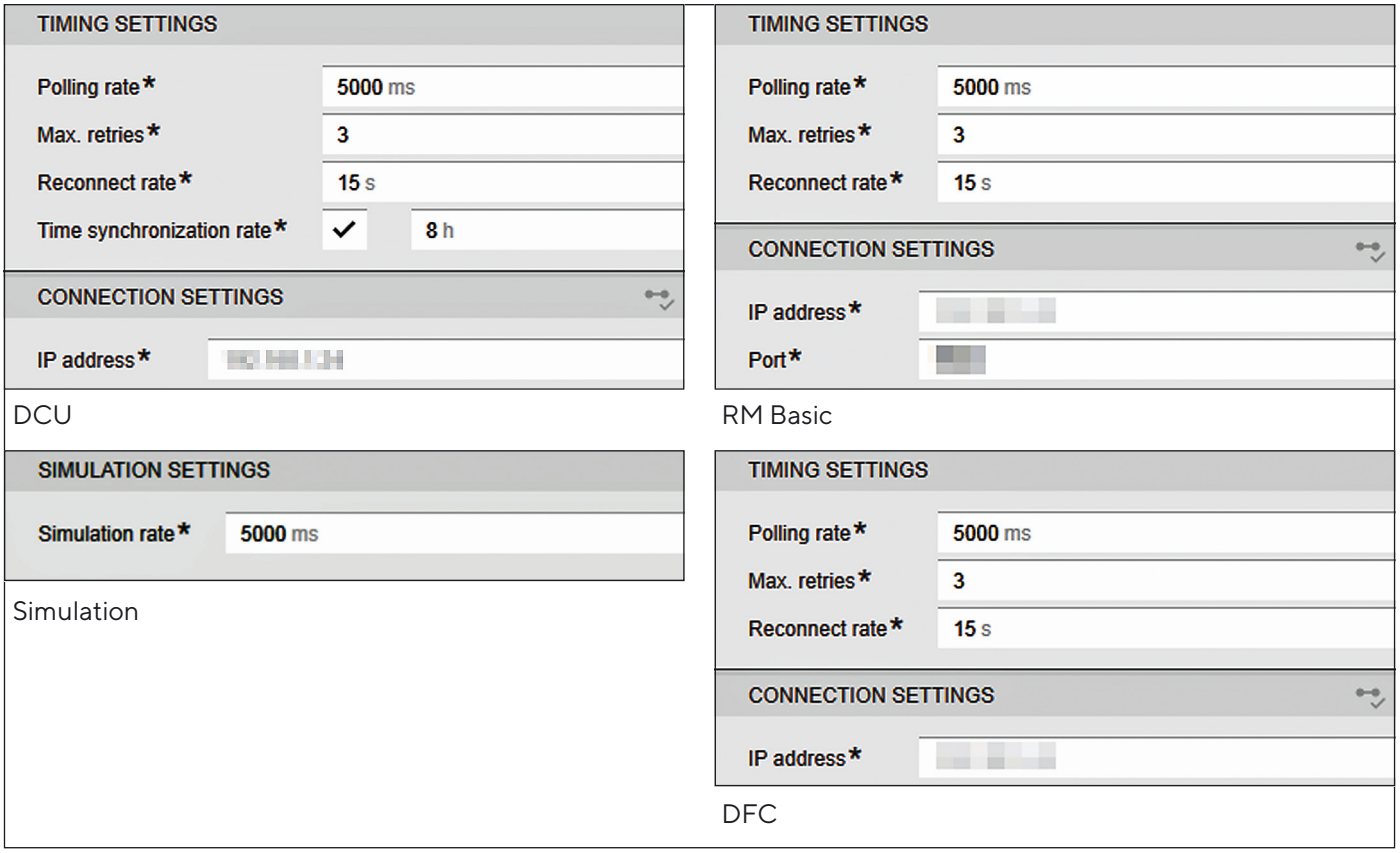


Fig. 5-3: Overview of communication protocol input screens ([Device Type] selection field)

[TIMING SETTINGS] Parameters

Parameters	Settings	Explanation
Polling rate*	500-60000 ms	Polling interval for process values (500-60000 ms)
Max. retries*	1-10	Number of reconnection attempts after an interruption in device communication. The interval between the reconnection attempts depends on the polling rate.
Reconnect rate*	10-500 s	Waiting time between the reconnection attempts. After the waiting time, reconnection attempts are made again on the basis of the configured number (max. retries).
Time synchronization rate*	2-72 h	Time synchronization interval for a DCU device: The time is synchronized between the computer on which the program server is installed and the connected DCU device. The timer is the computer.

* Required information

[CONNECTION SETTINGS] Input Field (DCU, RM Basic, DFC)

Field	Symbol	Description
		Connection test Communication, MFCS system – device
IP address*		DCU, DFC, RM Basic: IP address of the device
Port*		Port number transfer protocol, MFCS system – device

* Required information

[SIMULATION SETTINGS] Input Field (simulation)

Field	Description
Simulation rate*	Polling interval for process values (500-60000 ms)

* Required information

5.1.3 [DATA STORAGE] Input Screen

[STORAGE STRATEGY] Selection Field

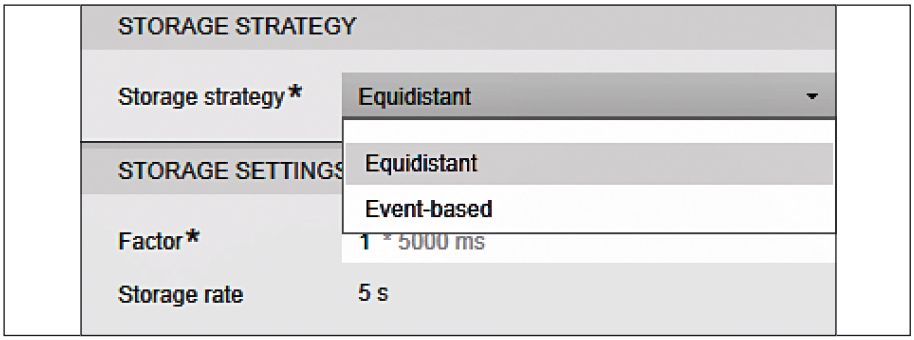


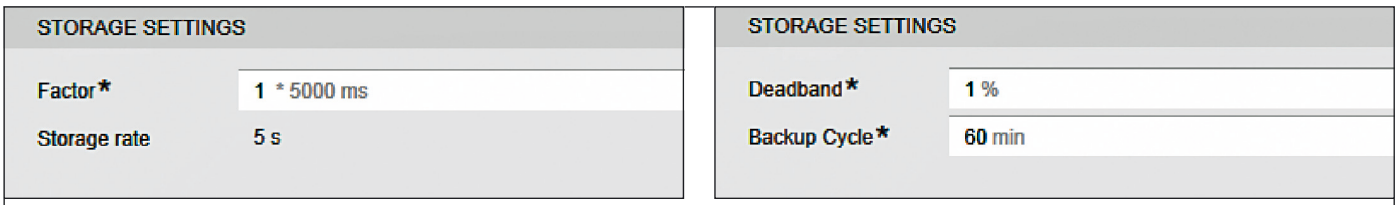
Fig. 5-4: [DATA STORAGE] input screen

Field	Description
Storage Strategy*	Storage strategy (see Chapter 5.1.4, page 45)
Equidistant	Storage in time intervals
Event-based	Storage in the event of deviations

* Required information

[STORAGE SETTINGS] Input Field

The [STORAGE SETTINGS] input screen depends on the selected storage strategy.



Equidistant | Event-based

Fig. 5-5: Storage strategy input screens

Field	Description
Factor*	Multiplier for calculating the storage interval
Storage Rate	Process values storage interval
Deadband*	Deviation of process value (as a percentage)
Backup Cycle*	Time interval for backing up all data

* Required information

5.1.4 "Equidistant" and "Event-based" Storage Strategies

The storage strategy selected determines how process data are stored. The following figure shows the differences between the two storage strategies.

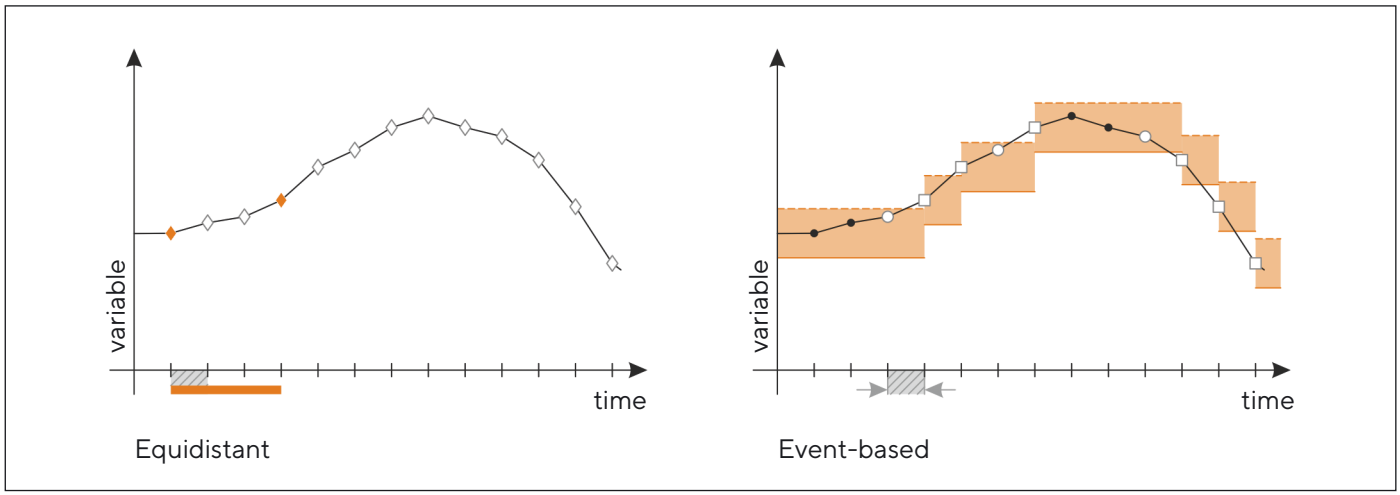


Fig. 5-6: "Equidistant" and "Event-based" Storage Strategies

Symbol	Description
◊	Process value (not stored)
♦	Process value (stored)
▨	Polling Rate
▬	Storage rate (depends on polling rate and factor; for example, the factor in the figure is 3)
▮	Deadband for storage (permitted deviation values)
----	Upper limit value for deadband
____	Lower limit value for deadband
•	Process value within the deadband (not stored)
□	Process value outside of the deadband (stored)
○	Saved process value because the next process value is outside of the deadband

"Equidistant" Storage Strategy

With the "Equidistant" storage strategy, the process values are stored at a preset time interval in order to reduce the data volume. This time interval is composed of the polling rate and a factor that is set for the "Factor" input field.

“Event-based” Storage Strategy

With the “Event-based” storage strategy, only those values are stored that differ from the defined deadband. The deadband defines the permitted percentage deviation within which the process value may deviate. A polling rate tests whether a process value is within or outside of a deadband. If a process value lies outside of the deadband, this and the last within the deadband are stored with time and date.

After expiration of the backup cycle, all data are saved. The backup time point can be defined under Backup Cycle (Chapter 5.1.3, page 44). The backup cycle must be defined between one minute and one hour.

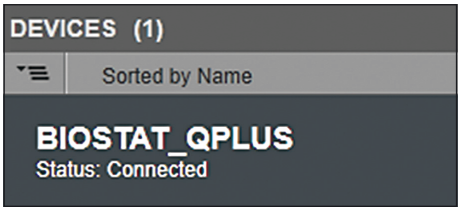
5.1.5 Creating a New Device

Requirement

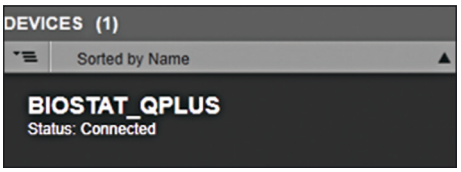
- The device that is being controlled is switched on.
- The network connection to the device has been established.
- The device is configured for the process.

Procedure

▶ Access the [DEVICES (#)] menu.
▶ In the toolbar, click on the [Add] button.
▷ The [GENERAL SETTINGS] input screen appears (see Chapter 5.1.1, page 40).
Some input fields have preset values.
▶ Enter the data for “Name”, “Serial Number”, “Firmware”, and “Configuration” in the input fields.
▶ Enter a descriptive text for the device in the “Description” input field.
▶ Select the corresponding protocol from the “Device Type” list (see Chapter 5.1.1, page 40).
▶ Click on the [NEXT] button.
▷ The [DEVICE TYPE SPECIFIC PROPERTIES] input screen appears.
▶ Enter the values for the corresponding protocol in the input screen:
  ▶ IP address: Enter the IP address of the device (see Chapter 3.1.2, page 20).
  ▶ OPC server string: Contact the system administrator for this.
▶ Click on the [NEXT] button.
▷ The [DATA STORAGE] input screen appears.
▶ Select the storage strategy in the [STORAGE STRATEGY] selection screen (see Chapter 5.1.3, page 44).
▶ Enter the values on the [STORAGE SETTINGS] input screen.
▶ Click on the [SAVE] button.
▷ The configured device is entered in the overview.
▷ The connection status is displayed. The “Connected” connection status indicates that communication with the device (in this example BIOSTAT® Qplus) has been established. The “Disconnected” connection status indicates that there is no network connection to the device.
▶ If the “Disconnected” connection status is displayed: Take measures to correct errors (see Chapter “8 Error Messages”, page 186).
▶ To set up other devices: Repeat the steps.



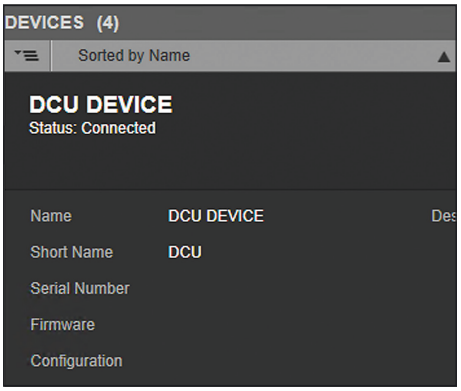
5.1.6 Changing Device Settings



Procedure

- ▶ Access the [DEVICES (#)] menu.
- ▷ All the devices that have been created are listed in the overview.
- ▶ Click on the device to change its settings.
- ▶ In the toolbar, click on the [Edit] button.
- ▷ The [GENERAL SETTINGS] input screen appears.
- ▶ Change the settings and click on [NEXT].
- ▷ The [DEVICE TYPE SPECIFIC PROPERTIES] input screen appears.
- ▶ Change the settings and click on [NEXT].
- ▷ The [DATA STORAGE] input screen appears.
- ▶ Change the settings.
- ▶ Click on the [SAVE] button.

5.1.7 Activate Extended Display of Device Settings



Procedure

- ▶ Access the [DEVICES (#)] menu.
- ▷ All the devices that have been created are listed in the overview.
- ▶ In the overview, double-click on the device or click on the [Details] button in the lower toolbar.
- ▷ The extended display appears.
- ▶ To view all settings: Click on the horizontal scroll bar and move it.
- ▶ To close the extended display: Click on the [CLOSE] button.

5.1.8 Removing a Device from the List

Requirements

No unit (process unit) is assigned to the device.

Procedure

- ▶ Access the [DEVICES (#)] menu.
- ▷ All the devices that have been created are listed in the overview.
- ▶ Click on the device you want to remove from the list.
- ▶ Click on the [Delete] button.
- ▷ The message “Do you really want to delete the selected device?” appears.
- ▶ Click on the [YES] button.
- ▷ The device is deleted from the list.

5.2 Unit Management

The following illustrations show the input and selection screens for configuring the unit (process unit) settings. The [ADD UNIT] or [EDIT UNIT] input screens appear if a new unit is created or the values of an existing unit are modified.
Control modules can be assigned to the unit in 2 ways. The input and selection screens differ depending on the type of configuration:

- Manual configuration – by selecting the configuration parameters (for input and selection screens, see Chapter 5.2.1, page 49)
- Import – using a configuration file (for selection screens: see Chapter 5.2.2, page 57)

[ADD UNIT] Higher-level Input and Selection Screen

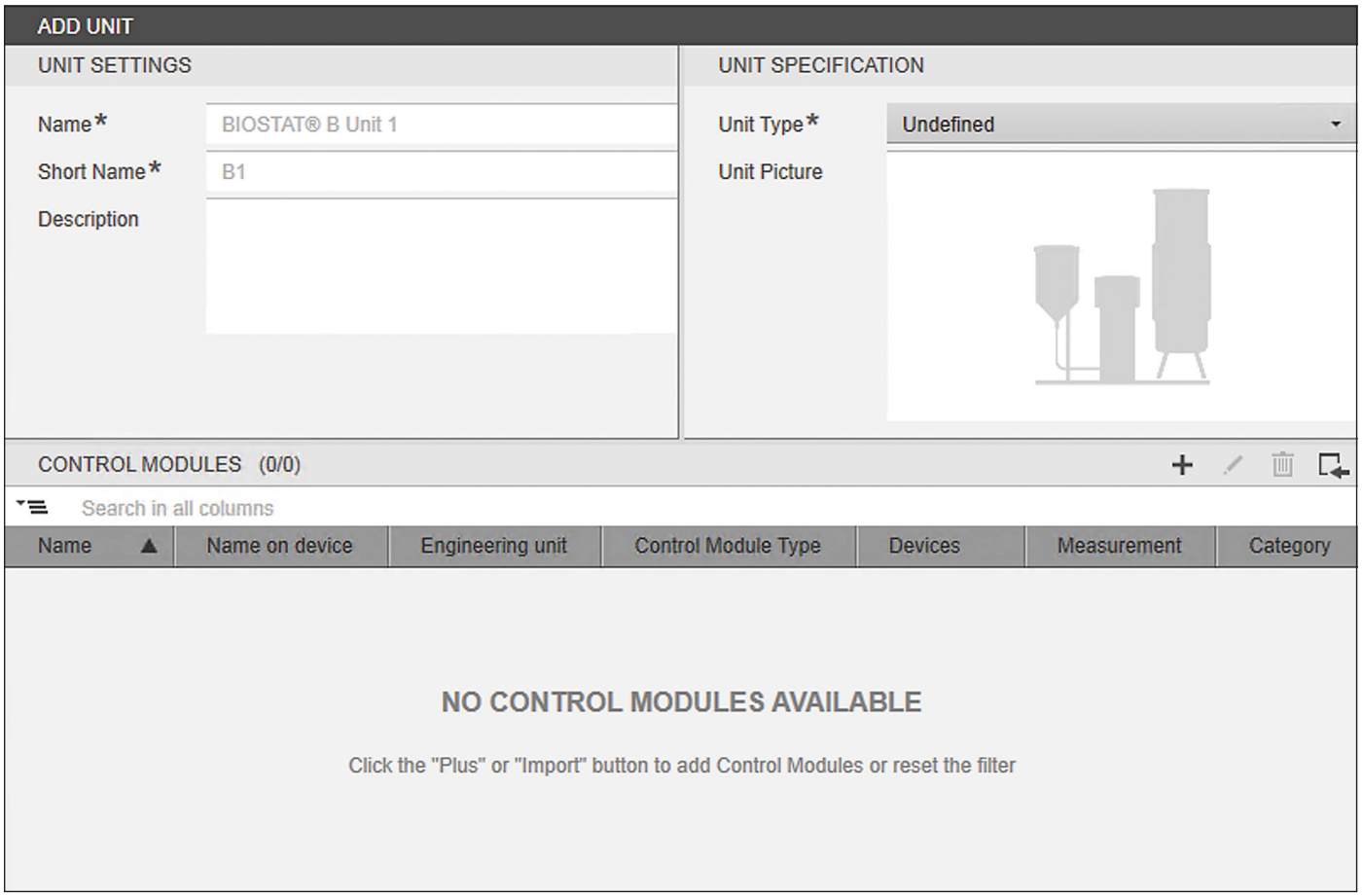


Fig. 5-7: [ADD UNIT] input screen

[UNIT SETTINGS], [UNIT SPECIFICATION], [CONTROL MODULES] Input Fields

Field	Symbol	Description
Name*		Name of the unit (process) (max. 48 characters)
Short Name*		Abbreviated name of the unit (process) (max. 4 characters)
Description		Description of the unit (max. 255 characters)

Field	Symbol	Description
Unit Type*		Selection of the assigned device
Unit Picture		Image of the assigned device
PID controller, setpoint controller, process variables, digital variables, offline variables, Constants		Control modules that can be selected for monitoring
		Add control modules (see Chapter 5.2.4, page 61)
		Edit control modules (see Chapter 5.2.4, page 61)
		Delete control modules (see Chapter 5.2.4, page 61)
		Import control modules (configuration file) (see Chapter 5.2.3, page 59)

5.2.1 [ADD NEW CONTROL MODULE (#/#)] Input/Selection Screens

5.2.1.1 [GENERAL] Input Screen

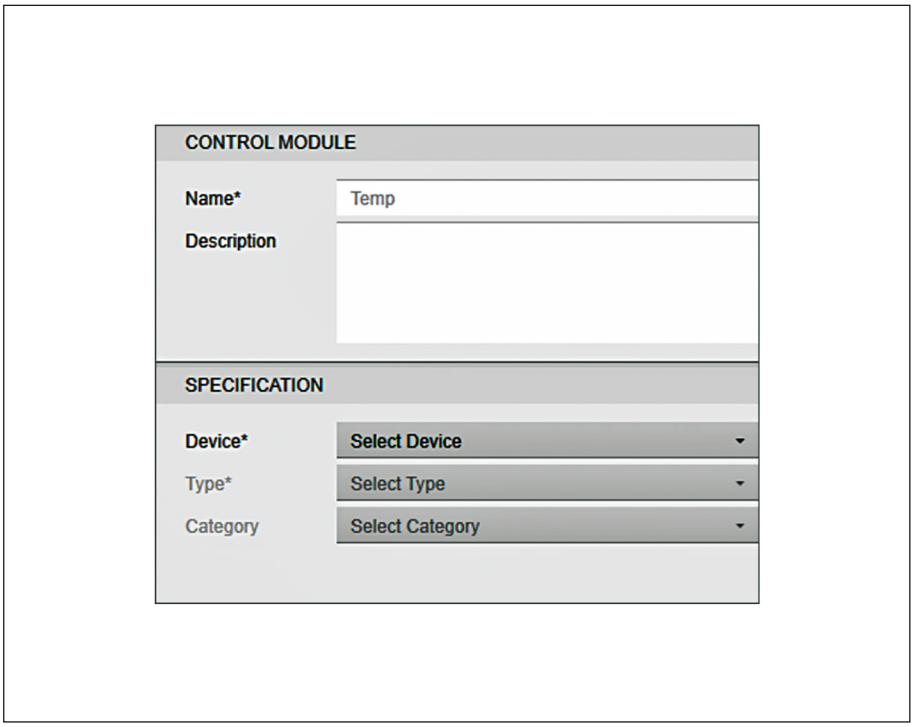


Fig. 5-8: [GENERAL] input and selection screen

[CONTROL MODULE] Input Field, [SPECIFICATION] Selection Field

Field	Description
Name*	Name[1] of the control module (max. 16 characters)
Description	Description of the control module (max. 400 characters)
Device*	Assignment of the control module to a device
Type*	Type of control module
Process Variable	Process value
Digital Variable	"I/O" operating status (e.g., valve)
Setpoint Controller	Sets the process value to a configurable setpoint
PID Controller	Adjusts the process value to a configurable setpoint with PID logic of a PID controller on a DCU.
	Adjusts the process value to a configurable setpoint with PID logic of a software PID controller in the MFCS.
Offline Variable	Process value, e.g., analysis results of sampling (only available if the Sample Data Module is activated).
Sequence	DCU sequence or phase which can be controlled via a MFCS recipe.
Constant	Constant process value
Category	Type of measurement parameter
Fluids	Fluids
Gas	Gases
pH	pH value
Power Units	Drives (e.g., impeller)
Ratio	Ratio value
Temperatures	Temperatures
Totalizer	Counter
Biological Constant	Biological constant
Chemical Constant	Chemical constant
Density	Density
Miscellaneous Constant	Miscellaneous constant
Molar Fraction	Molar fraction
Molar Mass	Molar mass
Natural Constant	Natural constant
Physical Constant	Physical constant

* Required information

[1] The name "ProcessTime" cannot be entered, because this name has been assigned for the system variable.

[PARAMETERS] Input and Selection Fields

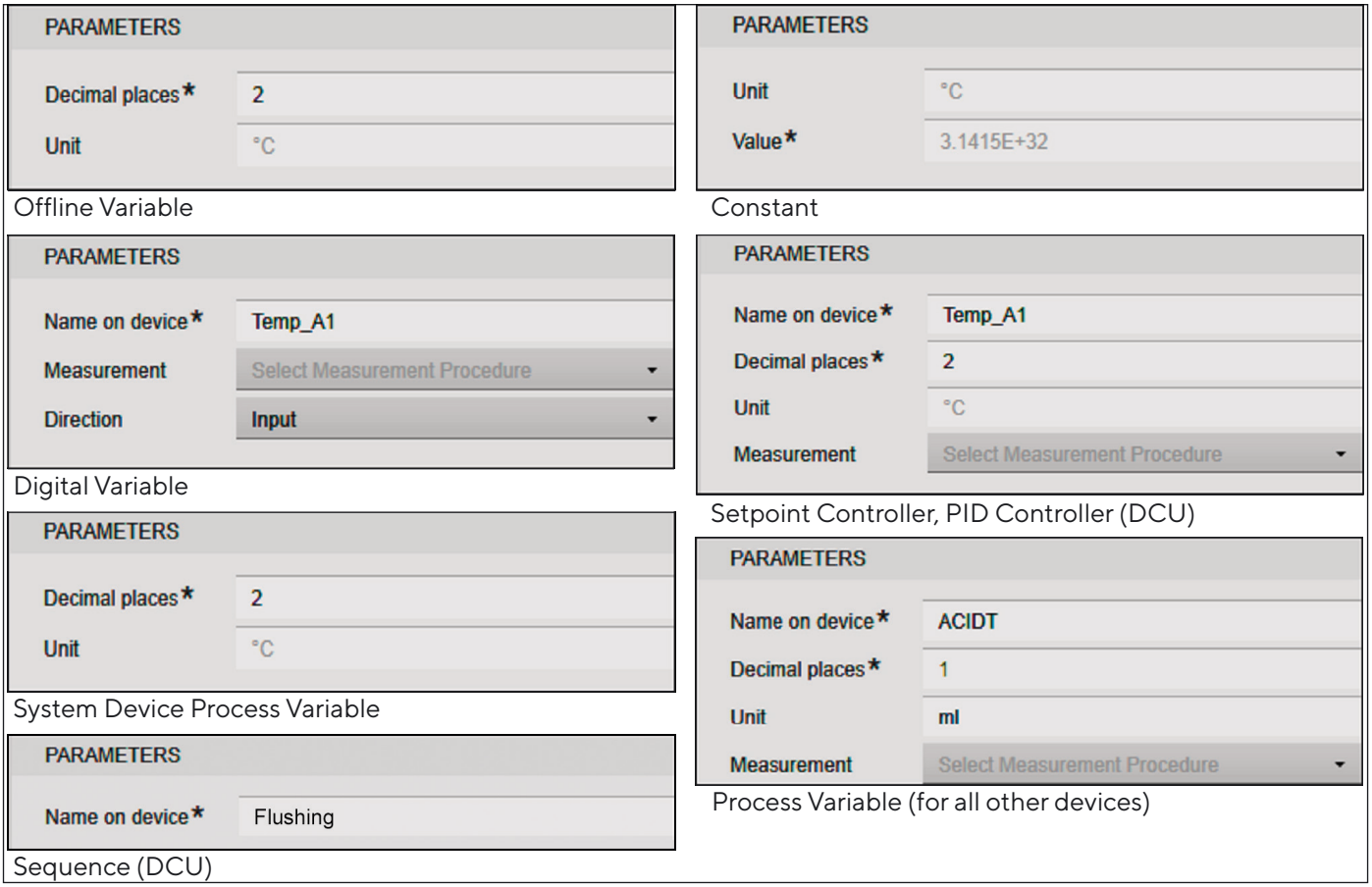


Fig. 5-9: [PARAMETERS] input and selection fields (selection field [Type*])

Field	Description
Decimal places*	Number of decimal places
Unit	Physical unit of measurement
Value*	Process value
Name on device*	Name of the control module on the device
	Name of the DCU sequence or phase on the device
Measurement	Type of measurement
in-line	The sample is not removed from the process stream and can be invasive or non-invasive.
on-line	The sample is diverted from the manufacturing process and can be returned to the process stream.
at-line	The sample is taken, isolated and analyzed in the immediate vicinity of the process stream.
off-line	The sample is removed, isolated and analyzed in an area separate from the manufacturing process.
Direction	Signal direction
Input	Digital input (switch monitoring)
Output	Digital output (turn the switch on/off)

* Required information

5.2.1.2 [VALUE], [SETPOINT] Input and Selection Screens

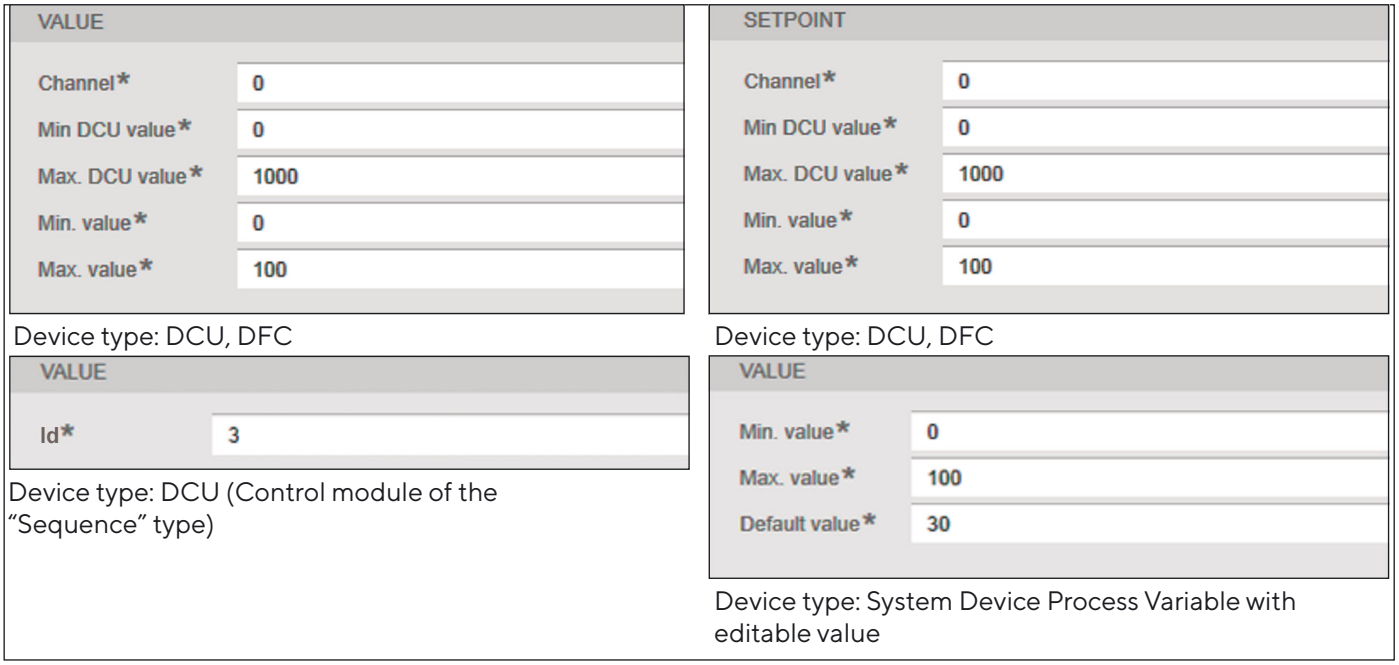


Fig. 5-10: [VALUE], [SETPOINT] input and selection fields

Field	Description
Channel*	DCU output channel
Min DCU Value*	Lower limit value of the DCU
Max. DCU Value*	Upper limit value of the DCU
Min Value*	Lower limit value (process-dependent / > "Min DCU Value")
Max Value*	Upper limit value (process-dependent / < "Max DCU Value")
Channel*	DCU input channel
Min DCU Value*	Lower limit value of the DCU
Max. DCU Value*	Upper limit value of the DCU
Min Value*	Lower limit value (process-dependent / > "Min DCU Value")
Max Value*	Upper limit value (process-dependent / < "Max DCU Value")
Default value*	Standard value[1] of the control module (the value must be between the "Min. Value" and "Max. Value")
ID*	Identifier of the sequence or phase on the DCU

* Required information

[1] Information about a standard value is omitted as soon as a calculation formula has been assigned to the process variables of a system device. A licensed calculation module is required for this.

5.2.1.3 [PID 1] Input and Selection Screens

Customer-specific control loops with freely configurable control parameters can be created with a software PID controller. The user is not limited to a pre-configured setpoint and the PID controllers of the local control unit (e.g. DCU). The user can implement non-standard control tasks with any connected sensor and actuator devices.

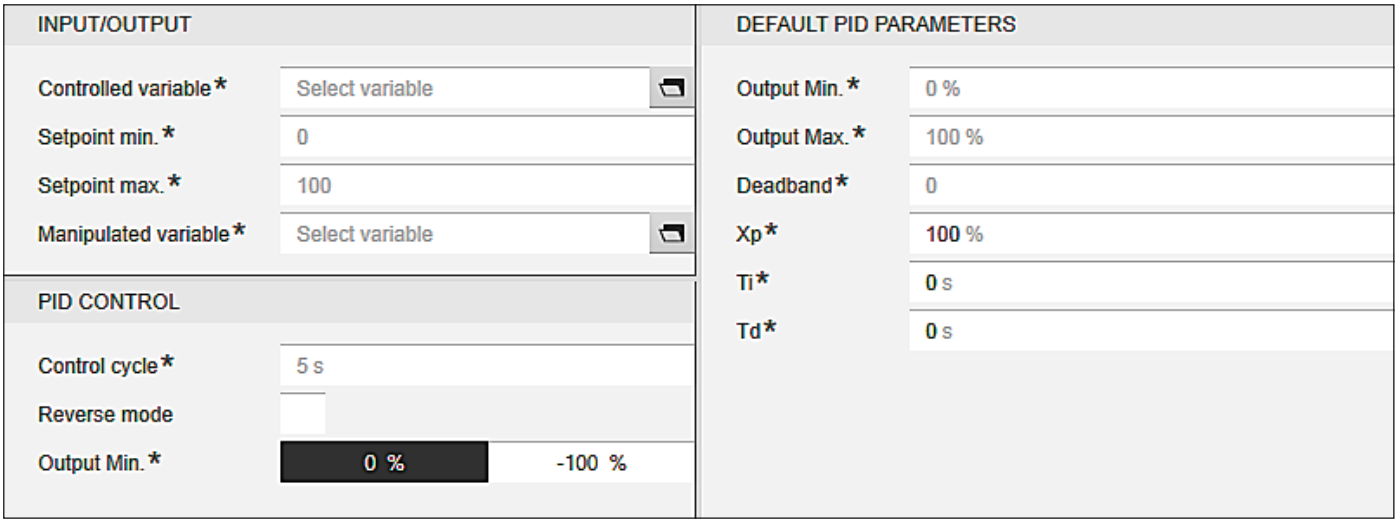


Fig. 5-11: [PID 1] input and selection screens

Field	Symbol	Description
INPUT/OUTPUT		Defines the input and output variables.
Controlled variable*		Selects a process variable or setpoint controller as a controlled variable.
Setpoint min.*		Displays the minimum setpoint limits and enters the value.
Setpoint max.*		Displays the maximum setpoint limits and enters the value.
Manipulated variable*		Selects a controller as the manipulated variable.
PID CONTROL		Defines the operating principle
Control Cycle*		Displays the request interval and enters the value.
Reverse mode		Sets whether the operating direction of the system deviation is inverted.
	☑	The operating direction of the system deviation is inverted.
	☐	The operating direction of the system deviation is **not** inverted.
Output Min.*		When selecting “0%”, a negative output for the manipulated variable is **not** supported. When selecting “-100%”, a negative output for the manipulated variable is supported.
DEFAULT PID PARAMETERS		Defines the parameters of the PID logic.
Output Min.*		Displays the output limitation of the minimum setpoint of the manipulated variable and enters the value (value in %).
Output Max.*		Displays the output limitation of the maximum setpoint of the manipulated variable and enters the value (value in %).
Deadband*		Displays the deadband and enters the value.

Field	Symbol	Description
Xp*		Displays the proportional range and enters the value.
Ti*		Displays the reset time and enters the value.
Td*		Displays the derivative time and enters the value.

* Required information

Selection Menu for [Controlled Variable] and [Manipulated Variable]

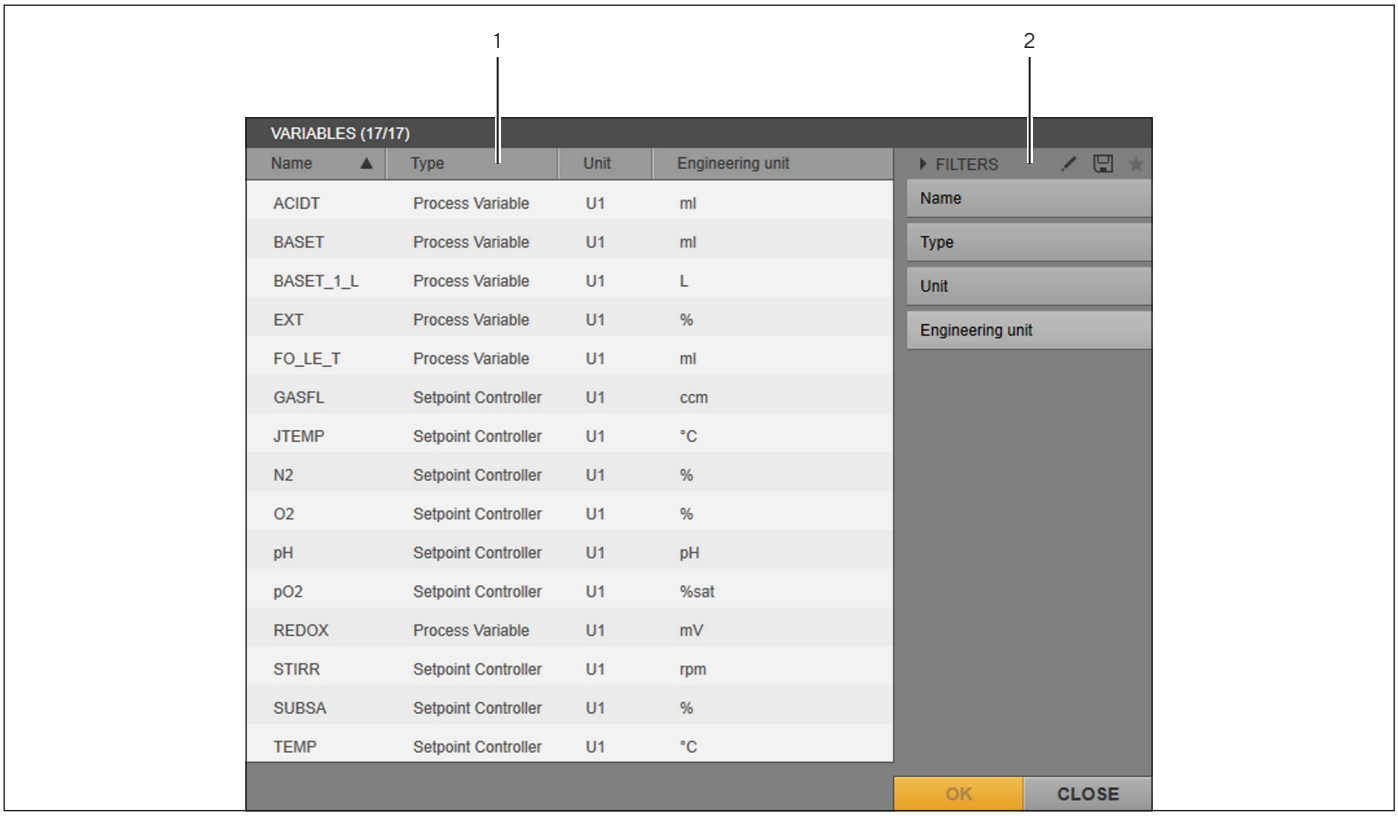


Fig. 5-12: [VARIABLES (#/#)] selection menu for selecting the input and output variable (example)

Pos.	Description
1	List for selecting the input and output variable: – Input variable: Controlled variable – Output variable: Manipulated variable (In the selection menu for the output variable, **no** process variables are listed since process variables **cannot** be selected as output variables.)
2	Search filter with search filter functions

5.2.1.4 Storage Strategy Input and Selection Screens

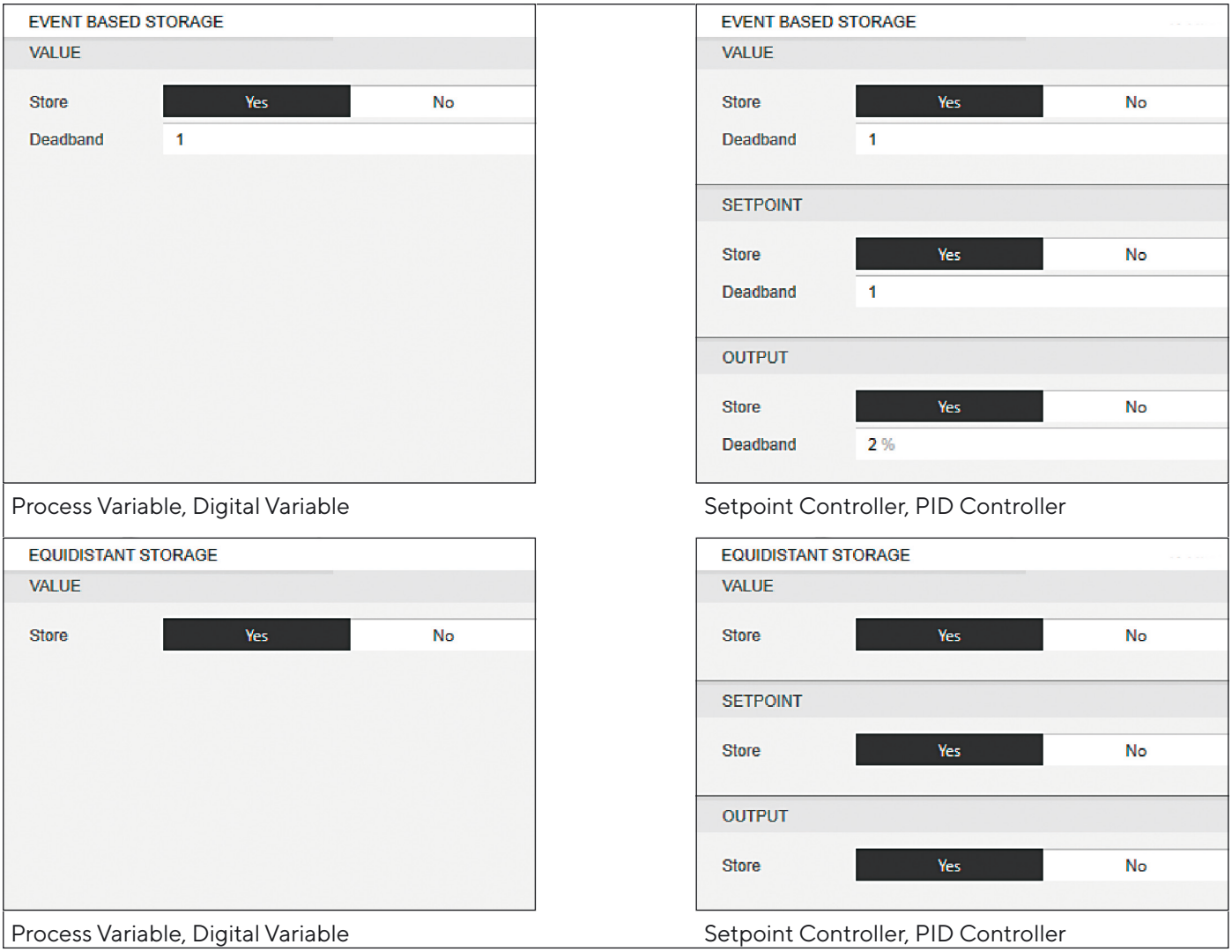


Fig. 5-13: [EVENT BASED STORAGE] and [EQUIDISTANT STORAGE] input and selection fields

Field	Description
VALUE	Process value (actual value)
SETPOINT	Setpoint
OUTPUT	Controller output
Store	Save selection field
Deadband	Deviation value input field (deadband)

5.2.1.5 [ALARMING] Input and Selection Screen

[PARAMETER], [LIMITS*] Input Fields and Selection Field

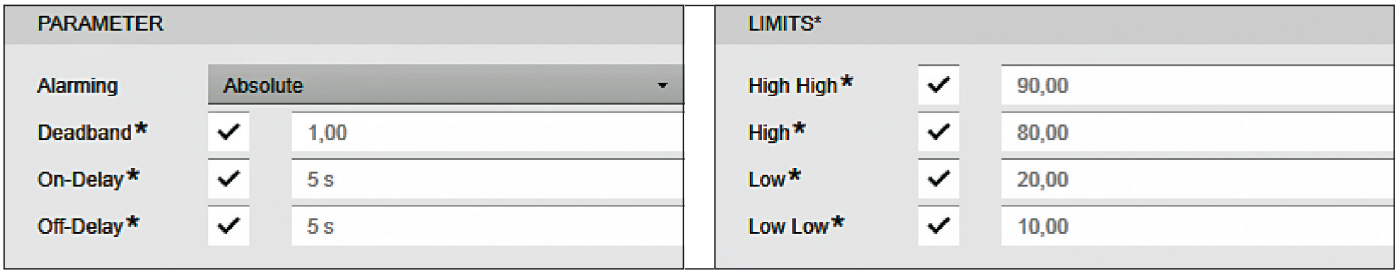


Fig. 5-14: [PARAMETER], [LIMITS*] input fields and selection field

Field	Symbol	Description
Alarming		Alarm function
Off		Alarm function is deactivated.
Absolute		Absolute alarm function is active.
Deadband		Activate/deactivate and configure the deviation alarm:
Deadband	☑	Deviation alarm is activated. When the function is activated, the corresponding values must be input.
Dead-band*	☐	Deviation alarm is deactivated.
On-Delay		Delay time for showing the alarm, activate/deactivate and configure the function:
On-Delay	☑	Delay time for display is activated. When the function is activated, the corresponding values must be input.
On-Delay*	☐	Delay time for display is deactivated.
Off-Delay		Delay time for hiding the alarm, activate/deactivate and configure the function:
Off-Delay	☑	Delay time for hiding is activated. When the function is activated, the corresponding values must be input.
Off-Delay*	☐	Delay time for hiding is deactivated.
High High		Alarm function for the top upper alarm limit, which generates an alarm with “High” priority. Activate/deactivate and configure the deviation alarm.
High High	☐	Alarm function is deactivated.
High High*	☑	Alarm function is activated.
High		Alarm function for the medium upper alarm limit, which generates an alarm with “Medium” priority. Activate/deactivate and configure the deviation alarm.
High	☐	Alarm function is deactivated.
High*	☑	Alarm function is activated.

Field	Symbol	Description
Low		Alarm function for the medium lower alarm limit, which generates an alarm with “Medium” priority. Activate/deactivate and configure the deviation alarm.
Low	☐	Alarm function is deactivated.
Low*	☑	Alarm function is activated.
Low Low		Alarm function for the bottom lower alarm limit, which generates an alarm with “High” priority. Activate/deactivate and configure the deviation alarm.
Low Low	☐	Alarm function is deactivated.
Low Low*	☑	Alarm function is activated.

* Value must be entered when function is activated

5.2.2 [IMPORT CONTROL MODULES (#/#)] Selection Screens

5.2.2.1 [DEVICE] Selection Screen

[SELECT DEVICE] Selection Field

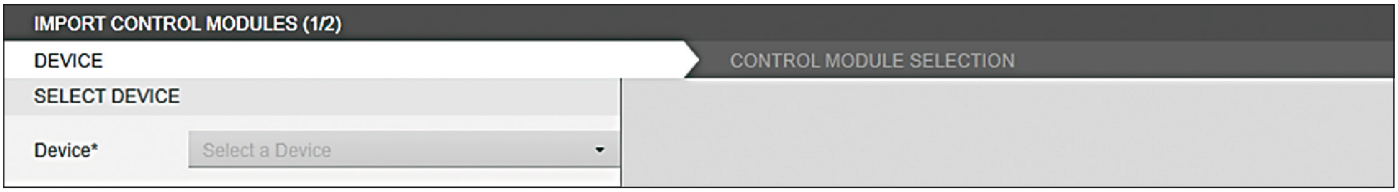


Fig. 5-15: [SELECT DEVICE] selection field

Field	Description
Device*	Assignment of the control modules to the device

* Required information

5.2.2.2 [SOURCE] Selection Screen

[SELECT SOURCE] Selection Field

Fig. 5-16: [SELECT SOURCE] selection field

Field	Description
MDB file	Load the unit-specific configuration file (see Chapter 2.4, page 12)

5.2.2.3 [IMPORT] Selection Screen

[SELECT PROCESS UNIT] Selection Field

Fig. 5-17: [SELECT PROCESS UNIT] selection field

Field	Description
Process Unit	Assignment of the unit (process unit) to the device

5.2.2.4 [CONTROL MODULE SELECTION] Selection Screen

[SELECT CONTROL MODULE] Selection Field

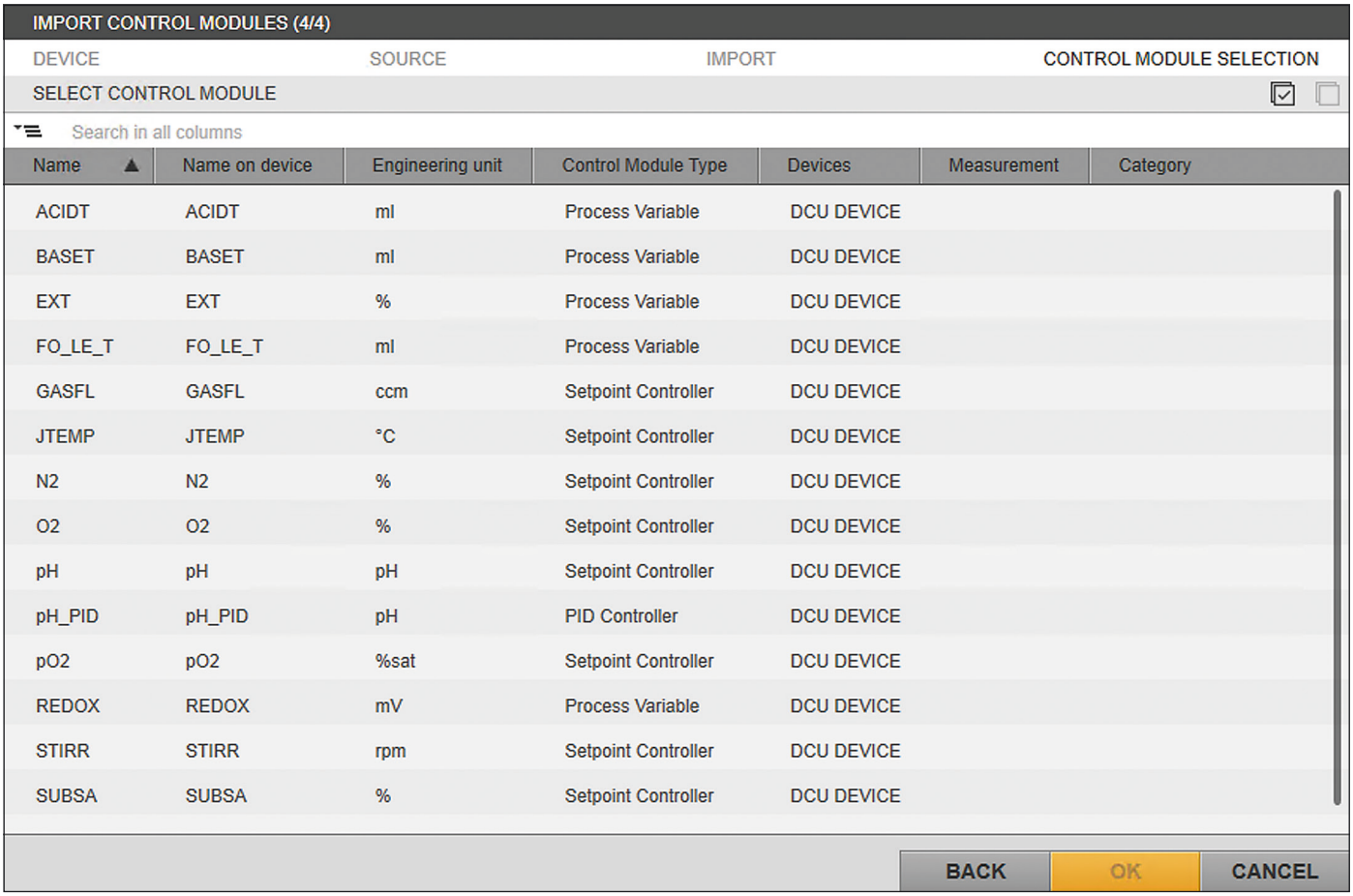


Fig. 5-18: [SELECT CONTROL MODULE] selection field

Field	Description
PID controller, setpoint controller, process variables, digital variables, offline variables	Selection of the control modules for monitoring

5.2.3 Creating a New Unit

Requirements

The device to which the unit is to be assigned has been created (see Chapter 5.1.5, page 46).

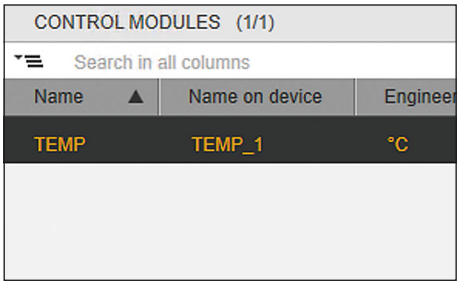
Procedure

- ▶ Call up the [UNITS (#)] menu.
- ▶ In the toolbar, click on the [Add] button.
- ▷ The [ADD UNIT] input screen appears.
- ▶ Enter the data for "Short Name*" and "Name*" in the input fields.
- ▶ Enter a descriptive text for the process in the "Description" input field.
- ▶ In the [UNIT TYPE*] selection menu, select the corresponding device.
- ▷ The image of the device appears.

5.2.3.1 Manually Configuring Control Modules

Procedure

- ▶ In the "CONTROL MODULES (#/#)" line, click on the [Add] button.
- ▷ The [GENERAL] input and selection screen appears (for an overview of the inputs for manual configuration, see Chapter "5.2.1 [ADD NEW CONTROL MODULE (#/#)] Input/Selection Screens", page 49).
- ▶ Enter the corresponding data in the [CONTROL MODULE], [SPECIFICATION], [PARAMETERS], [VALUE] or [VALUE/SETPOINT] and [EQUIDISTANT STORAGE] or [EVENT BASED STORAGE] input and selection screens.
- ▶ In the [ALARMING] input and selection screen, select the corresponding alarm functions and enter the data.
- ▶ Click on the [OK] button to complete configuration of the control module.
- ▷ The control module is entered in the "CONTROL MODULES" list.
- ▶ If additional control modules are to be configured: Manually configure control modules.
- ▶ Click on the [SAVE] button to complete the unit configuration.
- ▷ The configured unit is entered in the overview.



5.2.3.2 Importing Control Modules

Procedure

- ▶ In the “CONTROL MODULES (#/#)” line, click on the [Import] button.
- ▷ The [SELECT DEVICE] selection screen appears. The configuration file contains information about control modules for the corresponding process.
- ▶ Select the corresponding device in the selection menu and click on [NEXT].
- ▷ The [SELECT SOURCE] selection screen appears.
- ▶ Click on the [File location] button and select the file location (a separate CD or previous version (e.g., MFCS/win)) where the configuration file is located.
- ▶ Select the configuration file and click on the [open] button.
- ▷ The configuration file is loaded. The file path to the configuration file is displayed. The configuration file contains information about control modules for the corresponding process.
- ▶ Click on the [NEXT] button.
- ▶ In the [Process Unit] selection menu, select the unit and click on the [NEXT] button.
- ▷ The selection screen with the control modules appears. The selection screen lists all control modules which are included in the selected configuration.
- ▶ If you are not sure which control modules are required: Select all the control modules from the list.
- ▶ Select entries:
  - ▶ Select individual entries: Press the CTRL key and click on the control module entries one after the other.
  - ▶ Select all entries: Click on the [Checkbox with checkmark] button for this purpose.
- ▶ Click on the [OK] button.
- ▷ The control modules are entered in the “CONTROL MODULES” list.
- ▶ If additional control modules are to be added (e.g., offline variables for an activated Sample Data Module): See Chapter “5.2.3 Creating a New Unit”, page 59).
- ▶ Click on the [SAVE] button to complete the unit configuration.
- ▷ The configured unit is entered in the overview.

CONTROL MODULES (15/15)

Search in all columns

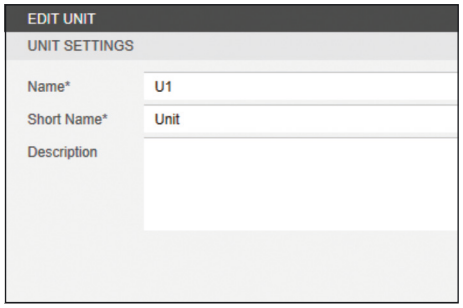
Name ▲	Name on device	Engi
ACIDT	ACIDT	ml
BASET	BASET	ml
EXT	EXT	%
FO_LE_T	FO_LE_T	ml
GASFL	GASFL	ccm
JTEMP	JTEMP	°C
N2	N2	%

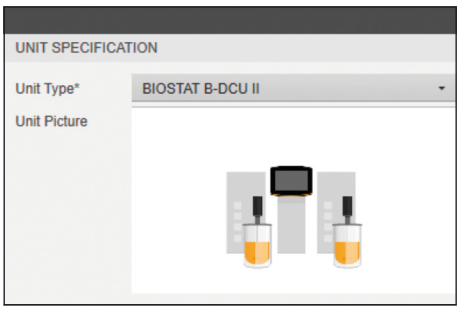
5.2.4 Modifying Unit Settings.

5.2.4.1 Changing the Unit Name/Unit Picture

Procedure

- ▶ Call up the [UNITS (#)] menu.
- ▶ Click on the unit for which the settings are to be changed.
- ▶ In the toolbar, click on the [Edit] button.
- ▷ The overview with the settings for the unit appears.
- ▶ In the [UNIT SETTINGS] input screen, change the entries for “Name*”, “Short Name*”, and “Description”.



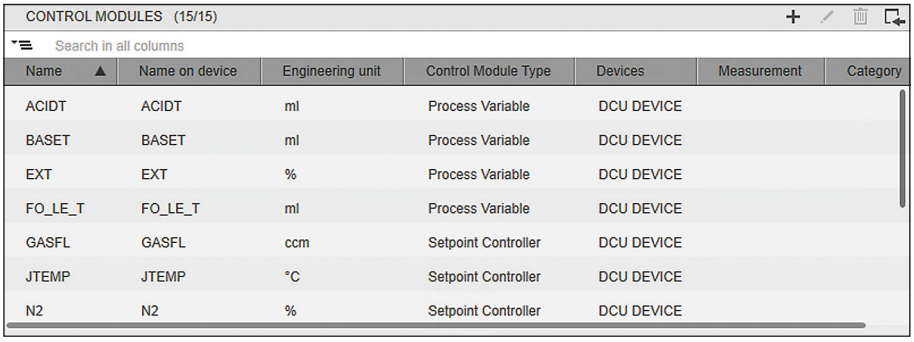


- ▶ In the [UNIT SPECIFICATION] input screen, change the image of the device.
- ▶ To do this, select the corresponding device in the [UNIT TYPE*] selection menu.
- ▷ The image of the device appears.

5.2.4.2 Adding a Control Module

Procedure

- ▶ Call up the [UNITS (#)] menu.
- ▶ Click on the unit for which the settings are to be changed.
- ▶ In the toolbar, click on the [Edit] button.
- ▷ The overview with the settings for the unit appears:



- ▶ In the “CONTROL MODULES (#/#)” line, click on the [Add] button.
- ▷ The [GENERAL] input and selection screen appears. An overview of the inputs for manually configuring the control module can be found in Chapter “5.2.1 [ADD NEW CONTROL MODULE (#/#)] Input/Selection Screens”, page 49.

- ▶ Enter the corresponding data in the [CONTROL MODULE], [SPECIFICATION], [PARAMETERS], [PID], and [VALUE] ([VALUE/SETPOINT]) input and selection screens.
- ▶ In the [ALARMING] input and selection screen, select the corresponding alarm functions and enter the data.
- ▶ Click on the [OK] button to complete configuration of the control module.
- ▷ The new control module is entered in the "CONTROL MODULES" list.
- ▶ Add more control modules if necessary.
- ▶ Click on the [SAVE] button to complete the unit configuration.
- ▷ The new control module(s) has/have been added.

5.2.4.3 Editing Control Modules

Procedure

- ▶ Call up the [UNITS (#)] menu.
- ▶ Click on the unit for which the settings are to be changed.
- ▶ In the toolbar, click on the [Edit] button.
- ▷ The overview with the settings for the unit appears.
- ▶ In the "CONTROL MODULES (#)" list, click on the control module you would like to edit.
- ▶ In the "CONTROL MODULES (#/#)" line, click on the [Edit] button.
- ▷ The [GENERAL] input and selection screen appears. An overview of the inputs for manually configuring the control module can be found in Chapter "5.2.1 [ADD NEW CONTROL MODULE (#/#)] Input/Selection Screens", page 49.
- ▶ In the [CONTROL MODULE], [SPECIFICATION], [PARAMETERS], [PID], and [VALUE] ([VALUE/SETPOINT]) input and selection screens, modify the corresponding values.
- ▶ In the [ALARMING] input and selection screen, select the corresponding alarm functions and enter the data.
- ▶ Click on the [OK] button to complete configuration of the control module.
- ▷ The settings of the control module have been saved.
- ▶ If additional control modules are to be edited: Edit additional control modules (see Chapter 5.2.4.3, page 62).
- ▶ Click on the [SAVE] button to complete the unit configuration.
- ▷ The changes have been saved.

5.2.5 Deleting Control Modules

Procedure

- ▶ Call up the [UNITS (#)] menu.
- ▶ Click on the unit for which the settings are to be changed.
- ▶ In the toolbar, click on the [Edit] button.
- ▷ The overview with the settings for the unit appears.
- ▶ In the "CONTROL MODULES (#)" list, click on the control module you would like to delete.
- ▶ In the "CONTROL MODULES" line, click on the [Delete] button.

▷ The message “Do you really want to delete the selected device?” appears.
▶ Click on the [YES] button.
▷ The control module is deleted from the list.
▶ If additional control modules are to be deleted: Highlight and delete the control modules.
▶ Click on the [SAVE] button to complete the unit configuration.
▷ The changes have been saved.

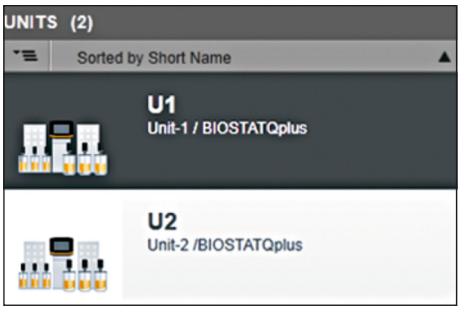
5.2.6 Replacing Control Modules (Configuration File)

Procedure

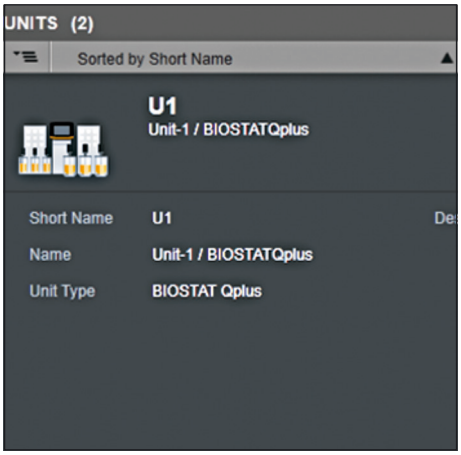
▶ Call up the [UNITS (#)] menu.
▶ Click on the unit for which the settings are to be changed.
▶ In the toolbar, click on the [Edit] button.
▷ The overview with the settings for the unit appears.
▶ Delete all control modules listed in the “CONTROL MODULES (#)” list.
▶ In the “CONTROL MODULES (#)” line, click on the [Import] button.
▷ The [DEVICE/SELECT DEVICE] selection screen appears.
▶ Select the corresponding device in the selection menu and click on the [NEXT] button.
▷ The [SOURCE/SELECT SOURCE] selection screen appears. The configuration file contains information about control modules for the corresponding device.
▶ Click on the [File location] button and select the file location (a separate CD or previous version (e.g., MFCS/win)) where the configuration file is located (see Chapter 2.4.1.2, page 12).
▶ Select the configuration file and click on the [open] button.
▷ The configuration file is loaded. The file path to the configuration file is displayed.
▶ Click on the [NEXT] button.
▶ In the [Process Unit] selection menu, select the unit and click on the [NEXT] button.
▷ The selection screen with the control modules appears. The selection screen lists all control modules which are included in the selected configuration. If you are not sure which control modules you need for monitoring, select all control modules in the list.
▶ Select entries:
  ▶ Select individual entries: Press the CTRL key and click on the control module entries one after the other.
  ▶ Select all entries: Click on the [Checkbox with checkmark] button for this purpose.
▶ Click on the [OK] button.
▷ The control modules are entered in the “CONTROL MODULES” list.
▶ Click on the [SAVE] button to complete the unit configuration.
▷ The control modules are assigned to the unit based on the configuration file.

5.2.7 Activating the Extended Display of Unit Settings

Procedure



- ▶ Call up the [UNITS (#)] menu.
- ▶ In the [UNITS (#)] overview, double-click the UNIT or select the UNIT and click the [Details] button.



- ▷ The extended display appears.
- ▶ To close the extended display: Click on the [CLOSE] button.

5.2.8 Removing a Unit from the List

Requirements

No batch has been started on the unit that is to be removed.

Procedure

- ▶ Call up the [UNITS (#)] menu.
- ▶ Click on the unit you want to remove from the list.
- ▶ Click on the [Delete] button.
- ▷ A message appears.
- ▶ Click on the [YES] button.
- ▷ The unit is deleted from the list.
- ▷ The control modules assigned to the unit are deleted.

5.2.9 Exporting and Importing a Unit Configuration

A unit configuration can be exported and imported. The export / import file contains the complete configuration of the control modules and devices defined for the unit. The configuration includes calculations and system resources linked with the control module. The export file (import file) can be saved (uploaded) in (from) a target folder located on a local drive, a removable drive or a network drive. The export / import process is visualized. The export / import file is signed. Changes to the import file mean that it can no longer be imported.

Export

- Individual elements of the configuration, e.g. calculations, **cannot** be excluded from the export.
- User-specific settings, e.g. trend display settings and trend templates, are **not** exported.

Import

- The export / import file can be used for the unit configuration if
  - the export / import file is signed. (Editing the export / import file after exporting renders the signature invalid and the unit configuration **cannot** be imported.)
  - the export / import file was created with a MFCS program version which corresponds to the installed version or an older version. (The MFCS program must be installed in at least the version with which the export / import file was created.)
- The import is **not** executed if
  - a batch is simultaneously started on a unit that is to be imported (e.g. when a unit is updated).
  - a batch is started on a unit whose control module is attributed to a device which is also part of the unit configuration to be imported (e.g. a device with control modules in multiple units).
  - the import exceeds the licensed number of units.

Configuration matches and deviations:

- Devices, calculations, and system resources which are already in the system and import file and are identically configured **cannot** be replaced.
- If the unit configuration of the current system deviates from the unit configuration of the import file, the import process will only go ahead once the user has confirmed that the existing elements are to be replaced.
- For elements containing deviations from the existing elements, only the differences are imported.

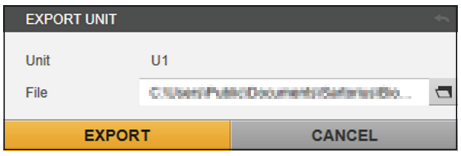
Importing elements that require a license:

- Elements of the unit configuration that require a license are imported even if the license for the program is not activated.
- Elements that require a license are displayed after the import and are deactivated. The elements can be used after the purchase of the relevant license(s).

5.2.9.1 Exporting Unit Configurations

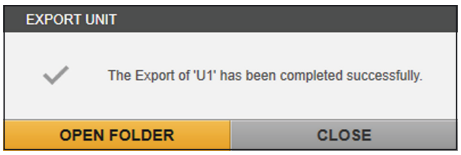
Procedure

- ▶ Call up the [UNITS (#)] menu.
- ▶ Select the unit for export in the overview.
- ▶ Click on the [Export] button.
- ▷ The [EXPORT UNIT] window appears.



Default file location

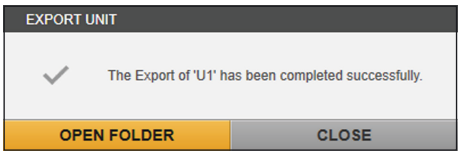
- ▶ Click on the [EXPORT] button.



- ▷ The progress of the export is displayed and the unit configuration is saved as an XML file.
- ▶ To directly access the export file and the complete the export process: Click on the [OPEN FOLDER] button.
- ▶ To complete the export process: Click on the [CLOSE] button.

Individual file location

- ▶ Click on the [Storage location] button.
- ▷ The window for setting the file location appears.
- ▶ Select the file location and confirm the selection with [Save].
- ▶ To return to the default file location: Click on the [Reset] button.
- ▶ Click on the [EXPORT] button.

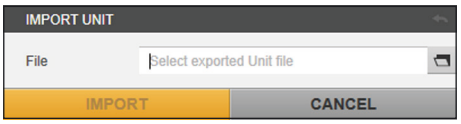


- ▷ The progress of the export is displayed and the unit configuration is saved as an XML file.
- ▶ To directly access the export file and the complete the export process: Click on the [OPEN FOLDER] button.
- ▶ To complete the export process: Click on the [CLOSE] button.

5.2.9.2 Importing Unit Configurations

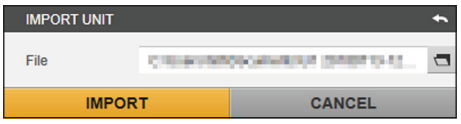
Procedure

▶ Call up the [UNITS (#)] menu.
▶ Click on the [Import] button.
▷ The [IMPORT UNIT] window appears.
▶ To select the export / import file: Click on the [Storage location] button.



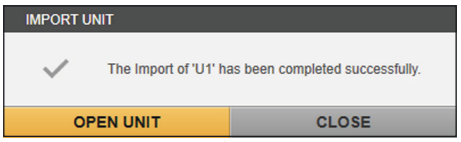
▶ Select the export / import file and confirm the selection.

▷ The [IMPORT UNIT] window appears.

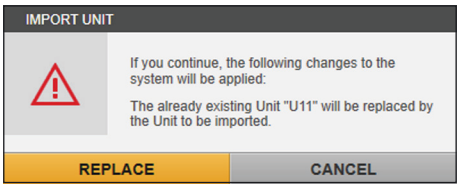


▶ Click on the [IMPORT] button.

▷ The export / import file is scanned.
▷ The import progress is displayed.



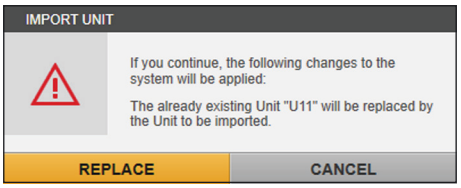
▶ To display the [EDIT UNIT] input and selection screen: Click on the [OPEN UNIT] button.
▶ To close the window: Click on the [CLOSE] button.



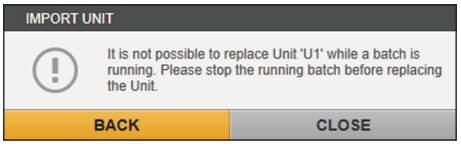
▷ If there is a unit configuration with the same name: The unit configuration can be replaced, or the process can be aborted.
▶ To abort the process: Click on the [CANCEL] button.

Replacing unit configurations

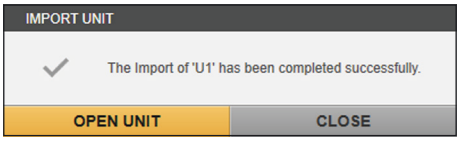
Procedure



▶ Click on the [REPLACE] button.
▷ The unit configuration of the export / import file is compared and verified with the existing unit configuration.



▷ The window with the [BACK] button appears if the unit configuration **cannot** be imported. The message displays the cause.
▶ To import another unit configuration: Click on the [BACK] button and repeat the selection process with another export / import file.
▶ To abort the process: Click on the [CLOSE] button.



▷ The window with the [OPEN UNIT] button appears if the unit configuration has replaced the existing unit configuration and has been imported.
▶ To display the [EDIT UNIT] input and selection screen: Click on the [OPEN UNIT] button.
▶ To close the window: Click on the [CLOSE] button.

5.3 [PRINTOUTS] Menu

The system configuration information can be printed in lists. Five lists are set up in the [PRINTOUTS] menu for this purpose.

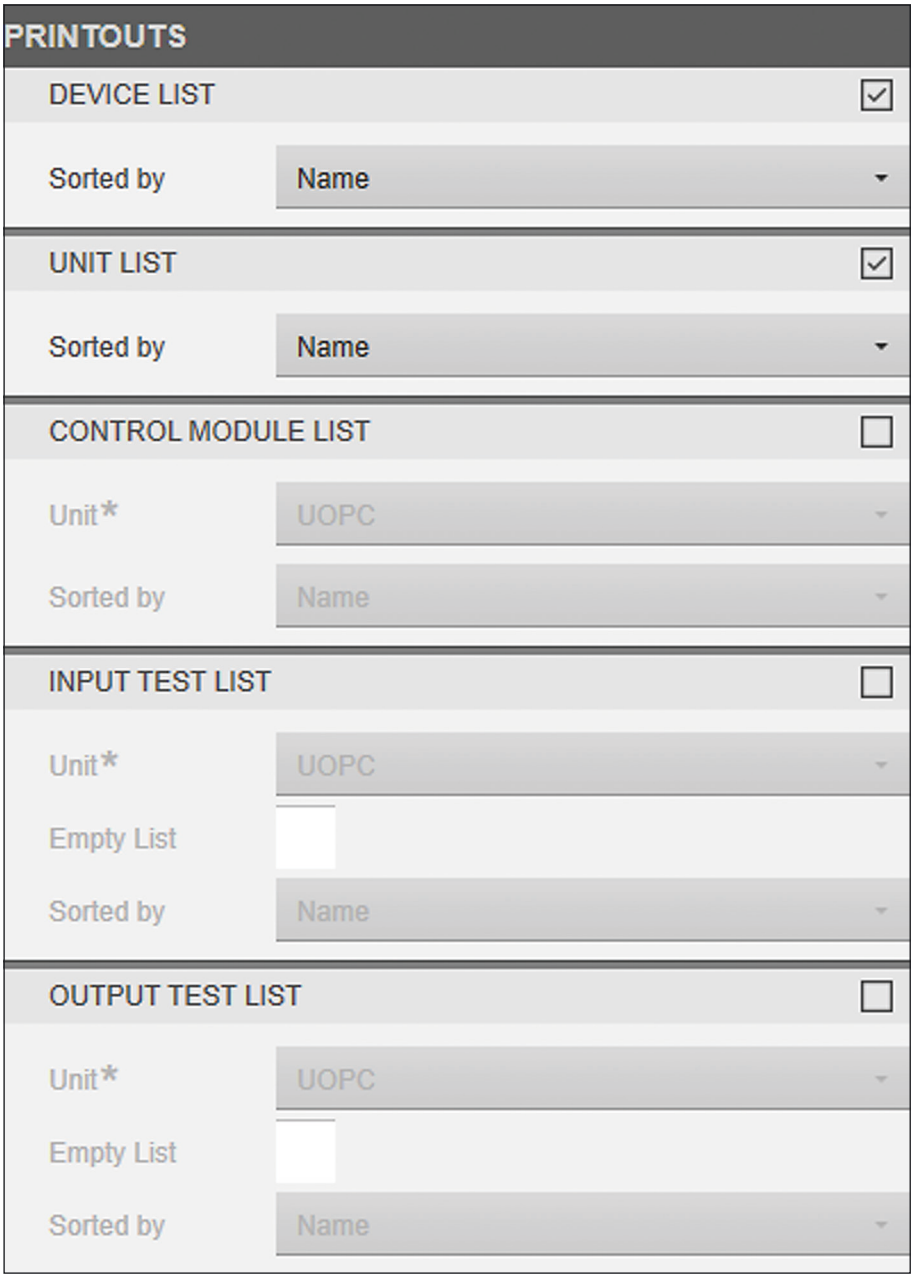


Fig. 5-19: [PRINTOUTS] selection screens

Field	Symbol	Description
DEVICE LIST		Configured devices
UNIT LIST		Configured units (process units)
CONTROL MODULE LIST		Configured or imported control modules
INPUT TEST LIST		Check of the actual values of the control modules

Field	Symbol	Description
OUTPUT TEST LIST		Check of the setpoints of the control modules
		Checkbox for export
Unit*		Assignment to a process unit
Empty List		Print an empty list
Sorted by		Sorting of entries by category

* Required information

5.3.1 Printing Lists

Procedure

▶ In the [ADMINISTRATION] function pane, click on the [PRINTOUTS] button.

▶ Select the lists for printing or export. To do so, place the relevant checkmarks in the checkboxes.
▶ Sort the entries in the list by category.
▷ The entries are then listed in the printout based on the selected sorting.
▶ To print out the lists directly: Click on the [PRINT] button.
  ▶ Select the desired printer in the printer selection menu and click on the [Print] button.
  ▷ The selected lists with system configuration information are printed out.
▶ To display and print out the lists in a preview: Click on the [PREVIEW] button (for printing from the preview, see Chapter 5.3.2, page 70).

5.3.2 Printing Lists from the Preview

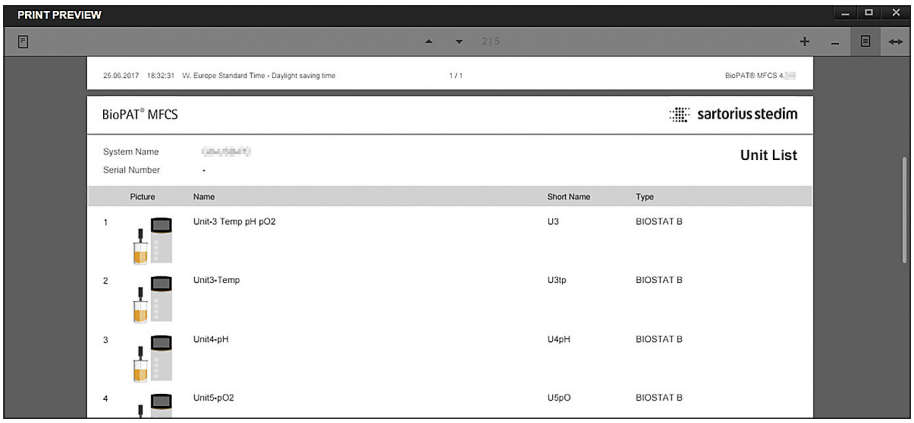


Fig. 5-20: Preview, "Unit List" page

Symbol	Name	Description
	Print list	Print entire lists from the preview
2 | 5	Navigate	Navigate in the preview
+ –	Zoom	Zoom in/out on the preview
	Zoom window size	Minimize preview to window size
	Zoom window width	Maximize preview to window width

Procedure

- To view the lists in the printout: Click on the vertical scroll bar and move it.
- To navigate through the lists: Click on the [Navigate] button.
- To zoom in or out of the preview: Click on the [Zoom] button.
- To minimize the preview to window size: Click on the [Zoom window size] button.
- To maximize the preview to window width: Click on the [Zoom window width] button.
- To print the lists: Click on the [Print list] button.

5.4 [SETTINGS] Menu

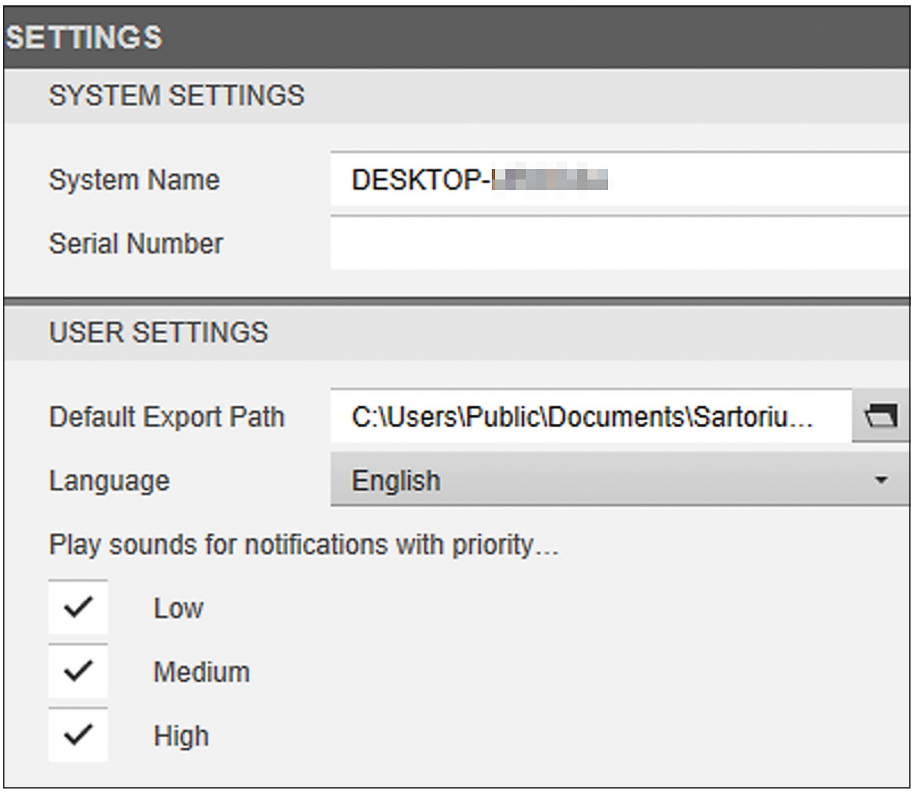


Fig. 5-21: [SETTINGS] input screens

[SYSTEM SETTINGS] Input and Selection Fields

Field	Description
System Name	During installation, the computer name is entered as the system name by default. The system name explicitly identifies the MFCS system and is used when printing, among other processes.
Serial Number	The serial number uniquely identifies the personal BioPAT® MFCS software and should be specified in any communication with Sartorius Stedim Systems.

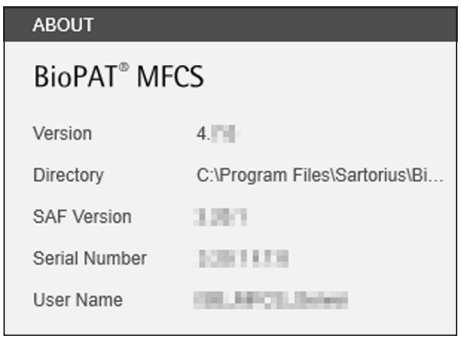
[USER SETTINGS] Input and Selection Fields

Field	Symbol	Description
Default Export Path		File location for export files File location can be modified.
Language		Language selection for the user interface
Play sounds for notifications with priority ...		Deactivation/activation of sounds for system and process messages

Field	Symbol	Description
Low	☐ ☑	Messages with low priority
Medium	☐ ☑	Messages with medium priority
High	☐ ☑	Messages with high priority

Procedure

- ▶ In the [ADMINISTRATION] function pane, click on the [SETTINGS] button.
- ▷ The [SYSTEM SETTINGS] and [USER SETTINGS] overviews appear.
- ▶ Configure the system settings.
  - ▶ To modify the system name: Enter the new system name in the input field.
  - ▶ To enter the serial number: Enter the serial number in the input field.
  - ▷ The serial number is displayed in the “BioPAT® MFCS” information pane as soon as the settings are saved.



- ▶ Configure the user-specific settings:
  - ▶ To modify the file location for the export file: Select a new file location and confirm the selection with [OK].
  - ▶ To modify the language setting: Select the desired language in the selection menu.
  - ▷ The new language setting is effective after restarting the program.
  - ▶ To activate/deactivate the sound function for the priority: Click on the corresponding checkbox.
- ▶ To save the system settings and user-specific settings: Click on the [SAVE] button.

5.5 Cross-system Control Modules

Cross-system (shared) control modules are stored in the [SYSTEM RESOURCES] pane. These control modules cannot be assigned to a unit. The shared control modules can, for example, be used for calculations in the optional calculation module and for recipe configuration in the optional recipe module.

The cross-system control modules can be configured like the control modules of a unit.

The [ADD NEW SYSTEM RESOURCE (#/#)] input screen appears when a new cross-system control module is to be added.

The [EDIT SYSTEM RESOURCE (#/#)] input screen appears when an existing cross-system control module is to be edited.

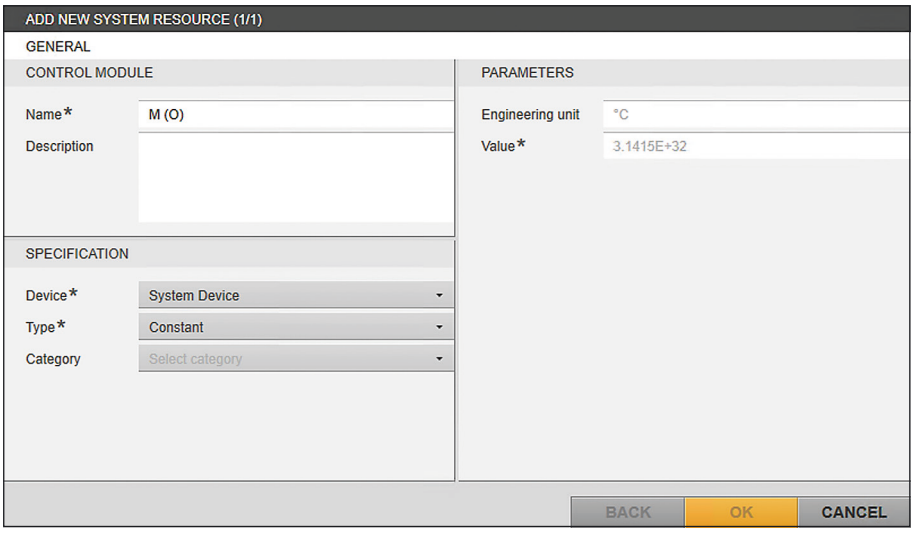


Fig. 5-22: [ADD NEW SYSTEM RESOURCE] input screen (example)

Field	Description
Name*	Name of the control module
Description	Abbreviated description
Device*	System assignment
Type*	Type of control module
Category*	Category of control module
Decimal Place*	Decimal places
Engineering Unit	Unit of measurement
Value*	Value of the control module

* Required information

5.5.1 Creating or Editing Cross-system Control Modules

Procedure

- ▶ In the [ADMINISTRATION] function pane, click on the [SYSTEM RESOURCES] button.
- ▷ The [SYSTEM RESOURCES (#/#)] overview appears.
- ▶ To create a new control module: Click on the [Add] button.
  - ▷ The [ADD NEW SYSTEM RESOURCE (#/#)] input screen appears.
  - ▶ Enter data into the input fields and select specifications in the selection menus.
- ▶ To edit an existing control module: Click on the [Edit] button.
  - ▷ The [EDIT SYSTEM RESOURCE (#/#)] input screen appears.
  - ▶ Modify the corresponding data in the input fields.
  - ▷ The settings [Device] and [Type] **cannot** be modified.
- ▶ Click on the [OK] button to complete the configuration.

6 MONITORING Function Pane

In the [MONITORING] function pane the progress of processes can be monitored and recorded by means of the control modules.

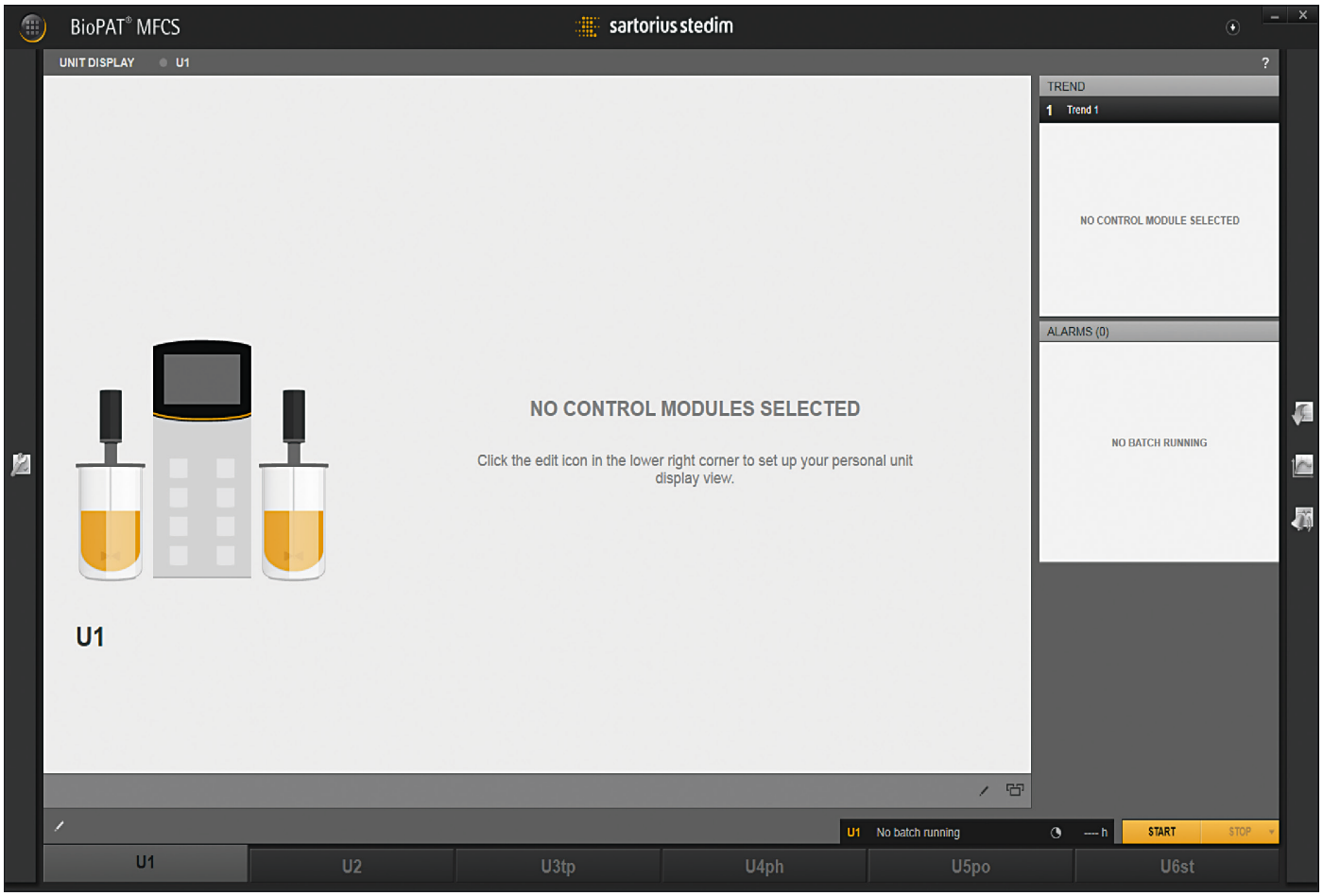


Fig. 6-1: "MONITORING" function pane

The following higher-level functions are available in the [MONITORING] function pane:

- Grouping of units
- Recording of process values (batch process)
- Alarm message management

[UNIT DISPLAY] Menu

- Freely configurable display for current process values
- Grouping of control modules (temperatures, gases, liquids, etc.)
- Detailed display of the control modules
- Multi-monitor operation
- Transfer of setpoints to the controllers of the device (e.g., DCU system).
- Setting of alarm parameters for control modules when a batch process is started:
  - Activation and deactivation of the alarm function for selected control module
  - Alarm limits and deadband

[TREND] Menu

- Display of current process values in the time curve of a selected unit or unit group
- Selection of up to six control modules/trends
- Adjustment of the display: time interval, colors of the process values, diagram (scaling auto or manual entry), marker function (symbol selection for measurement points), display of the control modules
- Simultaneous trend display (two trends/unit)
- Multi-monitor operation

[ALARMS] Menu

- Display of alarm messages in an alarm list
- Management of alarm messages and functions:
  - Acknowledge: confirmation of alarm messages
  - Shelve: temporary suppression of alarm messages
  - Out of Service: temporary disabling of alarm function for faulty control modules

Accessing the [MONITORING] Function Pane

Procedure

▶ On the start screen, click on the [MONITORING] button to display the function pane.

6.1 Viewing the [UNIT DISPLAY]/[TREND]/[ALARMS] Menus

6.1.1 Full-screen Mode

In full-screen mode, an additional BioPAT® MFCS program window opens. The program window shows the currently selected menu in full-screen mode.

Example: Full-screen view of the [TREND] menu

Fig. 6-2: Normal view: The [TREND] menu is docked (example)

Fig. 6-3: Full-screen view: The [TREND] menu is undocked (example)

Undocking a Menu

Procedure

▶ In the [UNIT DISPLAY] or [TREND] menu, click on the [Multi-monitor] button and select the [Current Screen] entry.
▷ The [UNIT DISPLAY] or [TREND] menu is displayed in full-screen mode.

Docking a Menu

Procedure

▶ Click on the [Normal view] button.
▷ The [UNIT DISPLAY] or [TREND] menu is reintegrated into the application and maximized.

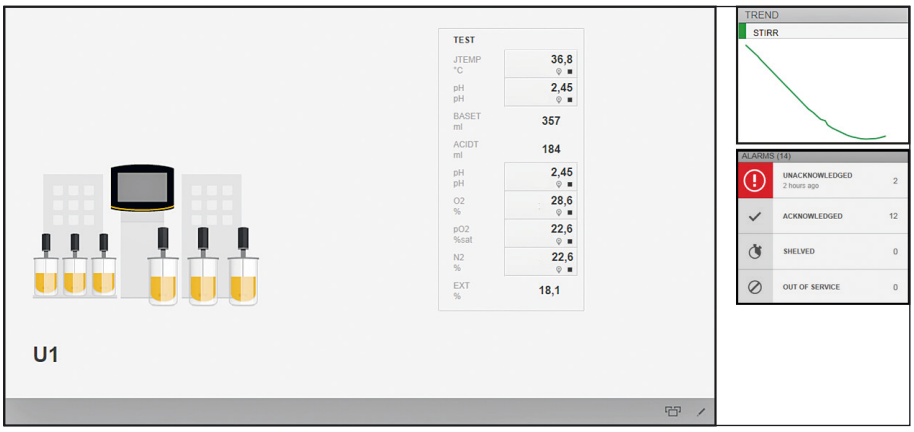
6.1.2 Menu View in Single-monitor Operation

The [UNIT DISPLAY], [TREND] and [ALARMS] menus are displayed in one window. Only one menu is ever active (settings can be configured in this menu), while the other menus are displayed as previews in the right-hand pane.

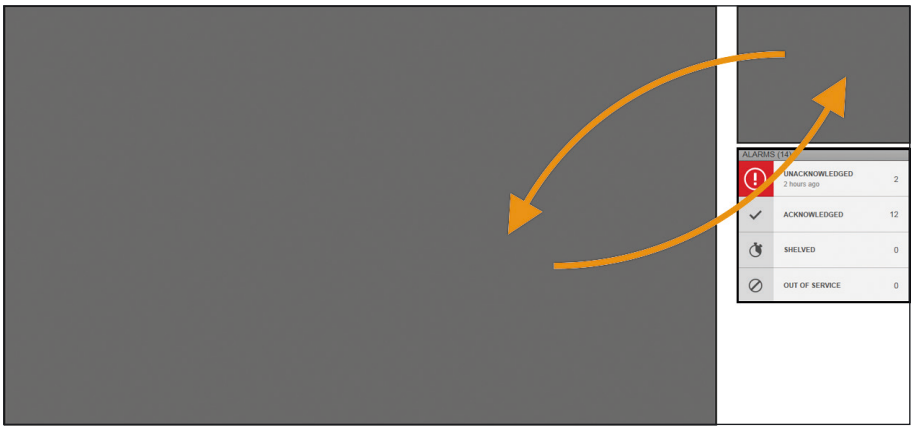
6.1.2.1 Toggling the Display of Active Menus

In the following example the display is toggled from the active [UNIT DISPLAY] menu to the [TREND] menu.

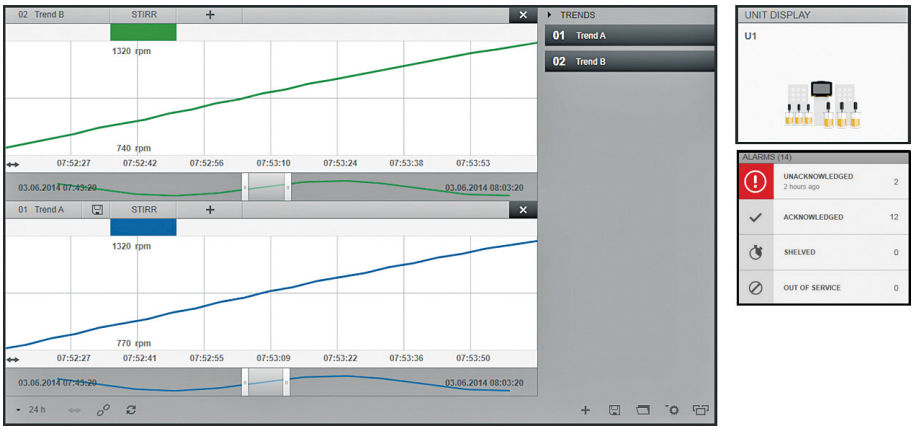
Procedure



▶ Click on the [TREND] preview window.



▷ The [UNIT DISPLAY] and [TREND] menus change position:

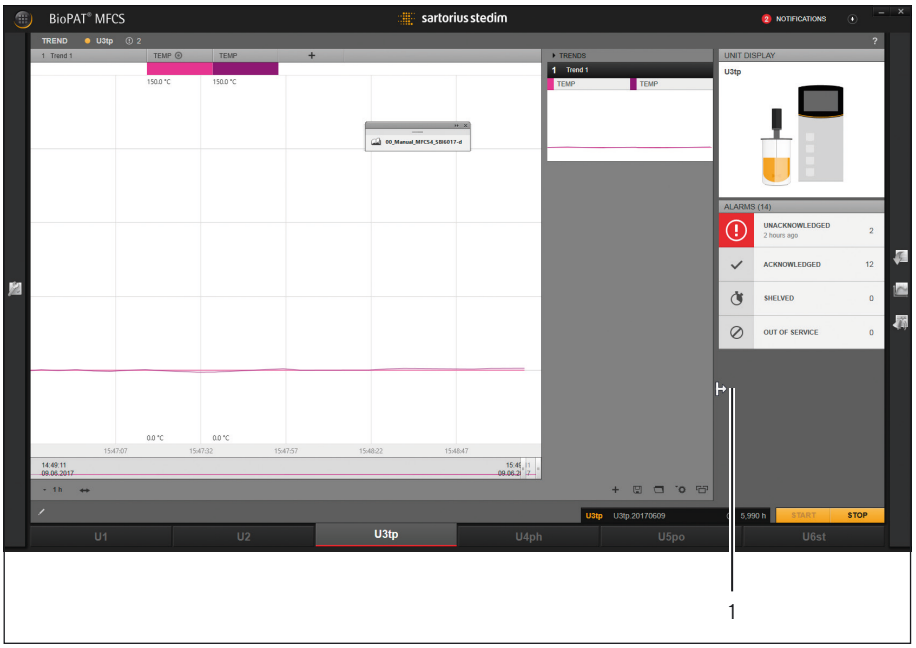


▷ The [TREND] menu is activated (settings can be configured in the [TREND] menu). The preview windows show the [UNIT DISPLAY] and [ALARMS] views.

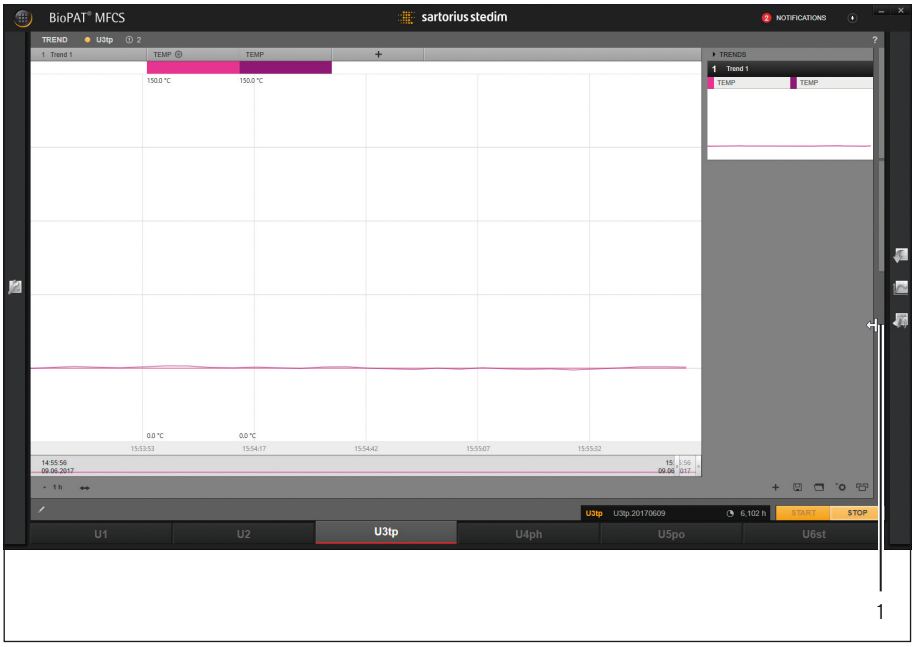
6.1.2.2 Displaying the Extended Normal View

In the extended normal view, the preview window is hidden and the active menu window expanded.

Procedure



- ▶ Move the mouse to the pane edge (1).
- ▷ The cursor becomes an expand/collapse symbol [Hide].
- ▶ Click with the mouse button.
- ▷ The active menu window expands:



- ▶ Move the mouse to the pane edge (1).
- ▷ The cursor becomes an expand/collapse symbol [Show].
- ▶ Click with the mouse button.
- ▷ The active menu window is minimized and the preview window reappears.

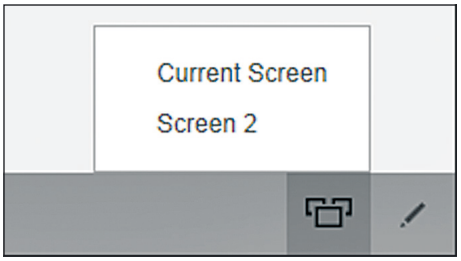
6.1.3 Menu View in Dual-monitor Operation

In dual-monitor operation, the [UNIT DISPLAY] and [TREND] menus can be displayed on monitor 1 and monitor 2 and settings configured in both menus.

Fig. 6-4: [TREND] menu on monitor 1 and [UNIT DISPLAY] menu (full-screen)

6.1.3.1 Activating the Menu View in Dual-monitor Operation

Procedure



▶ Click on the [Multi-monitor] button.
▷ The [Current Screen], [Screen 2] context menu appears.
▶ Select the [Screen 2] entry.
▷ The menu in the preview window is displayed on monitor 2 in full-screen mode. The menu on monitor 1 is displayed in full-screen mode.

6.1.3.2 Exiting the Menu View in Dual-monitor Operation

Procedure

▶ In the menu on monitor 2, click on the [Normal view] button.
▷ This ends multi-monitor operation.

6.2 Grouping of Units

Up to six units can be grouped into one unit group. By grouping units, the following functions can be utilized:

- Current process values in the [UNIT DISPLAY] menu can be displayed simultaneously for all units of the unit group.
- Current process values in the time curve in the [TREND] menu can be displayed simultaneously for all units of the unit group.
- Batch processes can be created: Simultaneous recording (start and stop time) of the process sequence values for units of the unit group.

The function for grouping units can be activated in the [UNIT DISPLAY] and [TREND] menus.

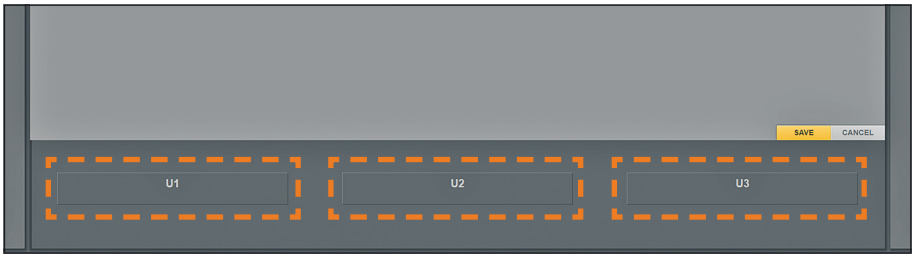
Fig. 6-5: Display in the footer (example: units 1–3, before and after grouping)

Pos.	Description
1	Editing mode for creating and editing unit groups
2-4	Configured units (not grouped)
5	Configured unit (not grouped)
6	Configured units 1+2 grouped

6.2.1 Grouping Units

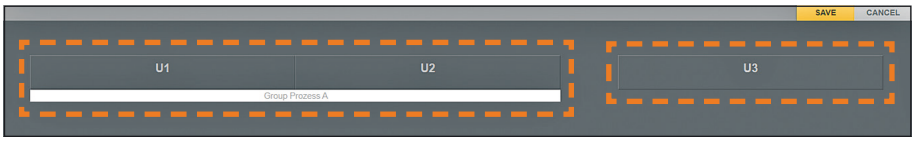
Procedure

- ▶ Access the [MONITORING] function pane.
- ▷ The [DISPLAY UNIT] or [TREND] menu appears.
- ▶ Click on the [Edit] button.
- ▷ The following window appears. In the following example, units [U1] and [U2] are grouped:



- ▶ Click on the [U2] button and hold down the mouse button.
- ▶ Drag the [U2] button onto the [U1] button and release the mouse button.

- ▷ Units [U2] and [U1] form one unit group:

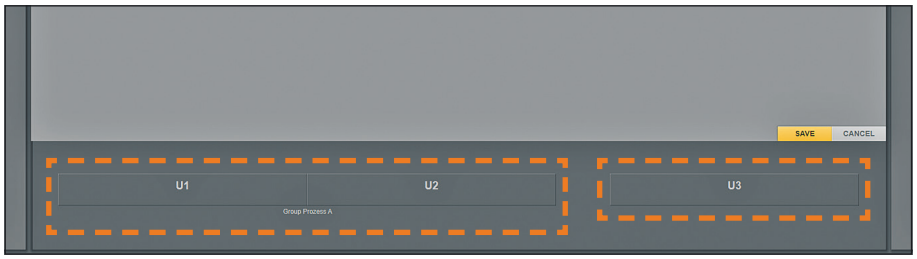


- ▶ In the input field, enter a name for the unit group.
- ▶ Click on the [SAVE] button.
- ▷ The unit group is saved. The unit group appears in the footer of the [UNIT DISPLAY]/[TREND] menus. Up to six units can be grouped into one unit group.

6.2.2 Removing a Unit from a Unit Group

Procedure

▶ Access the [MONITORING] function pane.
▷ The [DISPLAY UNIT] or [TREND] menu appears.
▶ Click on the [Edit] button.
▷ The following window is displayed.



In the following example, the unit [U1] is removed from the unit group.
▶ Click on the [U1] button and hold down the mouse button.
▶ Drag the [U1] button upwards or downwards out of the unit group.

▷ Unit [U1] has been removed from the unit group:

▶ Click on the [SAVE] button.
▷ Since the unit group consisted of two units in this example, the unit group now no longer exists.

6.3 Alarms

Alarms are only issued if the [ALARMING] function is activated for the control module of the unit and a batch process is ongoing.

Alarms are issued as alarm messages and are displayed in the [NOTIFICATIONS (#)] alarm window and listed in the [ALARMS] menu.

The following events trigger an alarm:

- Set alarm limits are violated
- Communication with the device is interrupted either temporarily or for an extended period of time

Alarm Limits

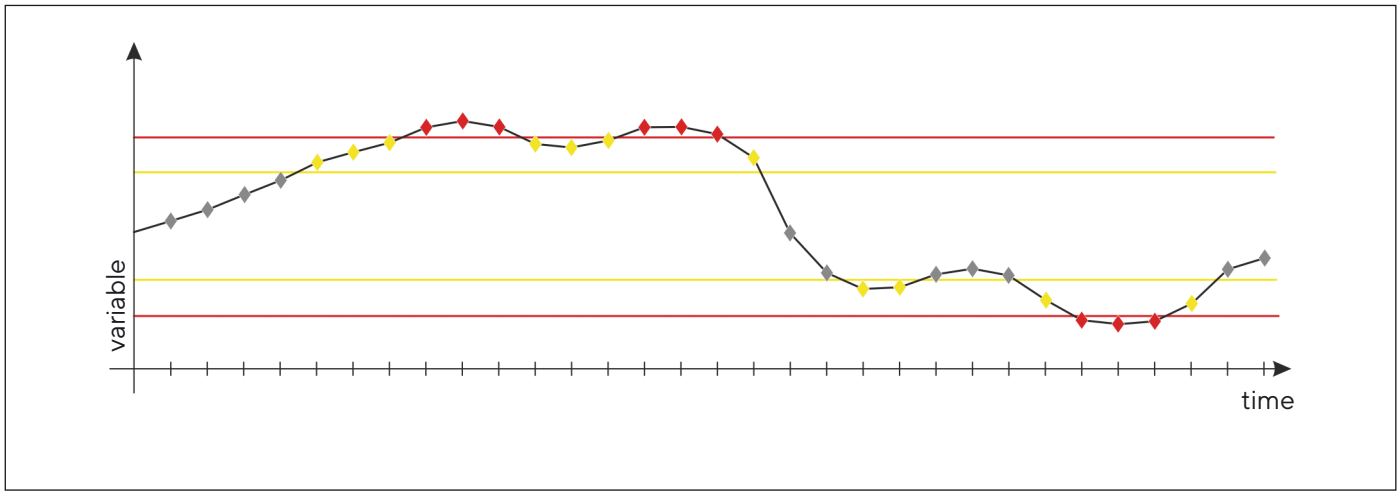


Fig. 6-6: Process values inside and outside of the alarm limits (Low, Low Low, High, High High)

Symbol	Description
◆	Process value outside of the alarm limits; process value is in normal range
◆	Process value in range above the [High] alarm limit and below the [Low] alarm limit
◆	Process value in range above the [High High] alarm limit and below the [Low Low] alarm limit
━	[High High] or [Low Low] alarm limit with [High] priority
━	[High] or [Low] alarm limit with [Medium] priority

Individual alarm

The process value triggers the [High] or [Low] alarm message upon exceeding or falling below a limit. The alarm message is acknowledged or the process value goes back into the normal range.

Grouped alarm

The process value triggers the [High] or [Low] alarm message upon exceeding or falling below a limit. The [High] or [Low] alarm message is **not** acknowledged. The process value continues to rise or fall as the batch process progresses, triggering the [High High] or [Low Low] alarm message.

[NOTIFICATIONS (#)] Notification Window

The [NOTIFICATIONS (#)] notification window shows the current alarms for all started batch processes. The notification window is displayed as a new window and can be moved around the screen as desired.

Once an alarm message has been acknowledged or suppressed (shelved), the entry is deleted from the notification window. The acknowledged or shelved alarm message is listed in the [ALARMS (#)] menu (see Chapter 6.5, page 105).

The following figure shows the notification window that appears when process value alarms are issued:

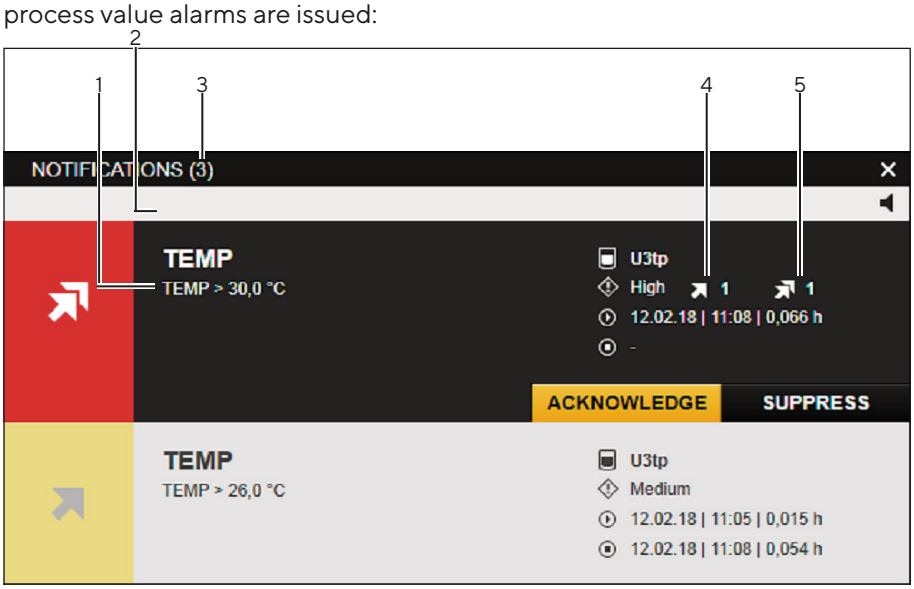


Fig. 6-7: [TEMP] control module with an individual alarm and a grouped alarm (example)

Pos.	Symbol	Field	Description
1		TEMP > 90.0°C	Set alarm limit [High], [High High], [Low], [Low Low] for the control module: > Value above the alarm limit < Value below the alarm limit
2		TEMP	Name of the control module
3		NOTIFICATIONS (3)	Number of current alarm messages for all batch processes
4			Value above the [High] alarm limit
			Value below the [Low] alarm limit
5			Value above the [High High] alarm limit
			Value below the [Low Low] alarm limit
		Unit	Unit on which the alarm is triggered.

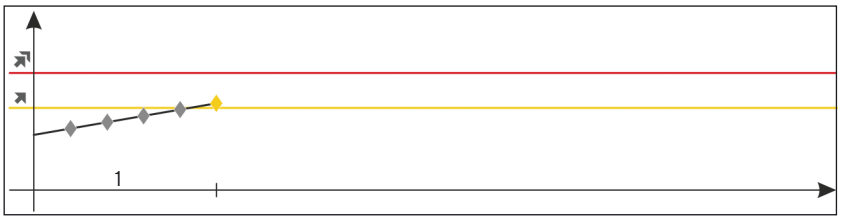
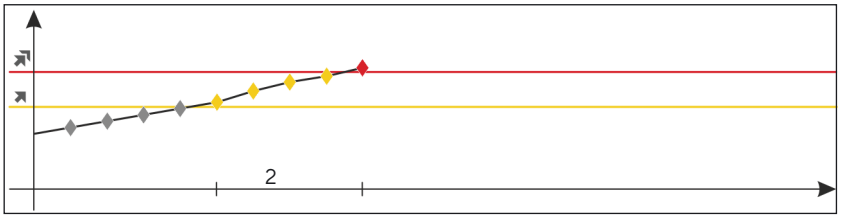
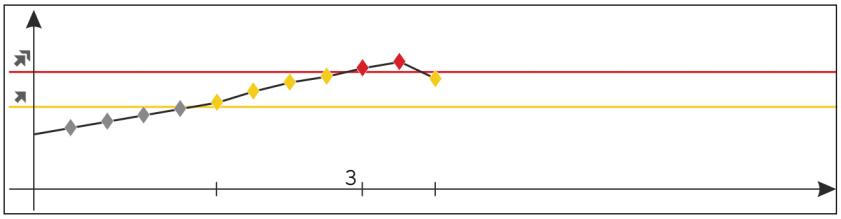
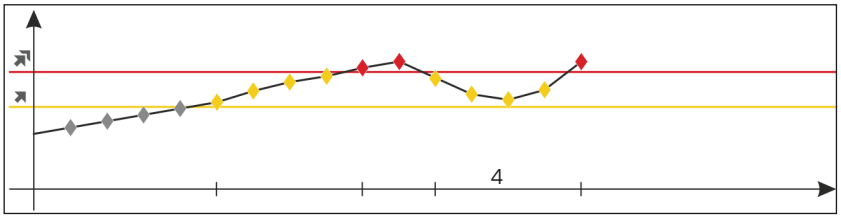
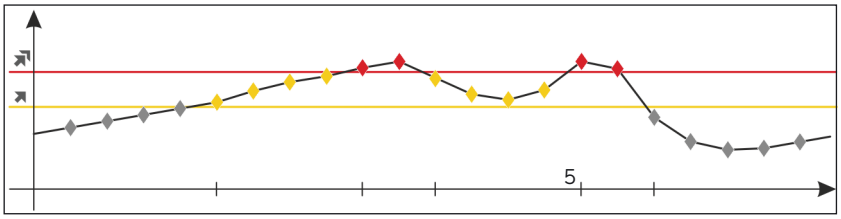
Pos.	Symbol	Field	Description
		Priority High Medium Low	Alarm message priority: – High priority – Medium priority – Low priority
		Activated	Time at which the alarm was triggered: DD.MM.YYYY | HH:MM | batch process duration
		Return to Normal	Time at which the process value comes back to the normal range.
			[High] alarm priority: The process value has exceeded the [High High] alarm limit.
			[High] alarm priority: The process value has fallen below the [Low Low] alarm limit.
			[Medium] alarm priority: The process value has exceeded the [High] alarm limit
			[Medium] alarm priority: The process value has fallen below the [Low] alarm limit.
			After exceeding the [High] alarm limit, the process value has dropped and has returned to the normal range.
			After falling below the [Low] alarm limit, the process value has increased and has returned to the normal range.
		Counter	Individual alarm: The process value exceeds the [High] alarm limit and comes back to the normal range [Return to Normal]. (max. counter with value “1”)
		Counter	Grouped alarm: The process value first exceeds the [High] alarm limit and then the [High High] alarm limit.
		Counter	Individual alarm: The process value falls below the [Low] alarm limit and returns to the normal range [Return to Normal]. (max. counter with value “1”)
		Counter	Grouped alarm: The process value first falls below the [Low] alarm limit and then the [Low Low] alarm limit.

Pos.	Symbol	Field	Description
			Audible tone when an alarm occurs or when the alarm status changes:
			– Indicates that the sound is on. – Switches the sound off.
			– Indicates that the sound is off. – Switches the sound on.
		[ACKNOWLEDGE]	Shows the window for acknowledging the alarm.
		[SUPPRESS]	Shows the window with options for suppressing the alarm message.
			– Hides the notification window. – To show the notification window again: In the header of the program interface, click on or .

Example of an Alarm Curve with Process Values

The alarm curve is shown with the TEMP control module as an example. The alarm function is activated. The fictional alarm limits are set for [High] and [High High]. The batch process has been started. The alarm messages are **not** acknowledged until the end of the alarm curve.

Setpoint: 75°C, [High] alarm limit: 80°C, [High High] alarm limit: 90°C

Mark	Activated	Process value	Color signal	Priority	Alarm/counter	Return to Normal
	started batch process	76.2°C	-	-	-	-
1	06/16/2017 | 7:40 | 0.122 h	81.2°C		Medium	1	
	Status: individual alarm					
2	06/16/2017 | 7:47 AM | 0.245 h	91.6°C		High	1 1	-
	Status: grouped alarm					
3	06/16/2017 | 7:51 AM | 0.318 h	88.7°C		Medium	1 1	-
	Status: grouped alarm					
4	06/16/2017 | 7:58 AM | 0.430 h	91.4°C		High	1 2	-
	Status: grouped alarm					
5	Process value is back in normal range	78.6°C				06/16/2017 | 8:03 AM | 0.488 h
						

Notification Window when Connection is Interrupted

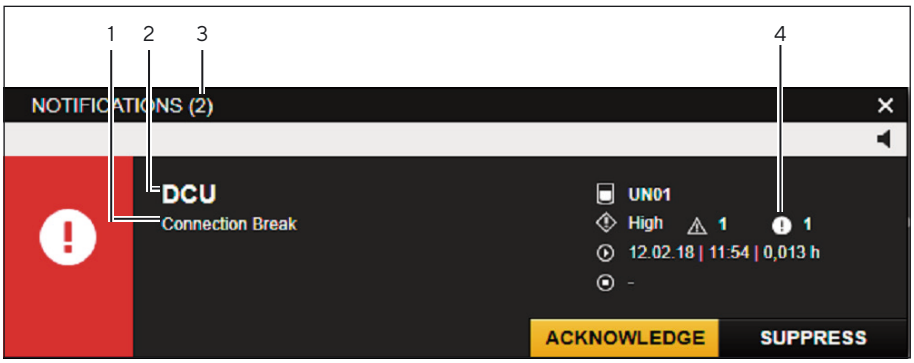


Fig. 6-8: Connection to device "DCU" interrupted (example)

Pos.	Symbol	Field	Description
1		Connection Break	The connection to the device is interrupted for an extended period of time.
		Connection Issue	The connection to the device is interrupted for a brief period.
2		DCU	Short name of the device
3		NOTIFICATIONS (1)	Number of current alarm messages for all batch processes
4	1	Counter	Number of connection interruptions (long term/short term according to 1)
		Unit	Batch process with assigned unit
		Priority High Medium	Alarm message priority: – High priority – Medium priority
		Activated	Time at which the alarm was triggered: DD.MM.YYYY | HH:MM | batch process duration
		Return to Normal	Time at which the connection was re-established.
			Audible tone when an alarm occurs or when the alarm status changes: – Indicates that the sound is on. – Switches the sound off. – Indicates that the sound is off. – Switches the sound on.

Pos.	Symbol	Field	Description
		[ACKNOWLEDGE]	Shows the window for acknowledging the alarm.
		[SUPPRESS]	Shows the window with options for suppressing the alarm message.
			– Hides the notification window. – To show the notification window again: In the header of the program interface, click on # or #.

Displaying Alarms

In the header, the number of triggered alarms which are unacknowledged or **not** suppressed is displayed.

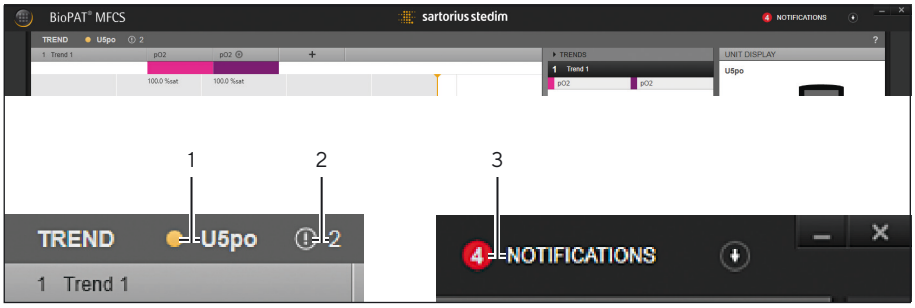


Fig. 6-9: Alarm counter in the header

Pos.	Symbol	Field	Description
1		U5po	Displayed batch process in the [TREND]/[UNIT DISPLAY] menu
2		Counter	Number of alarms that were triggered for the displayed batch process.
3		NOTIFICATIONS	Number of current alarm messages for all batch processes

In the footer, the unit batch processes for which an alarm was triggered are marked in color. The colors are removed when all alarm messages for the batch process in question are acknowledged or suppressed.

When an alarm is suppressed, the color returns when the suppression time limit expires or if the suppression has been canceled manually and the precondition for an alarm is still met.

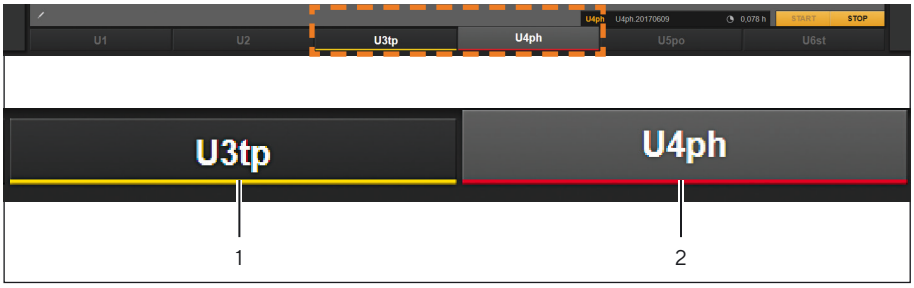


Fig. 6-10: Batch processes marked in color when alarm is triggered

Pos.	Symbol	Field	Description
1		U3tp	Alarm with [Medium] priority was triggered for the batch process for unit [U3tp].
2		U4ph	Alarm with [High] priority was triggered for the batch process for unit [U4ph].

Audible Tones

Audible Tone	Description
One beep in 10-second interval	Sounds at [Low] priority.
Two beeps in 10-second interval	Sounds at [Medium] priority.
Three beeps in 10-second interval	Sounds at [High] priority.

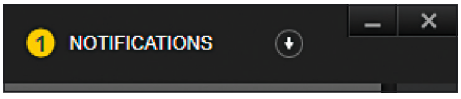
6.3.1 Showing and Hiding the Notification Window

Requirements

- The batch process to be monitored is started.
- The alarm function for the control modules is activated.
- An alarm is triggered and the notification window is open.

Procedure

▶ To hide the notification window: In the notification window, click on the [Close] button.
▷ The notification window is hidden.

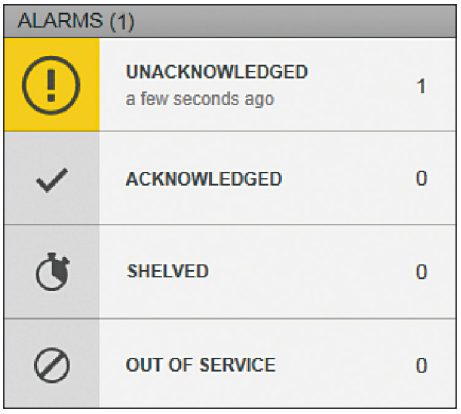


▶ To show the notification window: In the header of the program window, click on the [Number of alarms] button.
▷ The notification window appears.

6.3.2 Acknowledging an Alarm

Requirements

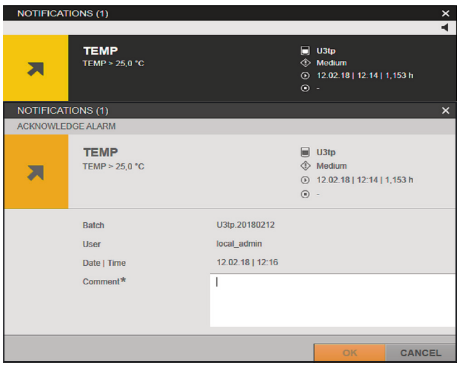
- The batch process to be monitored is started.
- The alarm function for the control modules is activated.
- An alarm is triggered.



- In the [ALARMS (#)] preview window, the alarm message is registered as an unacknowledged alarm.

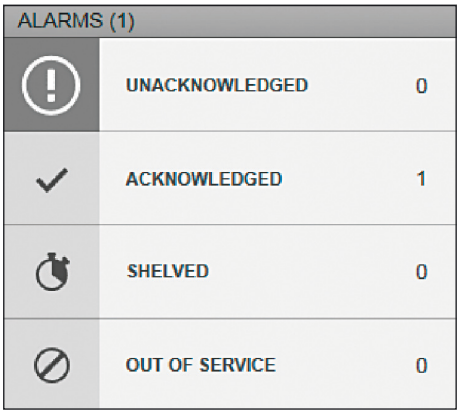
Procedure

▶ Click on the alarm message.
▷ The alarm message is selected.



▶ Click on the [ACKNOWLEDGE] button.
▷ The [ACKNOWLEDGE ALARM] input menu appears.

▶ In the input field next to [Comment*], enter a comment.
▶ Click on the [OK] button.
▷ The alarm message is acknowledged.



▷ In the [ALARMS (#)] preview window, the alarm is registered as an acknowledged alarm.
  ▷ If there are no other alarm messages in the notification window: The notification window closes.
  ▷ If there is at least one other unacknowledged alarm message: The notification window is hidden.
▷ In the [ALARMS (#)] menu, the alarm is listed as an acknowledged alarm.

6.3.3 Suppressing an Alarm

The alarm can be suppressed for any amount of time using the [SUPPRESS – SHELVE] function. An alarm is displayed in the notification window if the precondition for the alarm is still met after the suppression time limit has expired. The alarm can be suppressed as often as desired.

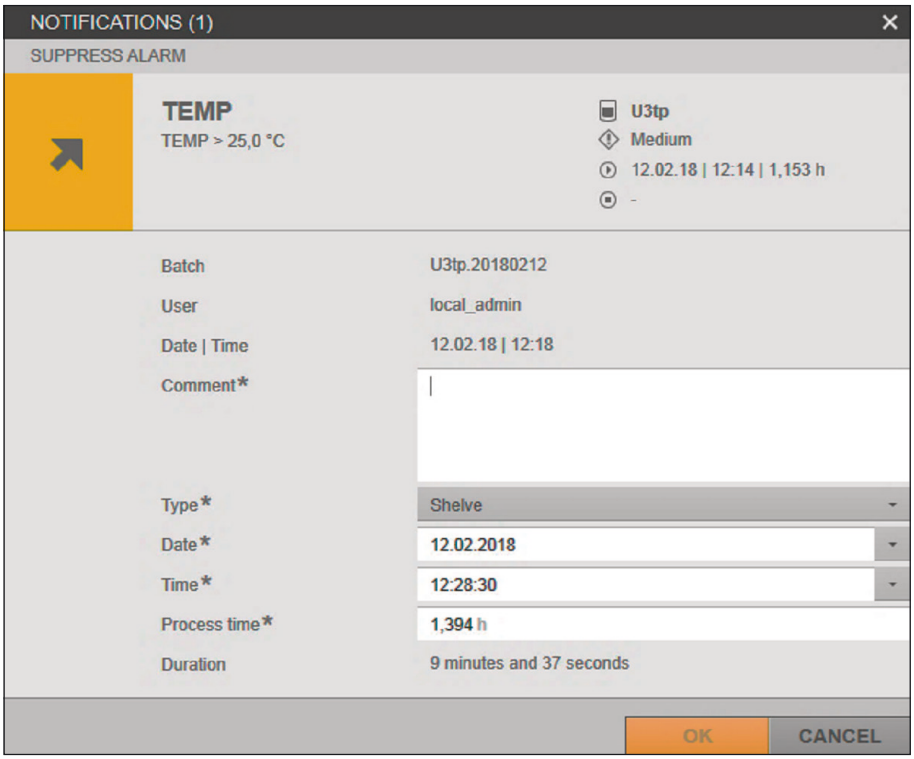


Fig. 6-11: [SUPPRESS ALARM]/[Shelve] input menu with parameter settings

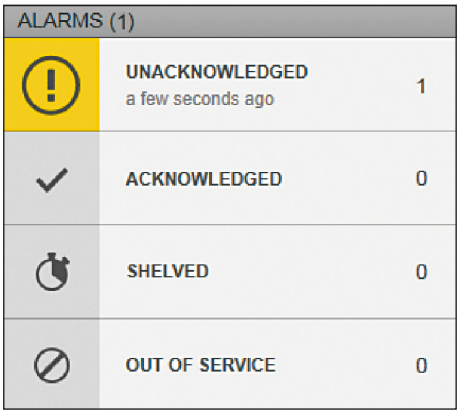
Field	Description
Comment*	Displays the input field for the comment.
Type*	Shows a drop-down menu for selecting the function:
Shelve	– Suppress the alarm
Out of Service	– Temporarily disable the control module from the alarm function (see Chapter 6.3.4, page 94)
Date*	Date on which the suppression time limit expires: – Shows a drop-down menu with calendar view. – Shows the set date.
Time*	Time at which the suppression time limit expires: – Shows a drop-down menu with a 24-hour list. – Shows the set time.
Process time*	Entry of the process time at which the suppression time limit expires.
Duration	Displays the remaining time until the suppression time limit expires.

Field	Description
[OK]	Confirms the entries and activates the alarm suppression.
[CANCEL]	Resets the entries and closes the window.

* Required information

Requirements

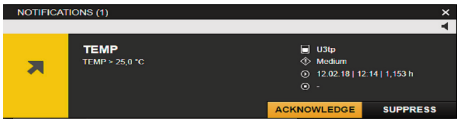
- The batch process to be monitored is started.
- The alarm function for the control modules is activated.
- An alarm is triggered.



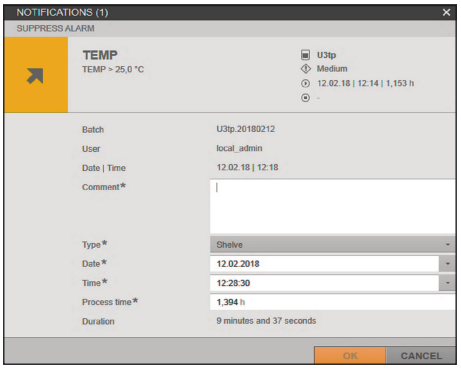
- In the [ALARMS (#] preview window, the alarm message is registered as an unacknowledged alarm.

Procedure

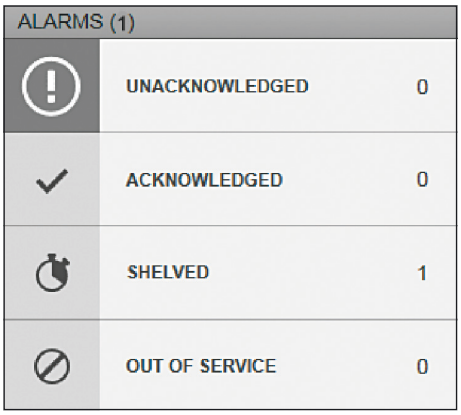
▶ Click on the alarm message.
▷ The alarm message is selected.



▶ Click on the [SUPPRESS] button.
▷ The [SUPPRESS ALARM] input menu appears.



▶ Set the parameters for the alarm suppression (see Fig. 6-11, 92).
▶ Click on the [OK] button.
▷ The alarm is suppressed based on the set parameters.



▷ In the [ALARMS (#)] preview window, the alarm message is registered as a suppressed alarm.
  ▷ If there are no other alarm messages in the notification window: The notification window closes.
  ▷ If there is at least one other unacknowledged alarm message: The notification window is hidden.
▷ In the [ALARMS (#)] menu, the alarm is listed as a suppressed alarm.
▶ To suppress the alarm early:
  ▶ Suppress the alarm (see Chapter 6.5.3.1, page 109).

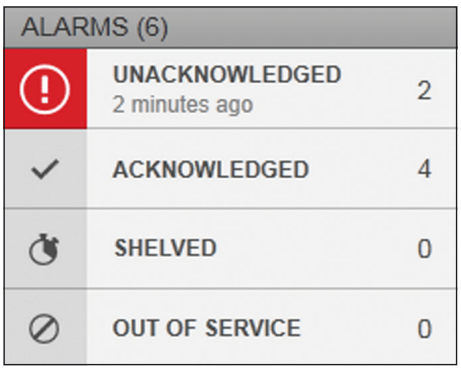
6.3.4 Disconnecting a Control Module from an Alarm Function

A control module for which the alarm function is activated can be temporarily disconnected from the alarm function during an ongoing batch process using the [SUPPRESS – OUT OF SERVICE] function.

The control module may need to be disconnected, for example, if the underlying hardware is determined to be faulty during the batch process. The faulty hardware is replaced with new hardware. The control module is reconnected to the alarm function.

Requirements

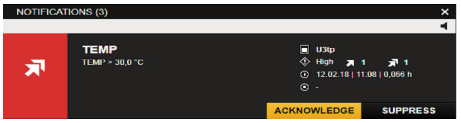
– The batch process to be monitored is started.
– The alarm function for the control modules is activated.
– An alarm is triggered.



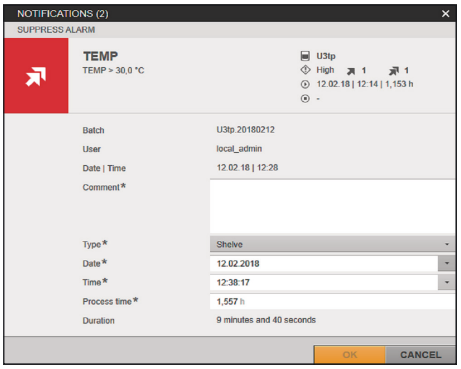
– In the [ALARMS (#)] preview window, the alarm message is registered as an unacknowledged alarm.

Procedure

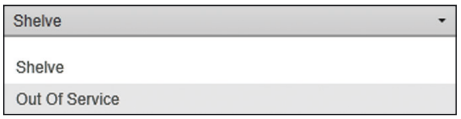
▶ Click on the alarm message.
▷ The alarm message is selected.



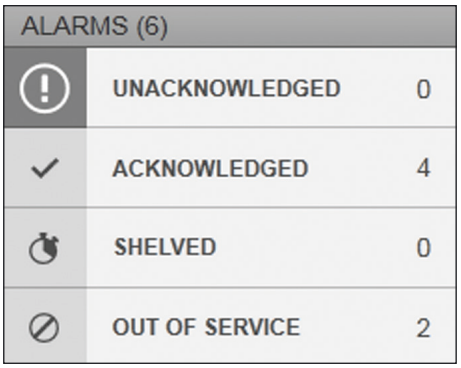
▶ Click on the [SUPPRESS] button.
▷ The [SUPPRESS ALARM] input menu appears.



▷ In the [Comment*] input field, enter a comment.



▶ Select the [Out of Service] entry in the drop-down menu.
▶ Click on the [OK] button.
▷ The control module is disconnected from the alarm function.



▷ In the [ALARMS (#)] preview window, the alarm message is registered as an [Out of Service] alarm.
  ▷ If there are no other alarm messages in the notification window: The notification window closes.
  ▷ If there is at least one other unacknowledged alarm message: The notification window is hidden.
▷ In the [ALARMS (#)] menu, the alarm is listed as an [Out of Service] alarm.
▶ Replace the faulty control module or signal line with a new control module or signal line.
▶ To reconnect the control module to the alarm function:
  ▶ Connect the control module to the alarm function (see Chapter 6.5.3.2, page 110).

6.4 Batch Process

The batch function enables a batch process to be started and stopped. For a started batch process, all control modules are recorded that were set up when the unit was created (see Chapter 5.2, page 48).

Batch Process Functionality:
- Process data recording of up to 24 units that are started at different times and run independently of one another.
- Process data recording of grouped units (max. six units/unit groups)
  - The batch processes of the units are started and stopped simultaneously.
  - Unit data is stored independently of the grouping in an individual batch process in each case.
- Alarm message management (see Chapter 6.3, page 83 and Chapter 6.5, page 105).
- A batch can be started and stopped from the [UNIT DISPLAY], [TREND] and [ALARMS] menus.
- Process data and data from offline samples of a batch process can be exported (see Chapter "7.4 "EXPORT" Menu", page 158).

Status Displays of a Unit in the Header

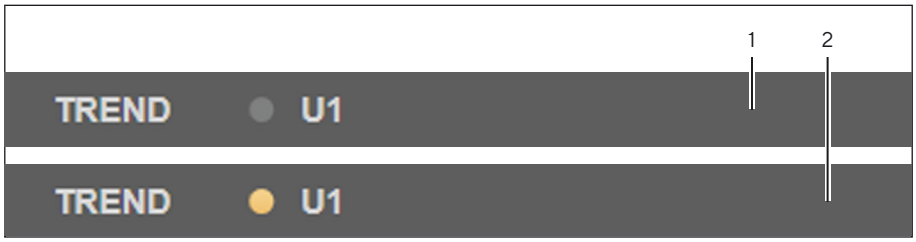


Fig. 6-12: Status display in the header (example of unit [U1])

Pos.	Description
1	The batch process has **not** been started.
2	The batch process has been started.

Status Displays of a Unit in the Footer

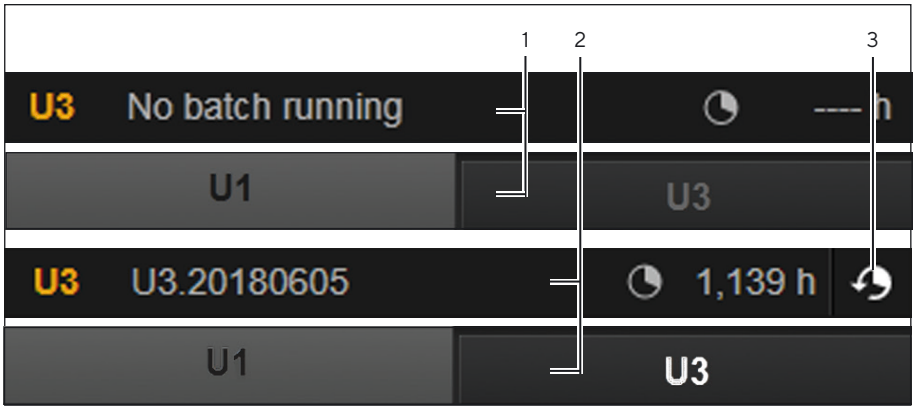


Fig. 6-13: Status display in the footer (example of unit [U3])

Pos.	Symbol	Description
1		The batch process has **not** been started.
2		The batch process has been started.
3		Set the process time for unit [U3] to a value of "0.000".

Status Displays of a Unit Group in the Header

Fig. 6-14: Status display in the header (example of unit group with [U1] + [U3])

Pos.	Description
1	The batch process has **not** been started.
2	The batch process has been started.

Status Displays of a Unit Group in the Footer

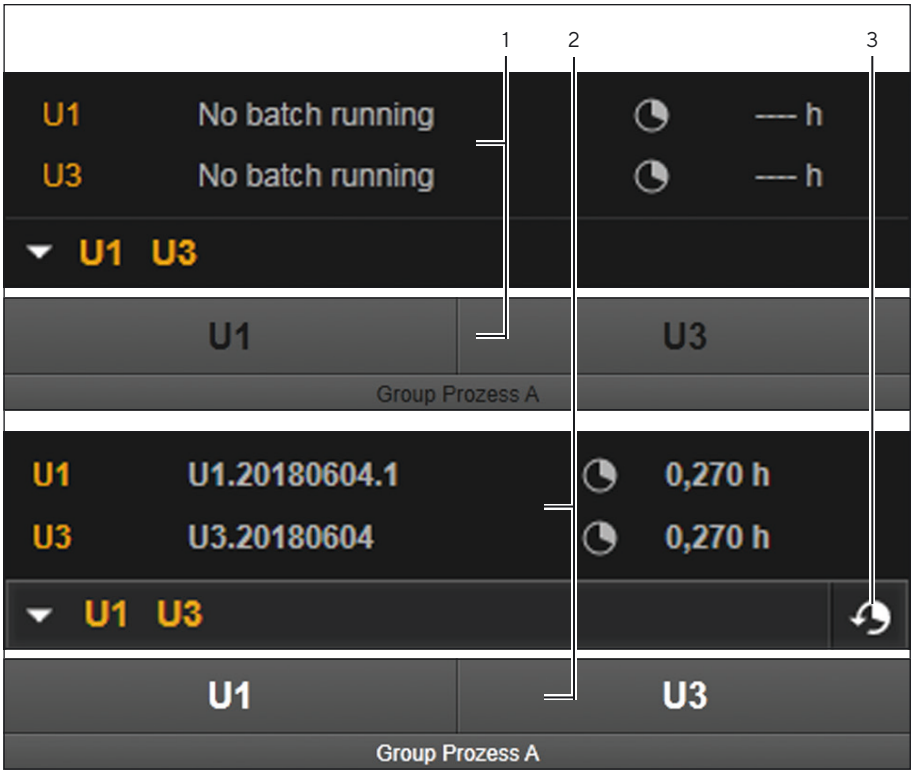


Fig. 6-15: Status display in the footer (example of unit group with unit [U1] and [U3])

Pos.	Symbol	Description
1		The batch process has **not** been started.
2		The batch process has been started.
3		Simultaneously reset the process time for unit [U1] and[U3] to a value of “0.000”.

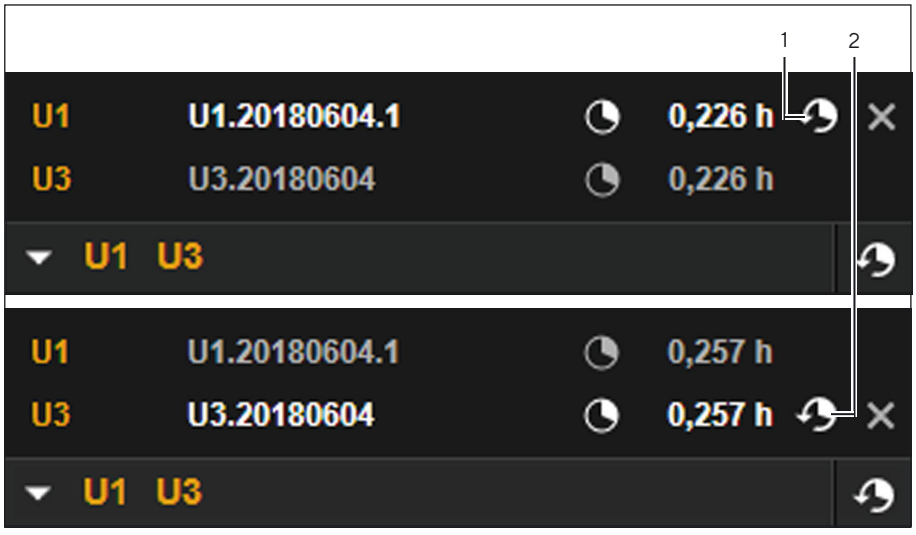


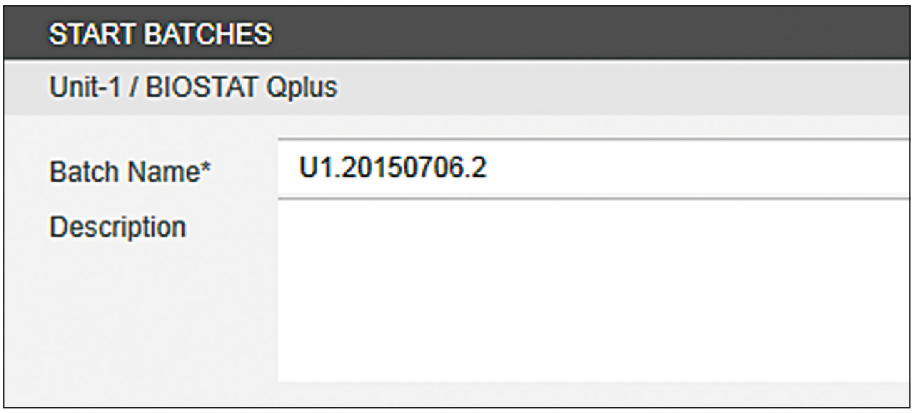
Fig. 6-16: Status display in the footer (example of unit group with unit [U1] and [U3])

Pos.	Symbol	Description
1		If you hover over the unit [U1] line, the following symbol is displayed: Set the process time for unit [U1] to a value of “0.000”.
2		If you hover over the unit [U2] line, the following symbol is displayed: Set the process time for unit [U3] to a value of “0.000”.

6.4.1 Starting a Batch Process

Procedure

- ▶ Access the [MONITORING] function pane.
- ▷ The [DISPLAY UNIT] or [TREND] menu appears.
- ▶ In the footer, select the unit for which you would like to create a batch process.
- ▶ Click on the [START] button.
- ▷ The [START BATCHES] input screen appears.



Unit

By default, the program specifies a name for the batch process according to the following pattern: UnitAbbreviation.YYYYMMDD.#

- ▶ Edit the name of the batch process and the description.
- ▶ Click on the [START] button.
- ▷ The process sequence of the unit is recorded.

Unit Group

- ▶ Enter a name for each of the individual batch processes and add a description to the entries.
- ▶ Click on the [START] button.
- ▷ The process sequences of the units are recorded.

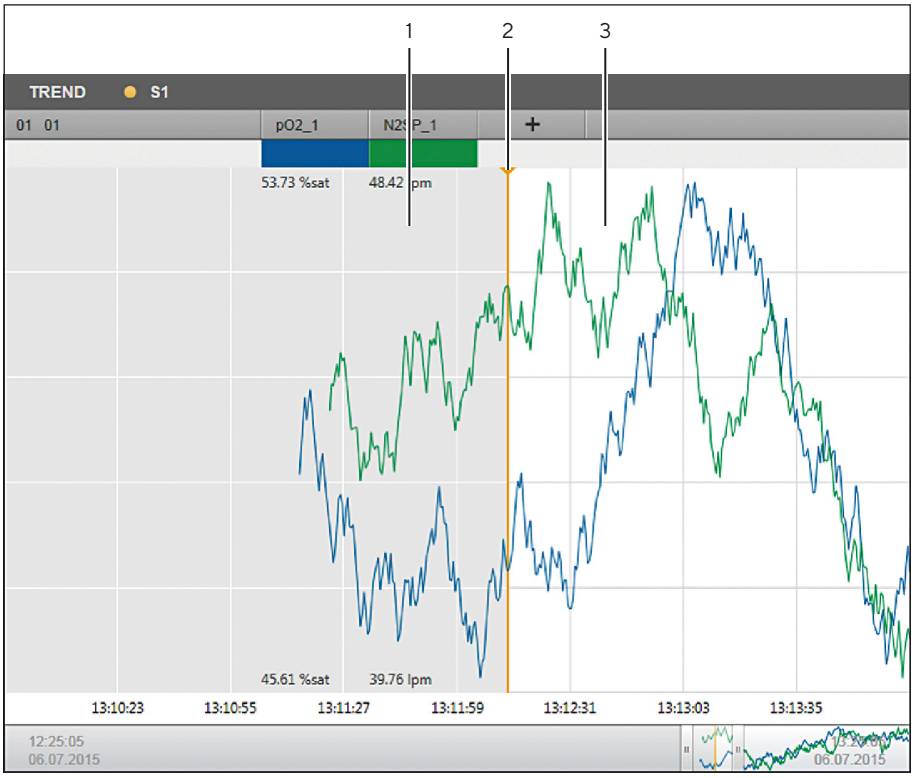


Fig. 6-17: Display of a batch process that has started

Pos.	Display	Description
1	Gray area	The process data is not in the database. The process data cannot be reloaded when changing over to the unit.
2	Orange line	Start time of the batch process
3	White area	The process data is in the database. The process data can be reloaded when changing over to the unit.

6.4.2 Ending a Batch Process

Procedure

- ▶ In the footer, select the unit (unit group) for which you would like to stop recording.
- ▶ Click on the [STOP] button.
- ▷ The [Stop Batch Process] confirmation window appears:

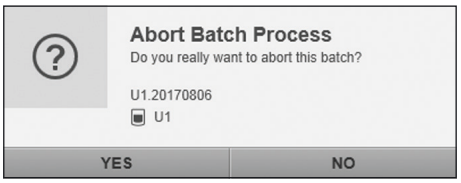
  - ▷ The confirmation window on the left appears if all alarm messages for the batch process are acknowledged.
  - ▶ To stop the batch process: Click on the [STOP] button.
  - ▷ The recording of the process sequence is stopped.
  - ▷ The batch process is marked as a stopped batch process in the [ANALYSIS] function pane.

  - ▷ The confirmation window on the left appears if all alarm messages for the batch process are **not** acknowledged.
  - ▶ To stop the batch process: Click on the [STOP] button.
  - ▷ The recording of the process sequence is stopped.
  - ▷ The alarm messages are marked as unacknowledged alarm messages in the [ANALYSIS] function pane.
  - ▷ The batch process is marked as a stopped batch process in the [ANALYSIS] function pane.
- ▶ To analyze the process sequence: Switch to the [ANALYSIS] function pane (see Chapter “7 ANALYSIS Function Pane”, page 152).

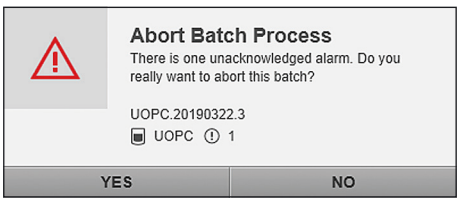
6.4.3 Aborting a Batch Process

Procedure

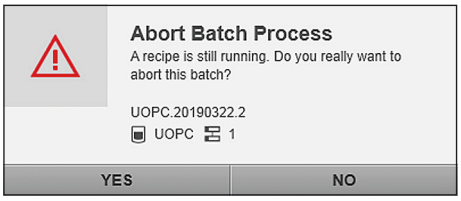
- ▶ In the footer, select the unit (unit group) for which you would like to abort recording.
- ▶ Click on the arrow symbol of the [STOP] button.
- ▶ Click on the [ABORT] button.
- ▷ The [Abort Batch Process] confirmation window appears:



  - ▷ The confirmation window appears if all alarm messages for the batch process are acknowledged.



  - ▷ The confirmation window appears if all alarm messages for the batch process are **not** acknowledged.
  - ▷ The alarm messages are marked as unacknowledged alarm messages in the [ANALYSIS] function pane.



▷ The confirmation window appears if a recipe-controlled batch is aborted.

▶ To abort the batch process: Click on the [YES] button.

▷ The recording of the process sequence is aborted.

▷ The batch process is marked as an aborted batch process in the [ANALYSIS] function pane.

▶ To analyze the process sequence: Switch to the [ANALYSIS] function pane (see Chapter “7 ANALYSIS Function Pane”, page 152).

6.4.4 Setting the Process Time to Zero

The process time of a started batch can be reset to 0.000 h. The function “Set the Process Time to Zero” is often used to mark the actual start of a process after the process data starts to be recorded. When the process is triggered, the process time is set to 0.000 h.

Type of execution

Once the batch has started, the function can be executed
- manually at any time.
- automatically in recipe-controlled batches (see “BioPAT® MFCS 4 Recipe Control Module” Operating Instructions).
- multiple times within the same batch. Every time the function is executed, the zero point is shifted again.

Unit / Unit Group

The process time is only set to 0.000 h for the selected Unit / Unit Group for which the batch has been started. The function is available for a Unit Group as long as at least one batch is running.

Negative Process Time

Process data recorded before the execution of the function is still available and can be exported. This process data relates to the negative process time, e.g. -3.215 h (the batch was started 3.125 h before the execution of the function).

In the dialog window of the export function, a negative process time can be set as the start/end date. The standard setting is the start time of the batch, e.g. -3.215 h.

Data points with a negative process time can also be supplemented with a comment.

Offline Samples

Offline samples recorded before the execution of the function are also accessible and can be exported. The time at which the offline sample was added has a negative value.

After the function has been executed at least once, the offline samples can also be added with a negative process time.

Alarms

Alarms and the associated interactions of the operator (e.g., acknowledgment of alarms), which took place before the execution of the function, relate to a negative process time.

Diagrams in the [ANALYSIS] Function Pane

Under the default setting, the total process duration is displayed. The process time that defines the actual start of the process is displayed as “Start”. According to the execution of the function, this is a negative process time, e.g. -3.4 h.

Batch data (e.g., process data, comments), which relates to a negative process time, may be shown in diagrams. A negative process time may be configured as a user-defined time span within the expanded diagram.

6.4.4.1 Setting the Process Time to Zero

The following demonstrates the function “Set the Process Time to Zero” for an individual unit. The procedure for executing the function for multiple units in a unit group is identical.

Requirements

A batch is started with one unit or unit group.

Procedure

▶ Click on the [Set process time to zero] button.

▷ The window with the request [Set process time to zero] is displayed.
▶ Confirm this request with [YES].

▷ The process time is set to “0.000”.
▷ Negative and positive values are displayed and stored when the batch is recorded (Chart, Export).
  ▷ Negative values: Time span between the start time of the batch and the time at which the function was executed.
  ▷ Positive values: Time span between the time the function was executed and the time at which the batch was stopped.

Information in the chart

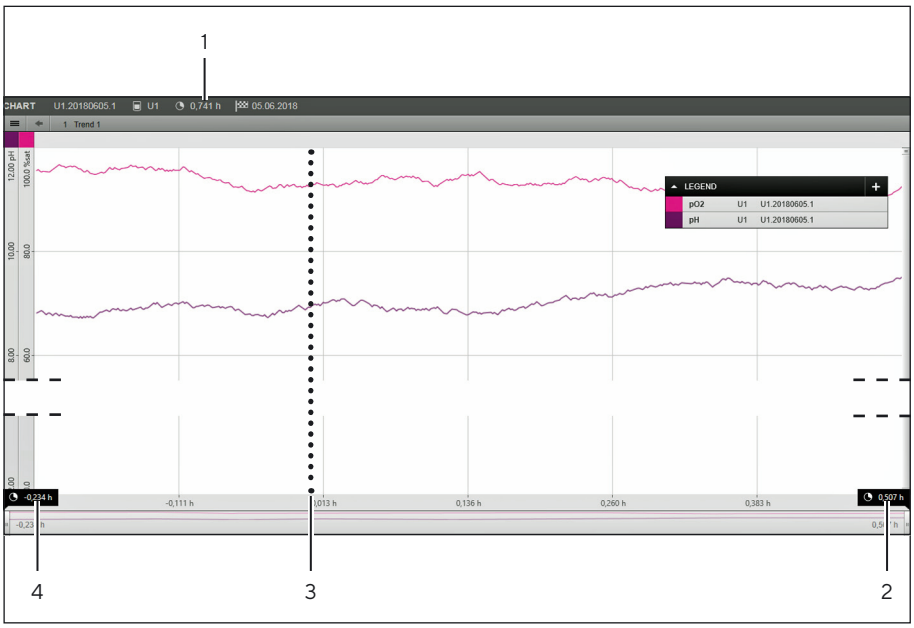


Fig. 6-18: Display of negative and positive process time in the chart

Pos.	Description
1	Displays the overall running time of the batch.
2	Shows the Process Time (PT) as a positive value: (PT) = (Time: Batch is stopped) - (Time: Function is executed)
3	Time at which the function is executed in relation to the total running time
4	Shows the Process Time (PT) as a negative value: (PT) = (Time: Function is executed) - (Time: Batch is started)

6.5 [ALARMS (#)] Menu

The alarm messages for a selected unit or unit group are listed in the [ALARMS (#)] menu. Alarm messages for a control module of the corresponding unit are only displayed in the alarm list if the [ALARMING] function is activated for the control module of the unit and a batch process has been started.

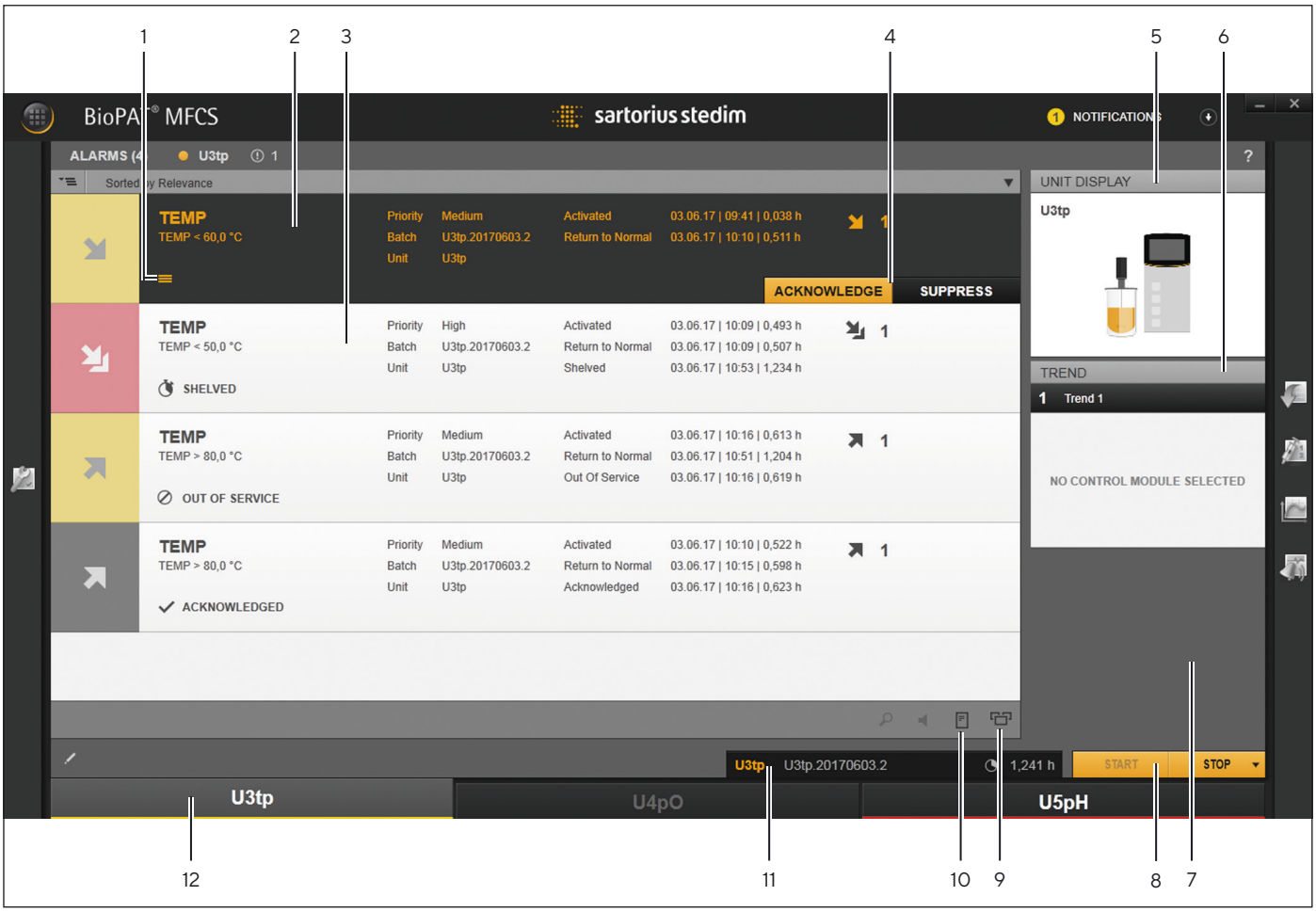


Fig. 6-19: Functional elements in the [ALARMS (#)] menu

Pos.	Symbol	Field	Description
1			The alarm tile indicates the alarm priority and status (for color coding, see Chapter 6.5.2, page 107).
			Hovering the mouse cursor over the symbol opens a pop-up element containing information about the alarm history.
			Displays the current alarm status:
		SHELVED	– The alarm message is suppressed.
		OUT OF SERVICE	– The control module is disconnected from the alarm function.

Pos.	Symbol	Field	Description
		ACKNOWLEDGED	– The alarm message is acknowledged.
2			Indicates which alarm message in the alarm list is selected and marked with a color.
3			Displays the alarm messages in the alarm list.
4			Edit alarm:
		ACKNOWLEDGE	Shows the [ACKNOWLEDGE ALARM] input menu for acknowledging the alarm.
		SUPPRESS	Shows the [SUPPRESS ALARM] input menu for suppressing the alarm.
		UNSHELVE	Unshelve the alarm early.
		RETURN TO SERVICE	Shows the [RETURN ALARM TO SERVICE] input menu for connecting the control module to the alarm function.
5			Clicking maximizes the [UNIT DISPLAY] menu, minimizes the [ALARMS (#)] menu, and displays it in a preview window.
6			Clicking maximizes the [TREND] menu, minimizes the [ALARMS (#)] menu, and displays it in a preview window.
7			Pane for [ALARMS (#)] preview window
8		START | STOP	Clicking starts and stops the batch process.
9			Clicking switches to full-screen mode or dual-monitor operation
10			Clicking shows the menu for printing the alarm list.
11			Displays the status of the batch process (unit, batch process name, duration).
12			Displays the status bar with the configured units.

6.5.1 Preview Window and Pop-up Window

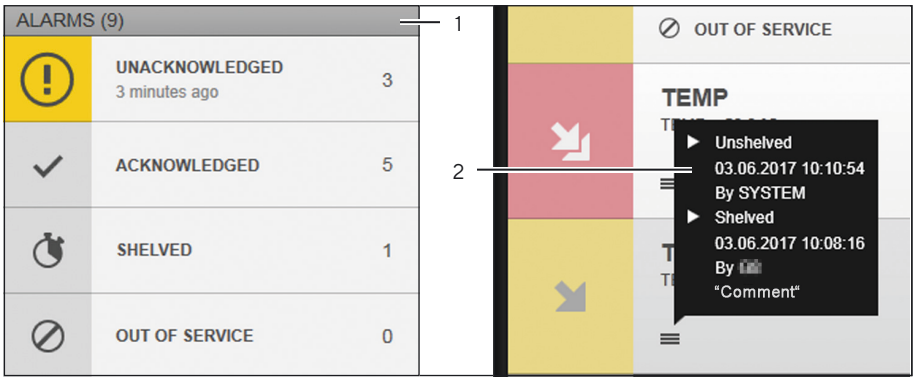
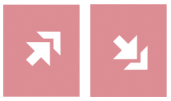


Fig. 6-20: Preview window and pop-up window

Pos.	Description
1	Displays the [ALARMS (#)] preview window in the [MONITORING] function pane.
2	Displays the pop-up window in the [ALARMS (#)] menu.

6.5.2 Color Coding of Alarm Tiles

Color Coding in the [ALARMS (#)] Menu

Alarm Tile	Description
	Indicates an alarm with [Medium] priority: – UNACKNOWLEDGED: Alarm is **not** acknowledged. – The process value is **not** in the normal range.
	Indicates an alarm with [Medium] priority: – UNACKNOWLEDGED: Alarm is **not** acknowledged. The process value is back in the normal range. – SHELVED: Alarm is suppressed. – OUT OF SERVICE: Control module is disconnected from the alarm function.
	Indicates an alarm with [High] priority: – UNACKNOWLEDGED: Alarm is **not** acknowledged. – The process value is **not** in the normal range.
	Indicates an alarm with [High] priority: – UNACKNOWLEDGED: Alarm is **not** acknowledged. The process value is back in the normal range. – SHELVED: Alarm is suppressed. – OUT OF SERVICE: Control module is disconnected from the alarm function.
	Indicates an alarm with [Medium] priority: – ACKNOWLEDGED: Alarm is acknowledged.
	Indicates an alarm with [High] priority: – ACKNOWLEDGED: Alarm is acknowledged.

Alarm Tile	Description
	Indicates an alarm with [Medium] priority: – The connection to the device is interrupted for a brief period. – UNACKNOWLEDGED: Alarm is **not** acknowledged.
	Indicates an alarm with “Medium” priority: – The connection to the device is re-established. – UNACKNOWLEDGED: Alarm is **not** acknowledged. – SHELVED: Alarm is suppressed.
	Indicates an alarm with [Medium] priority: – ACKNOWLEDGED: Alarm is acknowledged.
	Indicates an alarm with [High] priority: – The connection to the device is interrupted for an extended period of time. – UNACKNOWLEDGED: Alarm is **not** acknowledged.
	Indicates an alarm with [Medium] priority: – The connection to the device is re-established. – UNACKNOWLEDGED: Alarm is **not** acknowledged. The process value is back in the normal range. – SHELVED: Alarm is suppressed.
	Indicates an alarm with [Medium] priority: – ACKNOWLEDGED: Alarm is acknowledged.

Color Coding in “ALARMS (#)” Preview Window

Alarm Tile	Description
	Indicates an alarm with [Medium] priority: – UNACKNOWLEDGE: Unacknowledged alarms in the alarm list
	Indicates an alarm with [High] priority: – UNACKNOWLEDGE: Unacknowledged alarms in the alarm list
	Indicates no unacknowledged alarms: – UNACKNOWLEDGE: No unacknowledged alarms in the alarm list

6.5.3 [UNSHELVE] and [RETURN TO SERVICE] Functions

Suppressed alarms ([SHELVED] alarm status) are hidden from the [NOTIFICATIONS (#)] notification window until they are unshelved.

Control modules that are disconnected from the alarm function ([OUT OF SERVICE] alarm status) are hidden from the [NOTIFICATIONS (#)] notification window until the control modules are reconnected to the alarm function.

Alarms are unshelved early and control modules are reconnected in the [ALARMS (#)] menu.

Accessing the [ALARMS] Menu

Procedure

▶ If the [ALARMS] menu is **not** maximized in the [MONITORING] function pane: Click on the [ALARMS] preview window.
▷ The [ALARMS] menu is maximized. The following tasks can be performed.

Work	Chapter, Page
Unshelve alarms early	6.5.3.1, 109
Reconnect control module to alarm function	6.5.3.2, 110
Display alarm history	6.5.3.3, 111

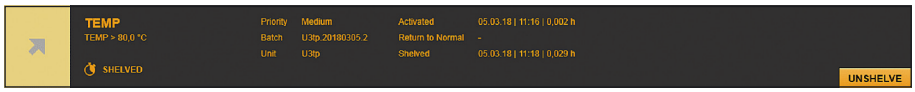
6.5.3.1 Unshelving an Alarm Early

Requirement

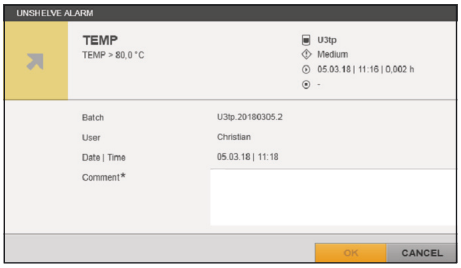
– The alarm has been suppressed (alarm status: [SHELVED]).
– The set time limit for alarm suppression has not expired yet.

Procedure

▶ In the alarm list in the [ALARMS (#)] menu, click on the suppressed alarm.
▷ The alarm message is selected:



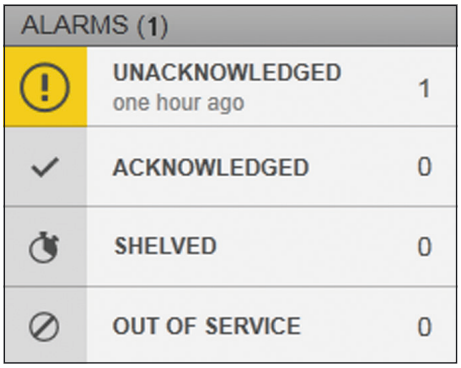
▶ Click on the [UNSHELVE] button.
▷ The [UNSHELVE ALARM] input menu appears.



▶ In the input field next to the [Comment*] entry, enter a comment.
▶ Click on the [OK] button.
▷ The alarm is unshelved early.

▷ If the process value remains outside of the normal range after alarm suppression has ended, an alarm will be triggered again and displayed in the [NOTIFICATIONS (#)] notification window. The tile is marked with a bright color.

▷ If the process value is inside the normal range after alarm suppression has ended, the alarm will be displayed in the [NOTIFICATIONS (#)] notification window. The tile is marked with a pale color.



▷ In the [ALARMS (#)] preview window, the alarm message is registered as an unacknowledged alarm:
  ▷ In the [NOTIFICATIONS (#)] notification window, the alarm is displayed as an unacknowledged alarm.
  ▷ In the [ALARMS (#)] menu, the alarm is listed as an unacknowledged alarm.

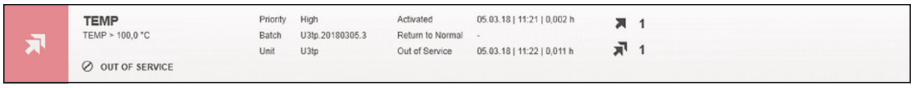
▷ The other actions can be carried out both in the alarm message in the list of the [ALARMS (#)] menu and in the [NOTIFICATIONS (#)] notification window.

Alarm Management Actions	Chapter, Page
Acknowledge alarm	6.3.2, 91
Suppress alarm	6.3.3, 92
Disconnect control module from alarm function	6.3.4, 94

6.5.3.2 Reconnecting a Control Module to an Alarm Function

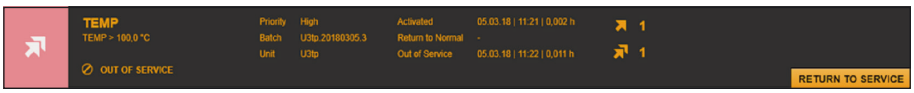
Requirement

- The control module was disconnected from the alarm function (Alarm status: [OUT OF SERVICE]).
- The control module may need to be disconnected, for example, if the underlying hardware is determined to be faulty during the batch process. The faulty hardware is replaced with new hardware. The control module is reconnected to the alarm function.

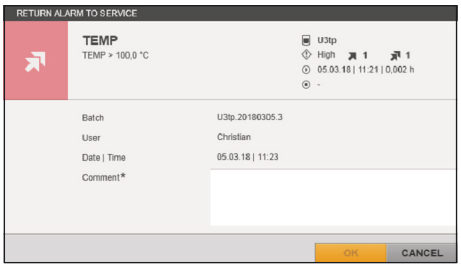


Procedure

▶ In the alarm list in the [ALARMS (#)] menu, click on the alarm.
▷ The alarm message is selected:

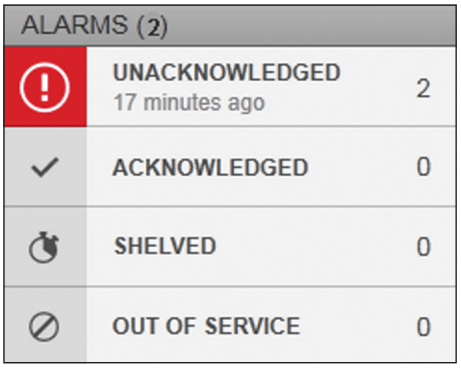


▶ Click on the [RETURN TO SERVICE] button.
▷ The [RETURN ALARM TO SERVICE] input menu appears.
▶ In the input field next to the [Comment*] entry, enter a comment.
▶ Click on the [OK] button.
▷ The control module is reconnected to the alarm function.



▷ If the process value remains outside of the normal range after alarm suppression has ended, an alarm will be triggered again and displayed in the [NOTIFICATIONS (#)] notification window. The tile is marked with a bright color.

▷ If the process value is inside the normal range after alarm suppression has ended, the alarm will be displayed in the [NOTIFICATIONS (#)] notification window. The tile is marked with a pale color.



▷ In the [ALARMS (#)] preview window, the alarm message is registered as an unacknowledged alarm:
  ▷ In the [NOTIFICATIONS (#)] notification window, the alarm is displayed as an unacknowledged alarm.
  ▷ In the [ALARMS (#)] menu, the alarm is listed as an unacknowledged alarm.

▷ The other actions can be carried out both in the alarm message in the list of the [ALARMS (#)] menu and in the [NOTIFICATIONS (#)] notification window.

Alarm Management Actions	Chapter, Page
Acknowledge alarm	6.3.2, 91
Suppress alarm	6.3.3, 92
Disconnect control module from alarm function	6.3.4, 94

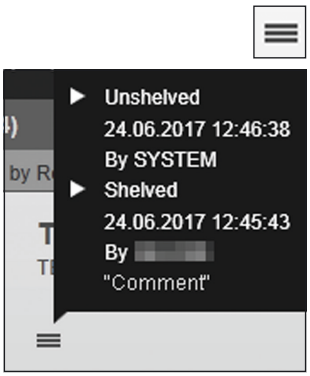
6.5.3.3 Displaying the Alarm History

If the alarm is suppressed or the control module has been disconnected from the alarm function, the alarm history can be displayed in the alarm message in the [ALARMS (#)] menu once the alarm is unshelved or the control module is reconnected to the alarm function.

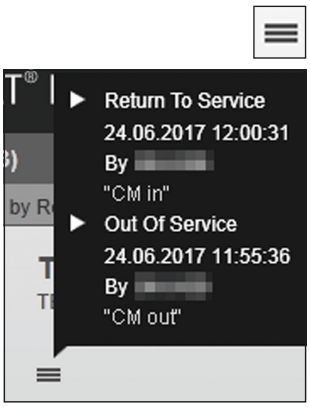
Requirement

- The alarm has been unshelved manually or the suppression time limit has expired.
- The control module has been reconnected to the alarm function.

Procedure



▶ To view the [Shelve] > [Unshelve] alarm history: In the alarm message, move the mouse cursor over the [Alarm history] button.
▷ The alarm history is displayed in the pop-up window.



▶ To view the [Out of Service] > [Return to Service] alarm history: In the alarm message, move the mouse cursor over the [Alarm history] button.
▷ The alarm history is displayed in the pop-up window.

6.6 [UNIT DISPLAY] Menu

The [UNIT DISPLAY] menu displays the current process values of the configured units. The selection of the displayed control modules can – depending on the configuration of the unit – be independently determined (see Chapter 5.2, page 48).

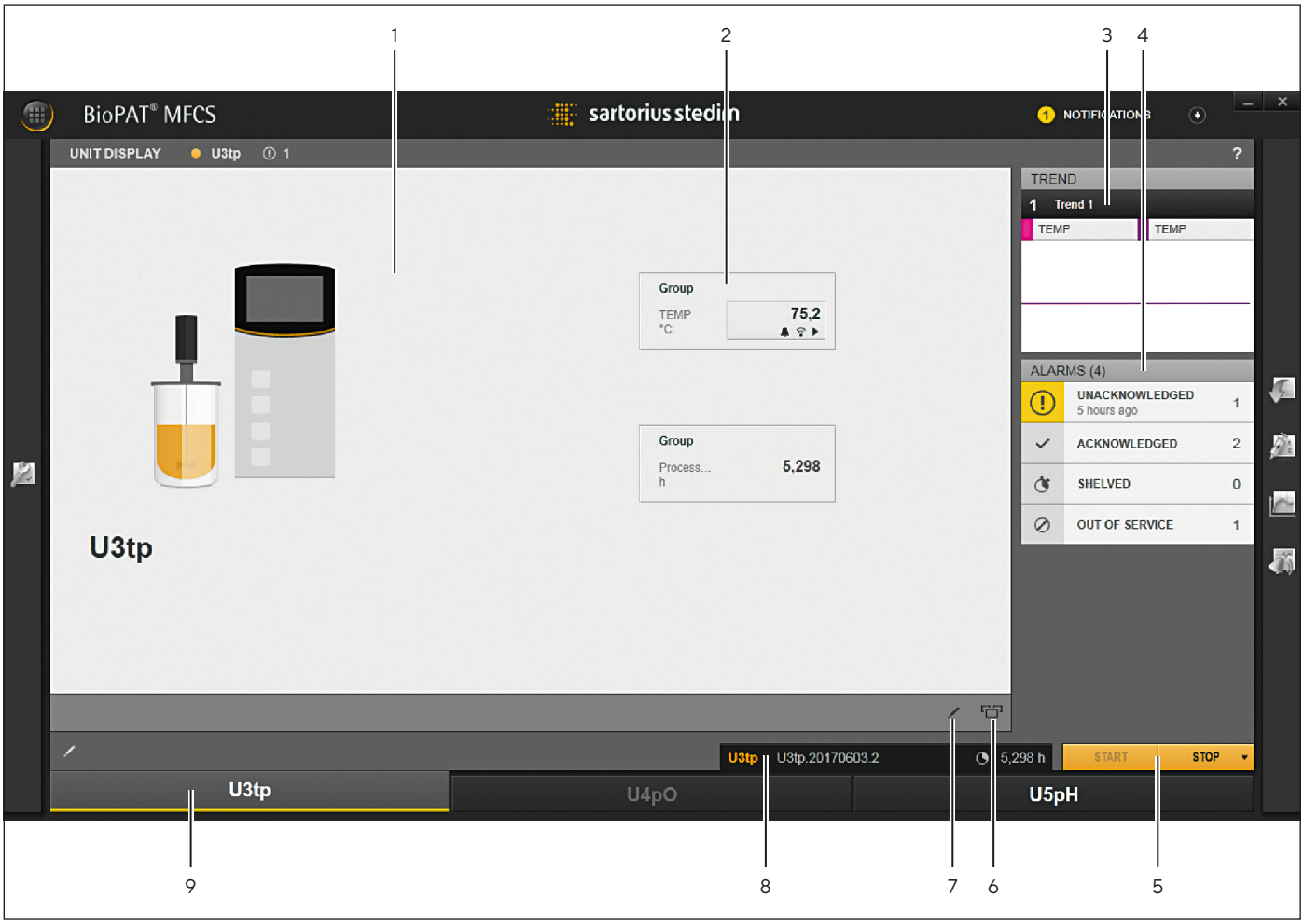


Fig. 6-21: Functional elements in the [UNIT DISPLAY] menu

Pos.	Description
1	Displays the [UNIT DISPLAY] overview with an image of the device.
2	Displays control modules with current process values. Shows the setpoint input screen for the corresponding controller.
3	Maximizes the [ALARMS (#)] menu, minimizes the [UNIT DISPLAY] menu, and displays it in a preview window.
4	Maximizes the [TREND] menu, minimizes the [UNIT DISPLAY] menu, and displays it in a preview window.
5	Starts and stops the batch process.
6	Switches to full-screen mode or dual-monitor operation.
7	Shows the editing mode for selecting the control modules.
8	Displays the status of the batch process (unit, batch process name, duration).
9	Displays the status bar with the configured units.

6.6.1 Displays in the Unit Display

Display of a Unit

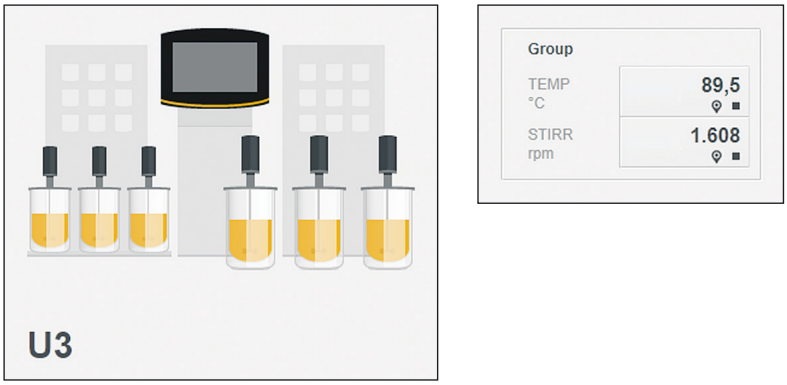


Fig. 6-22: Display of symbol and process values of a unit

Display of a Unit Group

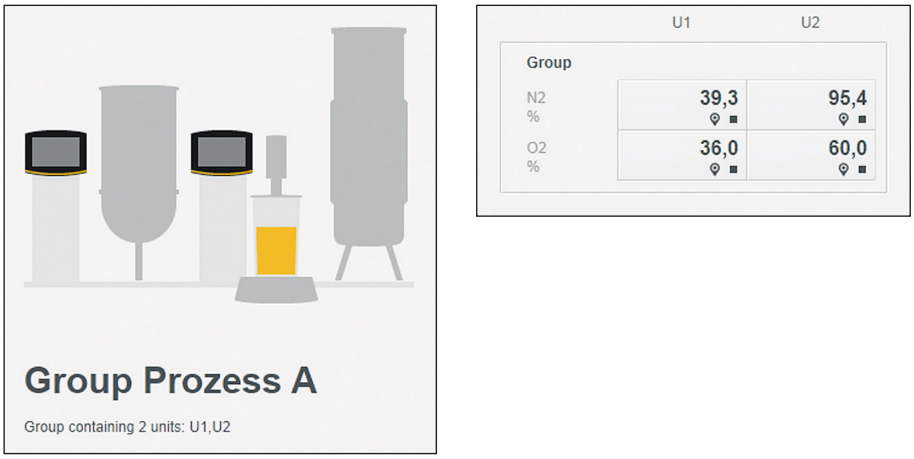


Fig. 6-23: Display of symbol and process values of a unit group

Display of Alarm Priority

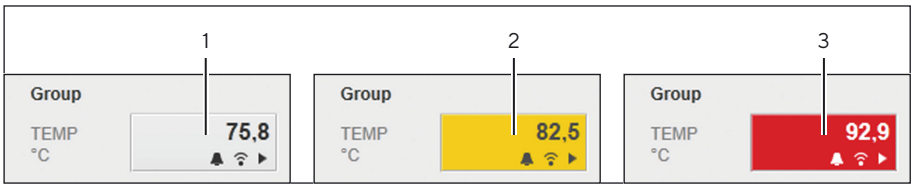


Fig. 6-24: Alarm priorities

Pos.	Description
1	The process value is in the normal range.
2	The process value has triggered an alarm with [Medium] priority: – The process value has exceeded the [High] alarm limit. – The process value has fallen below the [Low] alarm limit.
3	The process value has triggered an alarm with [High] priority: – The process value has exceeded the [High High] alarm limit. – The process value has fallen below the [Low Low] alarm limit.

6.6.2 Control Module Input Screens

Detailed Information and “Setpoint Controller” Input Screen (Unit/Unit Group)

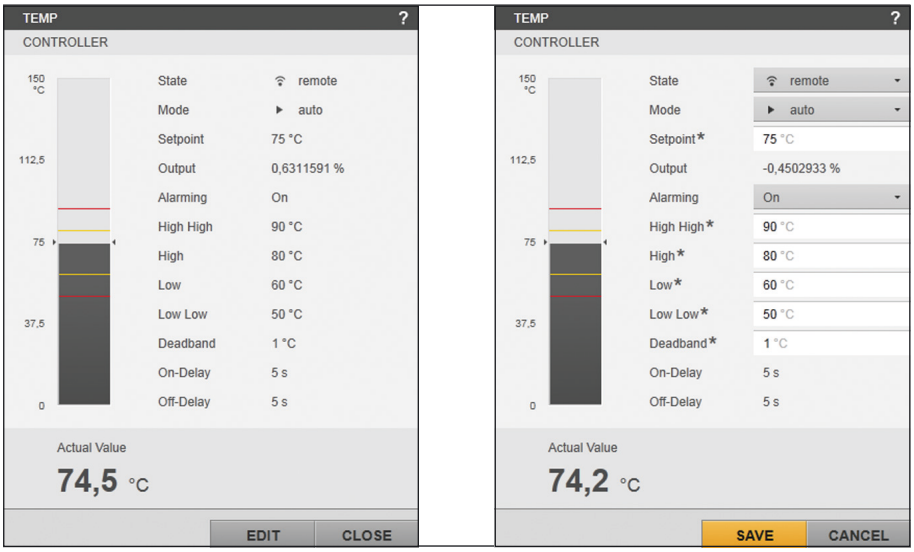


Fig. 6-25: Details and input screen of a setpoint controller (remote) with activated alarm function

Field	Symbol	Description
Actual Value		Current value (bar graph, value)
Status		Status of the remote control of the device
remote		Indicates that the remote function is activated on the device.
local		Indicates that the remote function is deactivated on the device.
cascade		Displays the cascade status for the “Manipulated Variable” controller in the MFCS PID control.
Mode		Controller mode
off		Indicates that the controller is deactivated.
auto		Indicates that the controller is in automatic mode.
manual		Indicates that the controller is in manual mode.
Setpoint*		Displays the setpoint and enters the value.
Output*		Displays the controller output.
Alarming		Alarm mode[1]
On		Indicates that the alarm function is activated.
Off		Indicates that the alarm function is deactivated.

Field	Symbol	Description
High High*		Displays the [High High] alarm limit[1] and enters the value.
High*		Displays the [High] alarm limit[1] and enters the value.
Low*		Displays the [Low] alarm limit[1] and enters the value.
Low Low*		Displays the [Low Low] alarm limit[1] and enters the value.
Deadband*		Displays the deadband[1] and enters the value.
On-Delay		Displays the delay time[1] (for showing an alarm).
Off-Delay		Displays the delay time[1] (for hiding an alarm).
		Indicates the [High High] and [Low Low] alarm limits[1] in the bar graph.
		Indicates the [High] and [Low] alarm limits[1] in the bar graph.
EDIT		Shows the editing mode for configuring the setpoint.
CLOSE		Closes the detailed information window.
SAVE		Saves the settings.
CANCEL		Closes the detailed information window. The changes are not saved.

* Required information

[1] Displayed when alarm function is activated and batch process has been started

Detailed Information and “PID Controller” Input Screen (Unit/Unit Group)

Fig. 6-26: Details and input screen of a PID controller (remote) with deactivated alarm function

Field	Symbol	Description
PID	▶ ◀	Maximizes/minimizes the input screen.
Actual Value		Displays the actual value as a bar graph and as a value.
Status		Status of the remote control of the device
Remote		Indicates that the remote function is activated on the device.
Local		Indicates that the remote function is deactivated on the device.
Mode		Controller mode
Off	■	Indicates that the controller is deactivated.
Auto	▶	Indicates that the controller is in automatic mode.
Manual		Indicates that the controller is in manual mode.
Setpoint*		Displays the setpoint and enters the value.
Output*		Displays the controller output (value in %).
Output Min.*		Displays the output limitation of the minimum setpoint of the manipulated variable and enters the value (value in %).
Output Max.*		Displays the output limitation of the maximum setpoint of the manipulated variable and enters the value (value in %).
Deadband*		Displays the deadband and enters the value.
X_P*		Displays the proportional range and enters the value.

Field	Symbol	Description
TI*		Displays the reset time and enters the value.
T_D*		Displays the derivative time and enters the value.
K_P		Displays the PID parameter and enters the value.
T_N		Displays the PID parameter and enters the value.
T_V		Displays the PID parameter and enters the value.
EDIT		Shows the editing mode for configuring the setpoint.
CLOSE		Closes the detailed information window.
SAVE		Saves the settings.
CANCEL		Closes the detailed information window. The changes are not saved.

* Required information

Detailed Information and Input Screen "Process Variable" of a System Device (Unit/Unit Group)

The value of a process variable can be edited in the unit display dialog. Possible forms of presentation in the following screenshots:

- Process variable with editable value (see Fig. 6-27, 118 and Fig. 6-28, 119)
- Process variable with calculated value for the case that a licensed "Calculation Module" is available (in accordance with the "BioPAT® MFCS Calculation Module instructions") (see Fig. 6-29, 119)

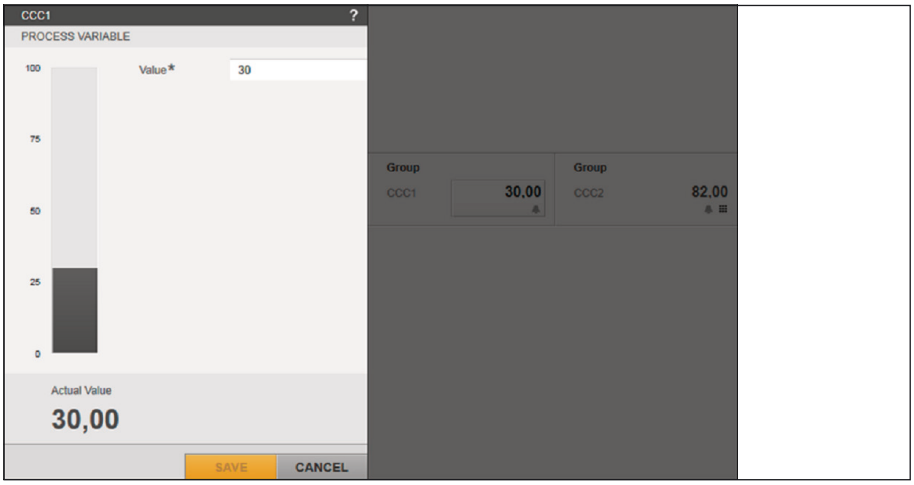


Fig. 6-27: Details and input screen of a process variable with editable value

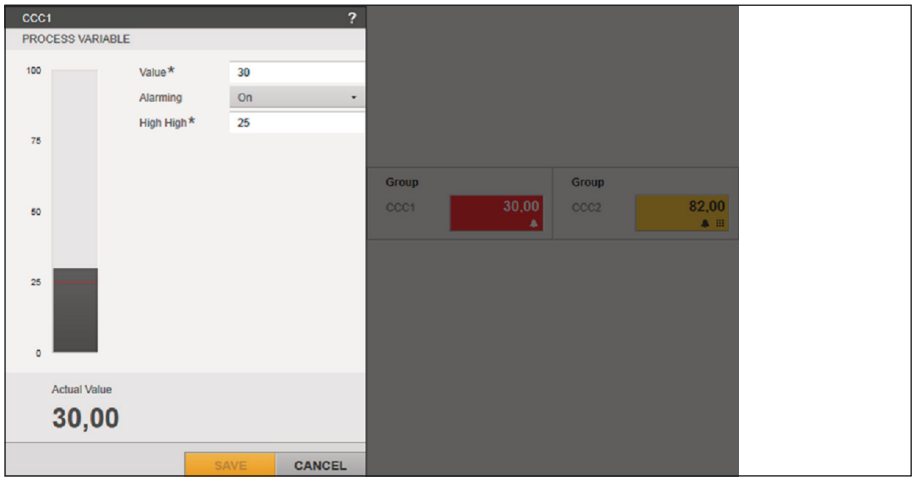


Fig. 6-28: Details and input screen of a process variable with editable value and activated alarm function during a running batch

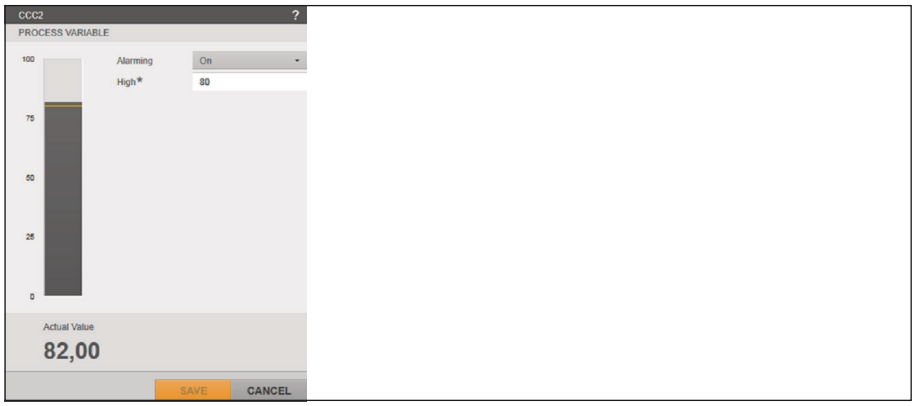


Fig. 6-29: Details and input screen of a process variable with calculated value and activated alarm function during a running batch

Field	Description
Value*	Displays the actual value as a bar graph and as a value.
	For an editable process variable: Enters the value.
Alarming[1]	Alarm mode The alarm modes [High High], [High], [Low], and [Low Low] are evaluated in the known way, provided the corresponding settings are carried out in the process variable.
On	Indicates that the alarm function is activated.
Off[2]	Indicates that the alarm function is deactivated.
High High*	Displays the [High High] alarm limit[1].
	Enters the [High High] alarm limit[1].
High*	Displays the [High] alarm limit[1].
	Enters the [High] alarm limit[1].
Low*,[2]	Displays the [Low] alarm limit[1].
	Enters the [Low] alarm limit[1].

Field	Description
Low Low*[2]	Displays the [Low Low] alarm limit[1].
	Enters the [Low Low] alarm limit[1].

* Required information
[1] Displayed when alarm function is activated and batch process has been started
[2] Not shown in the examples on Page 118

Status and Mode Combinations

The following table lists the possible combinations of status and mode. If you select the [remote] status, you can use all three modes. Depending on which mode you select, you must enter values for the setpoint or the output.

The [Calculated] status is only available for the licensed calculation module (see BioPAT® MFCS Calculation Module instructions).

Status	Mode[1]		Setpoint	Output
local	off	x	x	x
	auto	x	x	x
	manual	x	x	x
remote	**off**	o	x	x
	auto	o	*	x
	manual	o	x	*
(Calculated)	**auto**	-	x	x
cascade	auto	PID	PID	PID

x cannot be selected

o can be selected

- preset

PID The [auto] setting and the values for [Setpoint] and [Output] are preset by the software PID controller and **cannot** be edited.

[1] The availability of the [off], [auto], and [manual] modes depends on the device.

* Required information

6.6.3 Software PID Control

With a software PID controller, a control loop is configured in the MFCS for which no fixed controller is available on a device.
To illustrate MFCS PID control, the following figure shows the input screens of both the control modules [Software PID Controller] and [Manipulated Variable]. In general, several input screens **cannot** be displayed simultaneously.

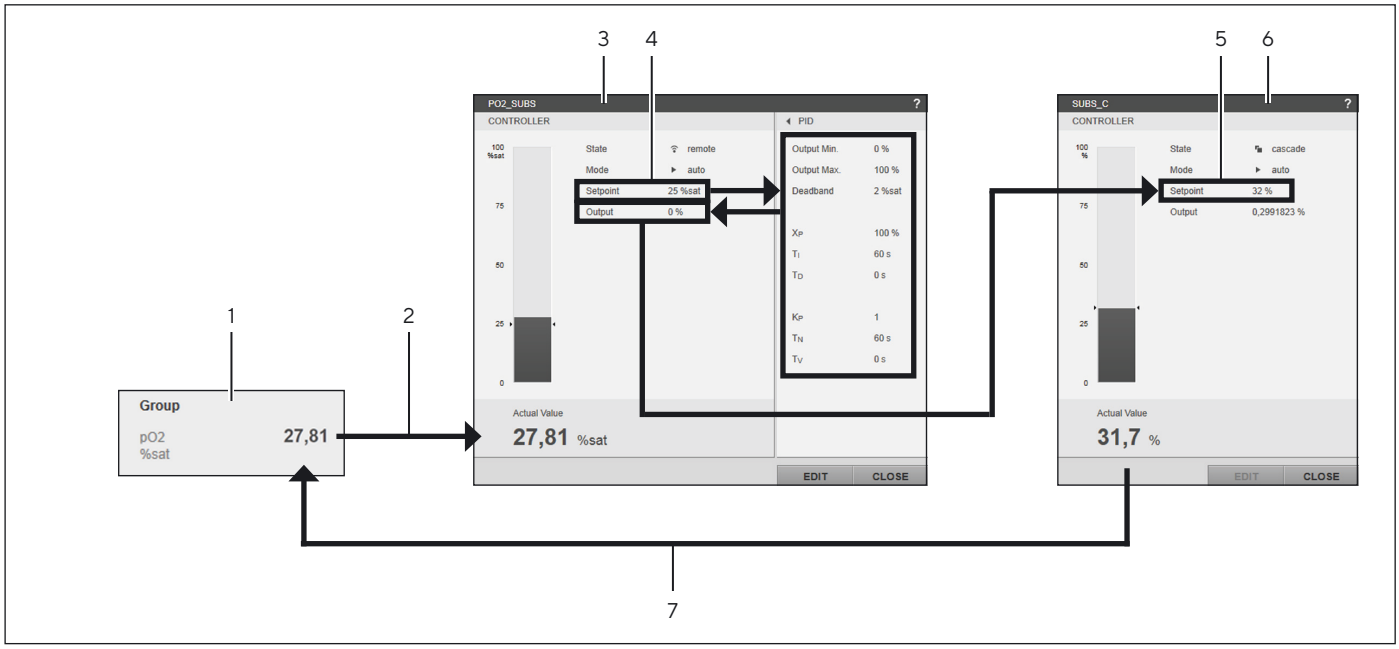
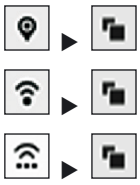
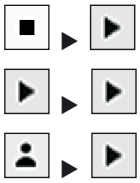


Fig. 6-30: MFCS PID control procedure (example)

Pos.	Description
1	Displays the actual value of the process variables (control module [Controlled Variable]).
2	The process value is transferred to the software PID controller as a controlled variable.
3	Displays the input screen of the software PID controller. The editing mode is **not** active. When the editing mode is active, the status set to [remote] and the mode to [auto], the PID parameters can be edited.
4	The setpoint is defined in the software PID controller.
5	The PID control determines the setpoint of the manipulated variable based on the calculated output (Control Module [Manipulated Variable]).
6	Displays the input screen of the manipulated variable (Control Module [Manipulated Variable]). The editing mode is **not** active.
7	After the adjusted setpoint on the software PID controller has been set, the manipulated variable influences the process value of the control variable.

Status/mode of the software PID controller

The software PID controller must have a [remote] status and be in [auto] mode to control the manipulated variable. The following table gives an overview of the statuses and modes of the software PID controller and how it affects the behavior of the control module [Manipulated variable].

PID[1] State / Mode	Symbol	MV[2] State / Mode	Symbol	Description
State: remote Mode: off		State: any Mode: any	all potential icons	The software PID controller does **not** control the [Manipulated Variable] control module. The control module may be in any random combination of status and mode that is allowed by the controller type and configuration.
State: remote		cascade / auto		The software PID controller **no longer** controls the control module [Manipulated variable].
Mode: auto ▶ off		State: cascade ▶ local		The control module switches to the [local] status and [auto] mode.
		Mode: auto ▶ auto		The control module can be edited.
State: remote		State: any Mode: any	all potential icons	The software PID controller does **not** control the [Manipulated Variable] control module. The control module may be in any random combination of status and mode that is allowed by the controller type and configuration.
Mode: off ▶ auto		State: random ▶ cascade		The control module switches from every permitted combination to the [cascade] status and [auto] mode. The control module **cannot** be edited. The control module is locked for other control tasks.
		Mode: random ▶ auto		If the control module is connected to a control task by the software PID controller at the time of a request, this control task will be ended and the software PID controller will take control of the control module. If the control module is connected to a control task by the software PID controller at the time of a request which **cannot** be ended, the software PID controller will **not** take control of the control module. The action is canceled with an error message.

[1] Software PID controller

[2] Control module [Manipulated variable]

6.6.4 Configuring the Unit Display

In the unit display, control modules are selected, which are displayed in the editing window. The control modules selected during the configuration of the unit can be selected. The scope of the selection of the control modules is based on the configuration for the corresponding unit.

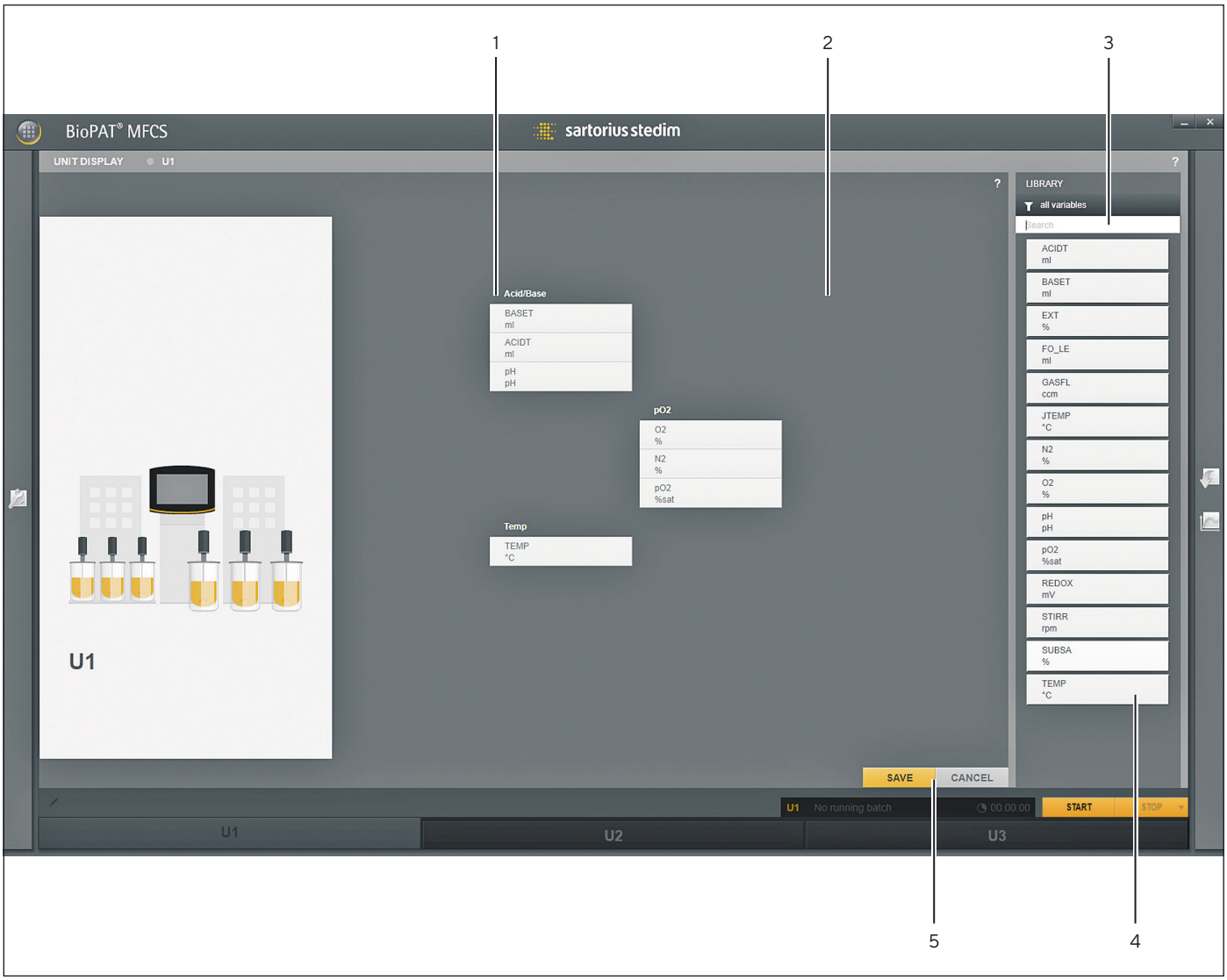


Fig. 6-31: [UNIT DISPLAY] editing mode (example)

Pos.	Description
1	Displays the control module group.
2	Displays the design area.
3	Enters the control module name in the search filter.
4	Displays the control module list for the loaded configuration.
5	Saves/discards the settings.

Accessing the [UNIT DISPLAY] Menu

Procedure

▶ If the [UNIT DISPLAY] menu is **not** maximized in the [MONITORING] function pane: Click on the [UNIT DISPLAY] preview window.
▷ The [UNIT DISPLAY] menu is maximized. The following tasks can be carried out for configuring the unit display.

Tasks for Configuring the Unit Display	Chapter, Page
Select control module	6.6.4.1, 124
Change group name	6.6.4.2, 125
Regroup control module	6.6.4.3, 125
Change the selection of control modules	6.6.4.4, 126
Remove a control module and control module groups	6.6.4.5, 127
Hide and show a unit image	6.6.4.6, 127
Enter controller and alarm parameters	6.6.4.7, 128

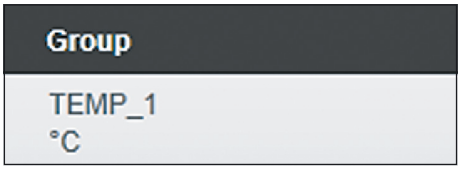
6.6.4.1 Selecting a Control Module

Procedure

▶ On the start screen, click on the [MONITORING] button to display the function pane.
▶ Select the unit in the status bar for which the settings are to be made.
▶ Click on the [Edit] button.
▷ The editing window opens.

Selecting a Control Module

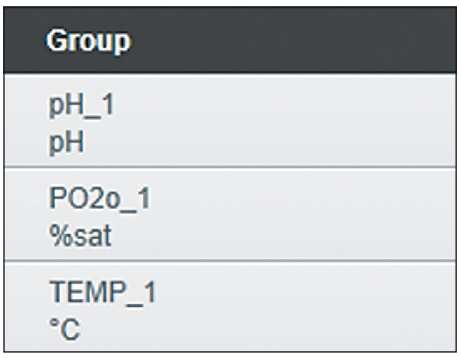
Procedure



▶ In the list of control modules, click on the selected entry with the left mouse button, keep the mouse button held down and drag the entry to an empty section of the design area.
▷ The control module is located in the design area.

Selecting More than One Control Module

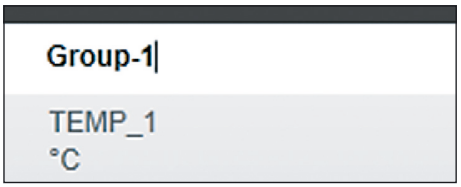
Procedure



- ▶ Press the CTRL key and in the list of control modules, click on the desired entries one after the other with the left mouse button, then keep the mouse button held down and drag the entries to an empty section of the design area.
- ▷ The control modules group is located in the design area.
- ▶ Click on the [SAVE] button.
- ▷ The modified view is updated in the overview [UNIT DISPLAY].

6.6.4.2 Changing the Group Name

Procedure

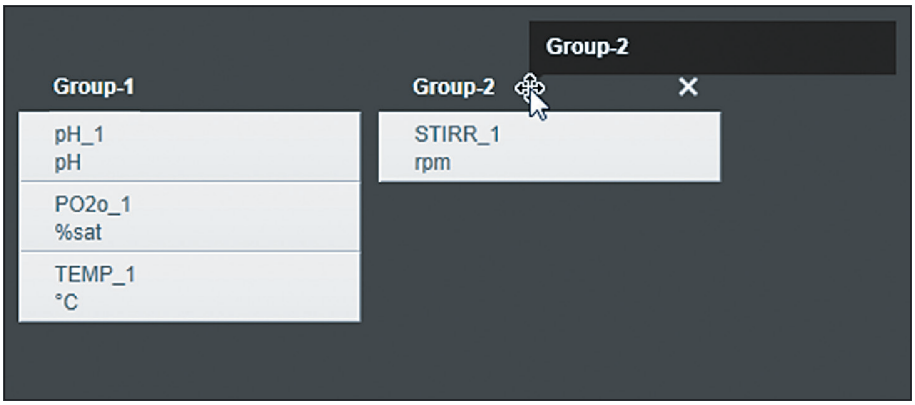


- ▶ Click on the [Edit] button.
- ▶ Double-click in the header of the control modules or group.
- ▶ Enter a new name and confirm the entry with the ENTER key.
- ▶ Click on the [SAVE] button.

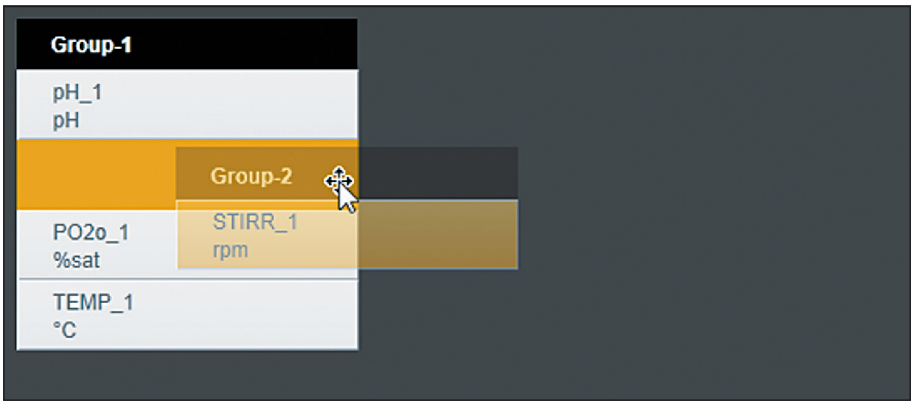
6.6.4.3 Regrouping a Control Module

Example: Integrating controller [STIRR_1] into control module [Group-1]

Procedure



▶ Click on control module group [Group-2] and drag it into the area of control module group [Group-1].



▷ Controller [STIRR_1] is part of the control module group [Group-1]:

6.6.4.4 Changing the Control Module Selection

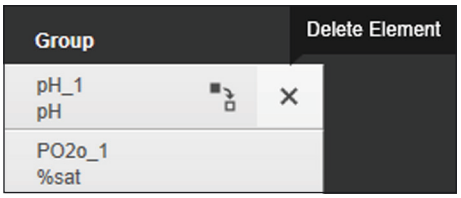
Procedure

▶ Click on the [Edit] button.
▶ In the control module window next to the control module name, click on the [Edit] button.
▷ The [REPLACE Variable] selection menu appears. The current control module is highlighted.
▶ Select the new control module.
▷ In the control module window, the new control module appears.

6.6.4.5 Removing Control Modules/Control Module Groups

Control modules of a group and control module groups can be removed from the design area.

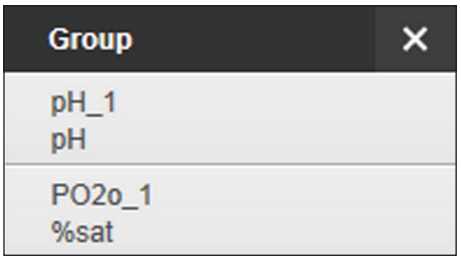
Removing Control Modules from a Group



Procedure

▶ Click on the [Close] button after the control module entry.
▷ The control module has been removed from the group.

Removing a Control Module Group



Procedure

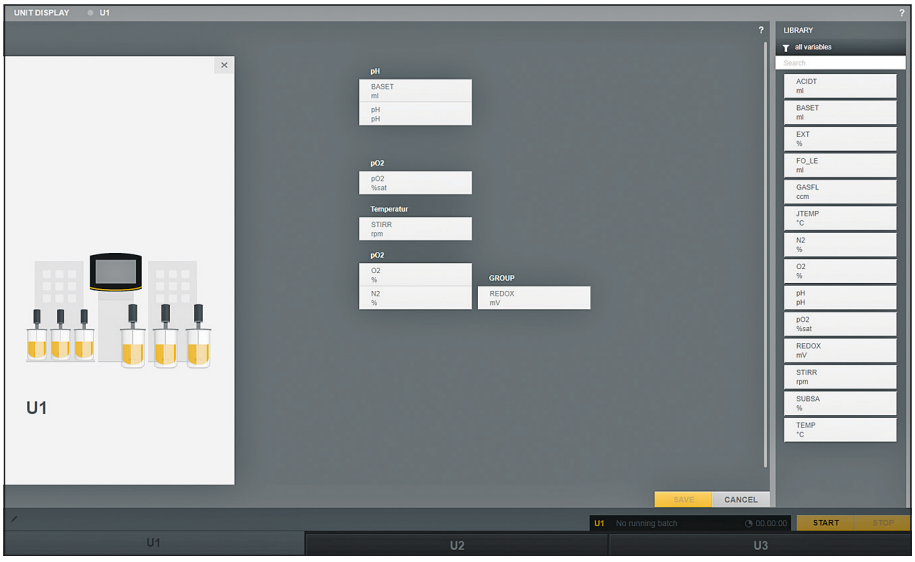
▶ In the header, click on the [Close] button.
▷ The control module group is removed from the design area.

6.6.4.6 Hiding and Showing a Unit Image

The unit image can be shown and hidden from the design area. The area which has become vacant can be used for other control module entries.

Hiding a Unit Image

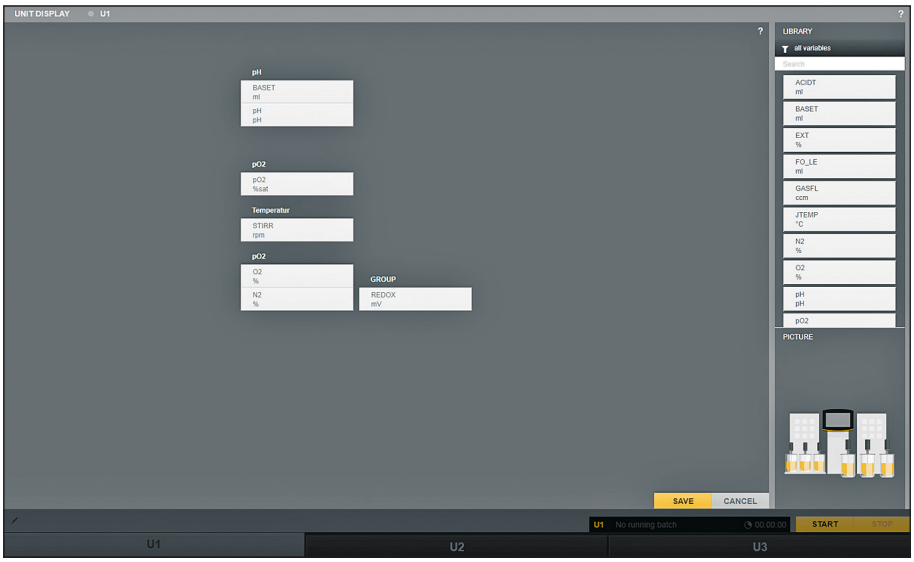
Procedure



▶ In the upper section of the unit image, click on the [Close] button.
▷ The unit image is moved to the section below the control module list.

Showing a Unit Image

Procedure



▶ Below the control module list, click on the image and drag the image to an empty section of the mounting surface.

6.6.4.7 Entering Controller and Alarm Parameters

The controller and alarm parameters can be entered from the BioPAT® MFCS 4 program. The “Remote” mode of the device must be activated in order to transfer the controller and alarm parameters to the device.

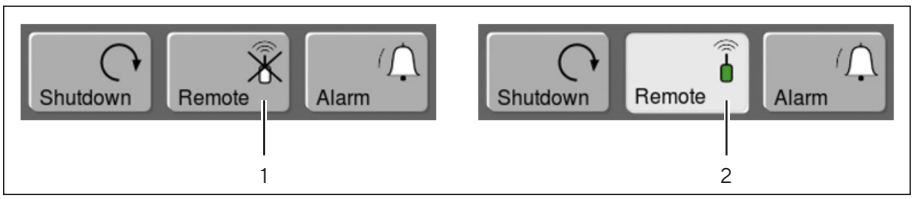


Fig. 6-32: Deactivated and activated “Remote” mode in the DCU 4 of the BIOSTAT® B (example)

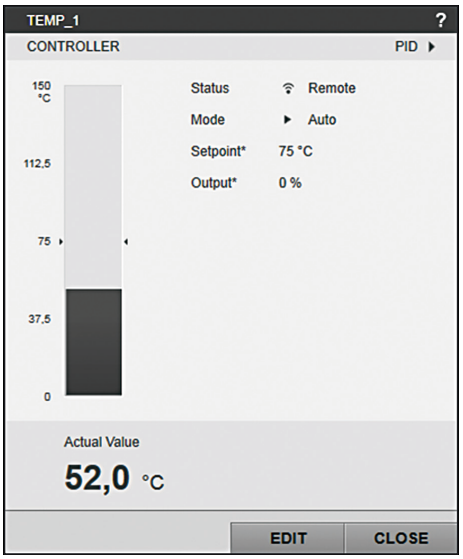
Pos.	Description
1	Indicates that the “Remote” mode is deactivated.
2	Indicates that the “Remote” mode is activated.

Entering Controller Parameters and Transferring Them to the Device

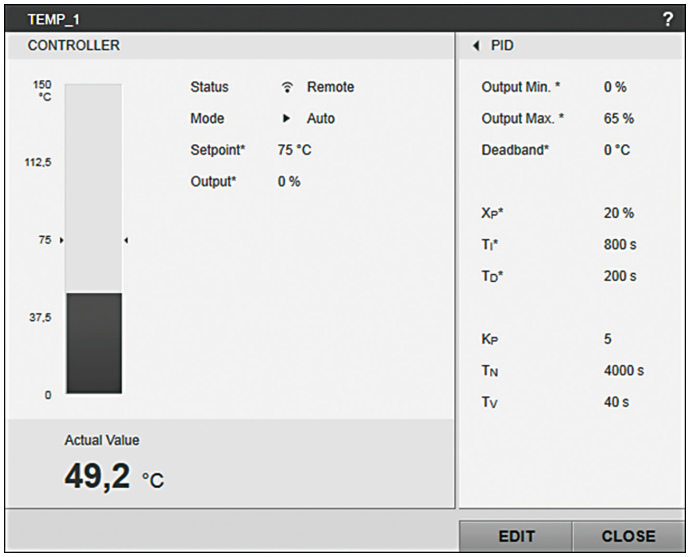
The method of entering the controller parameters is described below using PID controller [TEMP_1] as an example.

Procedure

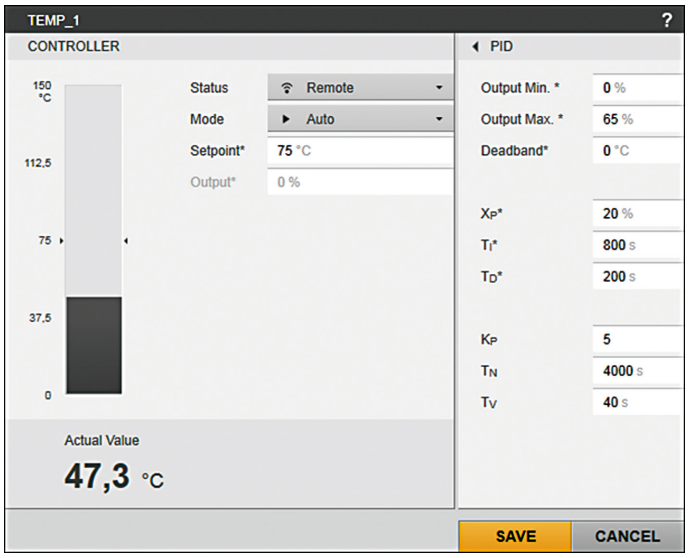
- ▶ Configure PID controller [TEMP_1] for the display in the [UNIT DISPLAY] menu (see Chapter "6.6.4 Configuring the Unit Display", page 123).
- ▶ Click in the display field in the [UNIT DISPLAY] overview (current actual value of PID controller [TEMP_1]).
- ▷ The window with detailed information about PID controller [TEMP_1] is displayed.



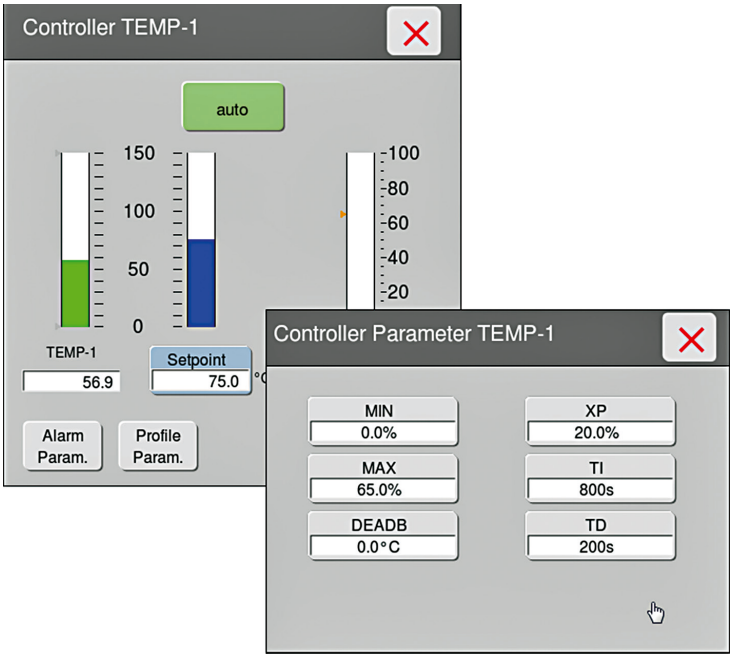
- ▷ The window with detailed information about PID controller [TEMP_1] is displayed.
- ▶ Click on the [PID] button to expand the input screen.



▶ Click on the [EDIT] button.
▷ The editing mode is displayed:



▶ Ensure that the “Remote” mode is selected on the device next to the [Status] entry.
▶ Enter the corresponding controller parameters for PID controller [TEMP_1].
▶ Click on the [SAVE] button to confirm the entries.
▶ Click on the [CLOSE] button.
▷ The controller parameters for PID controller [TEMP_1] are transferred to the DCU 4 of the BIOSTAT® B and displayed in the controller menus:

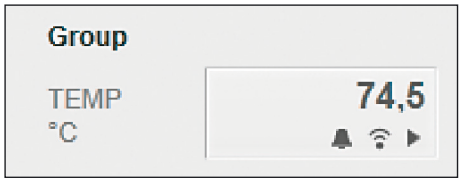


Activating / Deactivating and Configuring the Alarm Function

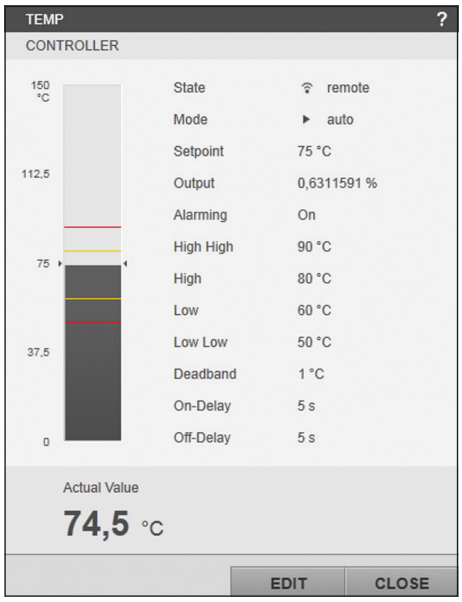
The process of activating / deactivating and configuring the alarm function after a batch process has been started is described below using setpoint controller [TEMP] as an example.

Procedure

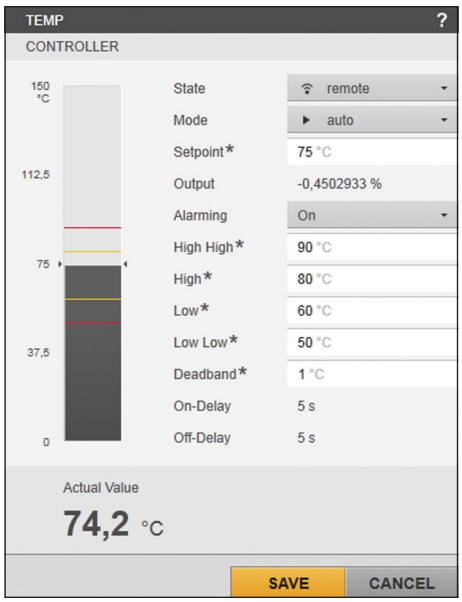
- ▶ Configure the setpoint controller [TEMP] for the display in the [UNIT DISPLAY] menu (see Chapter "6.6.4 Configuring the Unit Display", page 123).
- ▶ Click in the display field in the [UNIT DISPLAY] overview (current actual value of setpoint controller [TEMP]).
- ▷ The window with detailed information about setpoint controller [TEMP] appears.

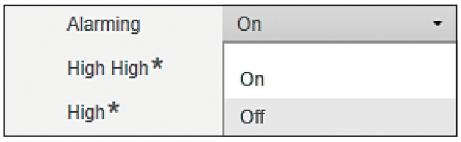


- ▶ Click on the [EDIT] button.

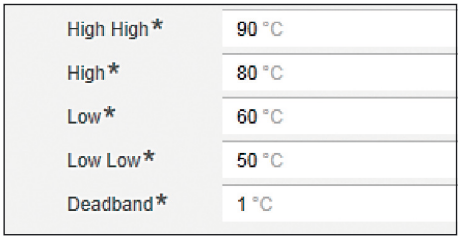


- ▷ The editing mode is displayed.





- ▶ Activate / deactivate the alarm function:
  - ▶ To activate the alarm function: Select [On] from the drop-down menu.
  - ▶ To deactivate the alarm function: Select [Off] from the drop-down menu.



- ▶ Set the alarm parameters for setpoint controller [TEMP].
- ▶ Click on the [SAVE] button to confirm the entries.
- ▷ The alarm function activation / deactivation and configuration are immediately implemented in the current batch process.

6.7 “TREND” Menu

In the [TREND] menu, the current process values of the configured units are displayed as time curves. For this purpose, trends are created in which up to six control modules in each case can be defined. The trends can be saved as trend templates.

6.7.1 Trend Display

Fig. 6-33: Functional elements of the trend display (example using single trend display)

Pos.	Description
1a-b	Shows the upper toolbar (control module selection):
1a	Shows the selected control modules.
1b	Adds a control module.
2	Shows the trend graph.
3	Maximizes/minimizes the trend list.
4	Shows the trend list (trends, trend templates).
5	Maximizes the [UNIT DISPLAY] menu, minimizes the [TREND] menu, and displays it in a preview window.

Pos.	Description
6	Maximizes the [ALARMS (#)] menu, minimizes the [TREND] menu, and displays it in a preview window.
7	Starts/stops the batch process.
8a-d	Shows the lower toolbar:
8a	Switches to full-screen mode or dual-monitor operation.
8b	Opens the selection menu for trend templates.
8c	Saves the trend as a trend template.
8d	Creates a new trend.
9	Displays the status of the batch process.
10	Shows the scalable timeline.
11	Displays the status bar with the configured units/unit groups.
12	Displays the scale of the timeline.

6.7.2 Split Trend Display

The split trend display can be created by using the drag & drop method (see Chapter “6.7.8 Displaying Two Trends”, page 149).

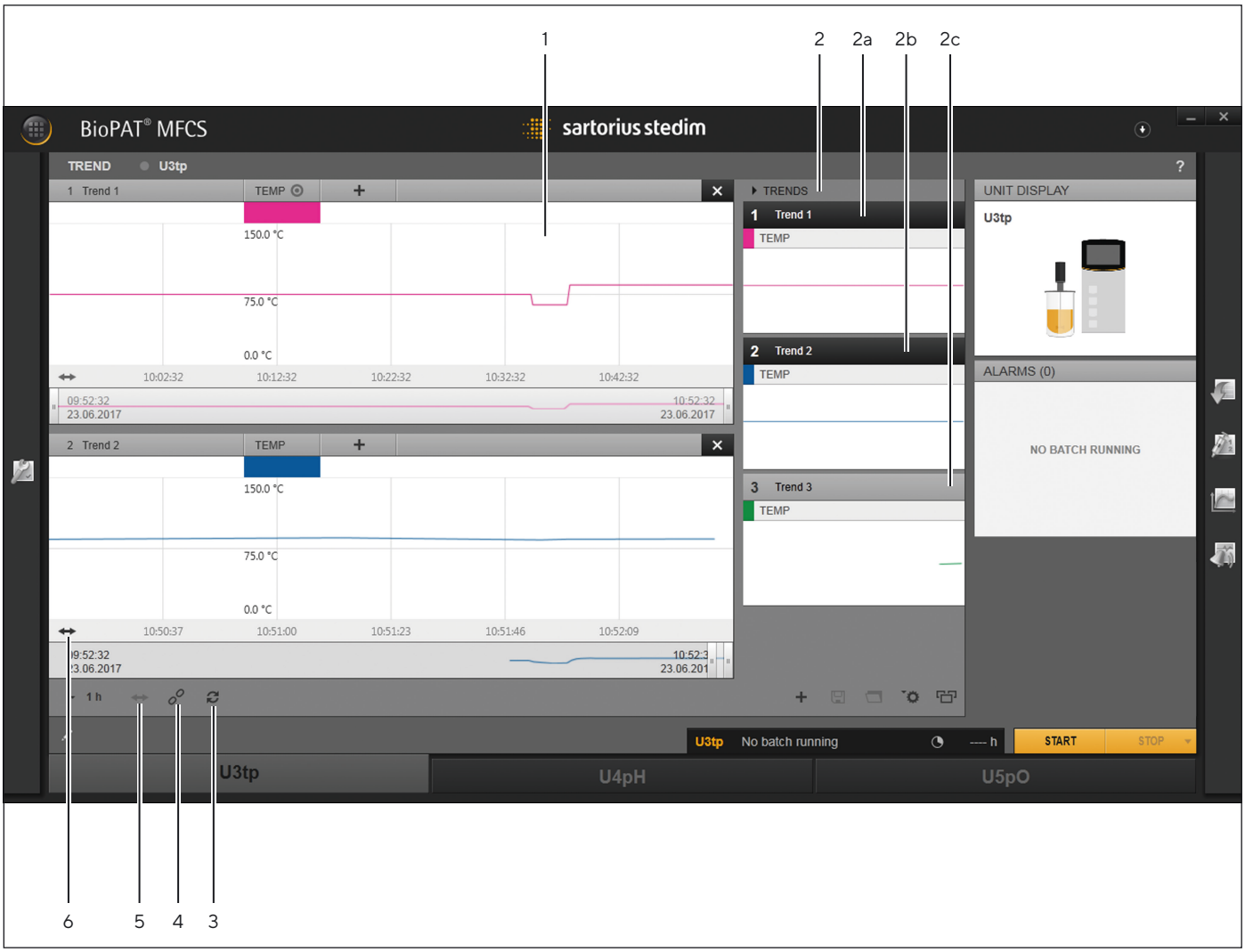


Fig. 6-34: Functional elements of the split trend display

Pos.	Description
1	Shows the trend graph with max. two trends.
2a-c	Shows the trend list:
2a, 2b	Shows loaded and active trends in the trend graph.
2c	Shows loaded and **non**-active trend in the preview.
3	Synchronizes the timelines.
4	Links the timelines.
5	Maximizes the timescale in conjunction with linking.
6	Maximizes the timescale for an individual trend.

6.7.3 Trend Graph

Displaying Selected Control Modules

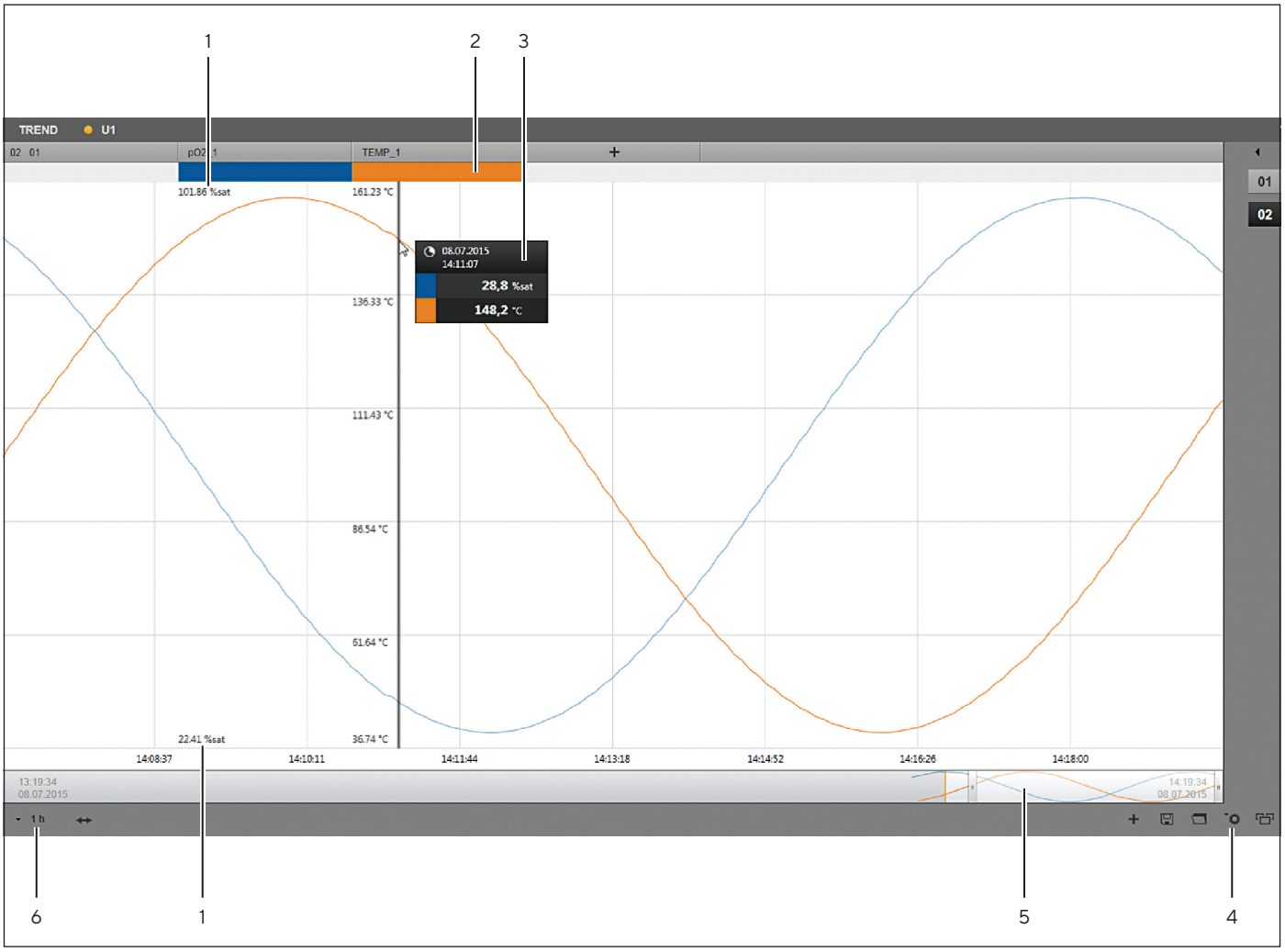


Fig. 6-35: Trend graph with selected control modules (example)

Pos.	Description
1	Shows the display area between the maximum/minimum process value.
2	Shows the color definition for displaying the process values.
3	Shows the tool tip with process values at time [hh:mm:ss].
4	Activates / deactivates the tool tip, display area, and marker.
5	Scales the timeline.
6	Sets the timescale (1 h – 72 h, All).

Detailed View: Controller Parameters

The detailed information can be displayed in the trend graph on the title bar and in the tool tip (see Chapter “6.7.7.8 Showing a Detailed View of a Controller”, page 148).

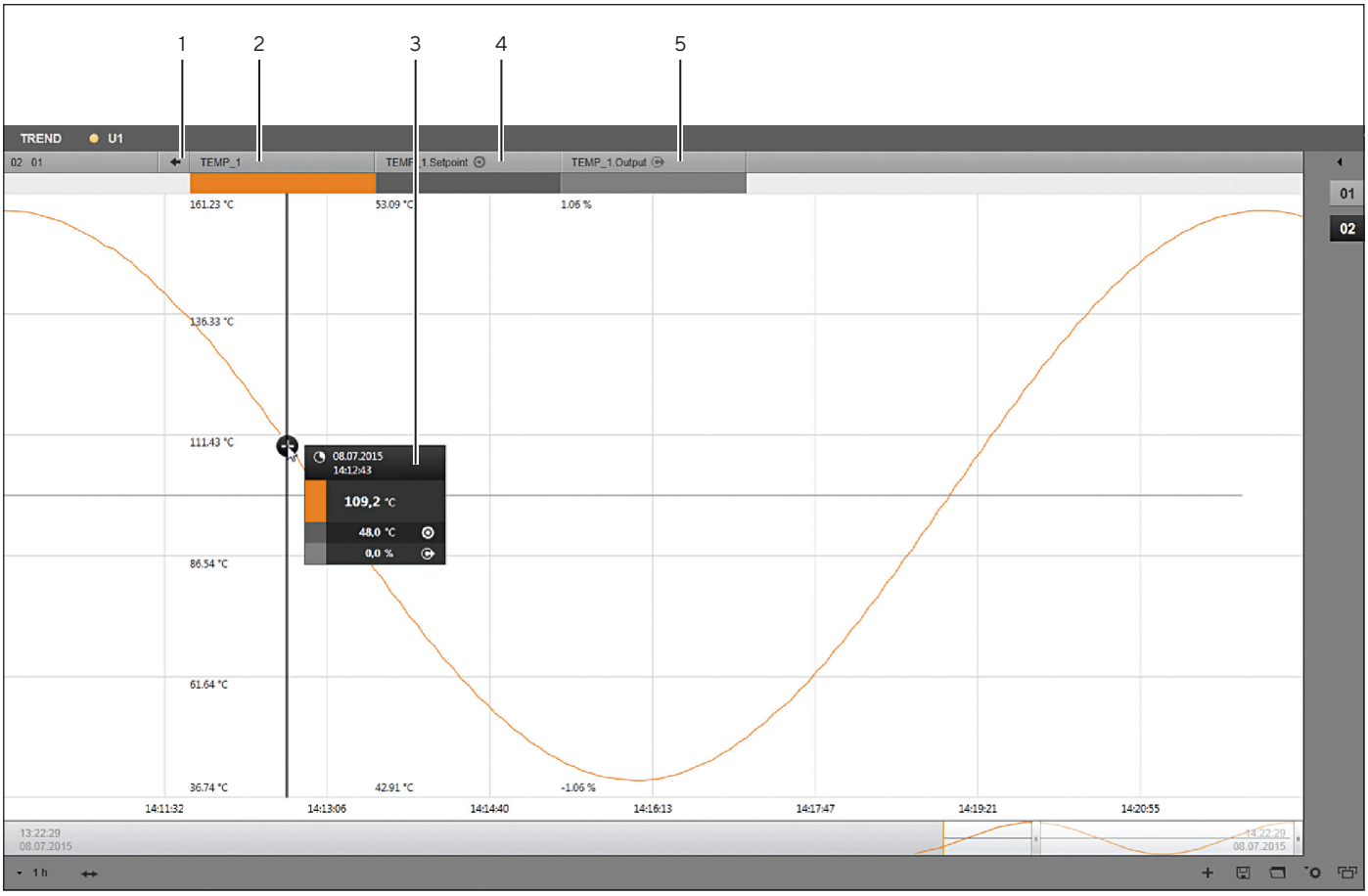


Fig. 6-36: Overview of the trend graph with detailed controller parameters

Pos.	Symbol	Description
1		Hides detailed controller parameters and shows all selected process values.
2		Displays the actual value of the controller.
3		Displays the tool tip with detailed controller parameters.
4		Displays the setpoint of the controller.
5		Displays the controller output.

"EDIT VARIABLE" Menu

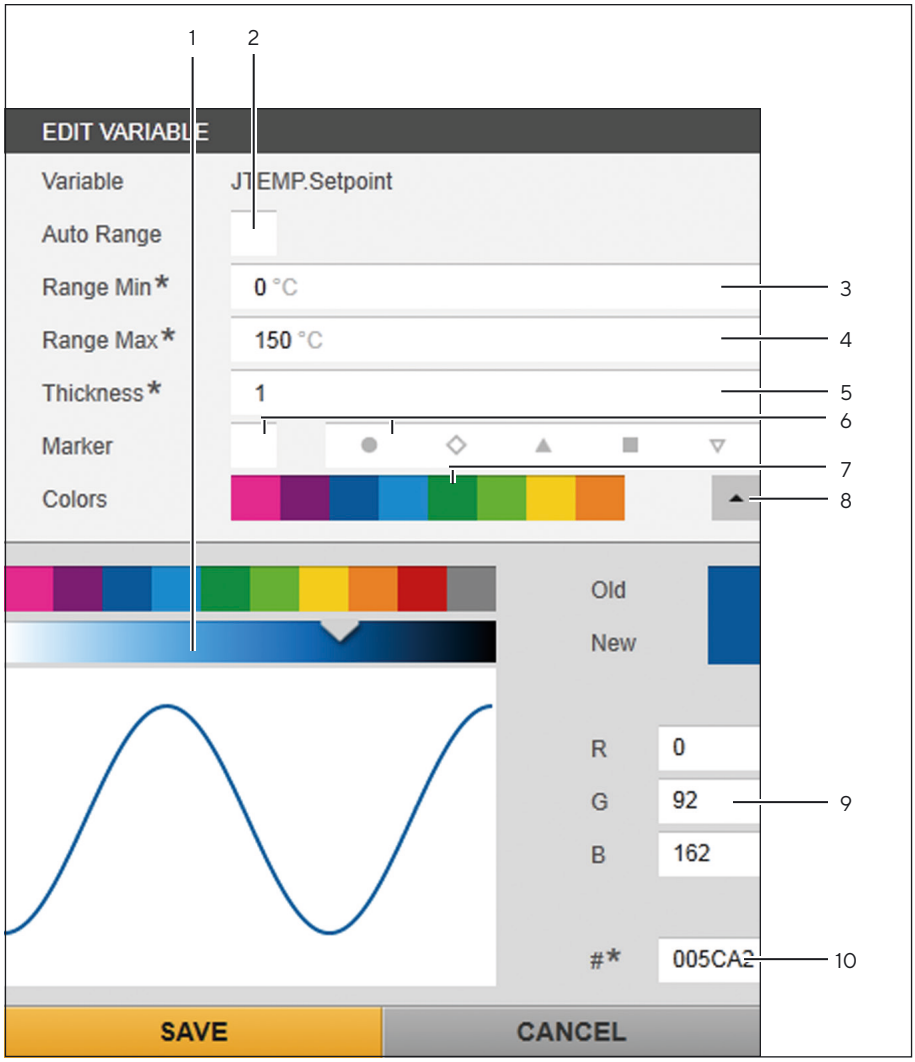


Fig. 6-37: Color profile menu, process value display range

Pos.	Description
1	Sets the color based on the advanced color profile settings.
2	Activates / deactivates the automatic setting for the display range. If deactivated, the [Range Min] and [Range Max] input fields are required information.
3	Enters the minimum value of the display range.
4	Enters the maximum value of the display range.
5	Enters the thickness of the curve.
6	Activates / deactivates the marker function (marking of measurement points with 5 different symbols).
7	Sets the color based on the palette colors.
8	Activates / deactivates the advanced color profile setting.
9	Sets the color based on the RGB color space.
10	Sets the color based on a hexadecimal color code (RGB color space).

Tool tip

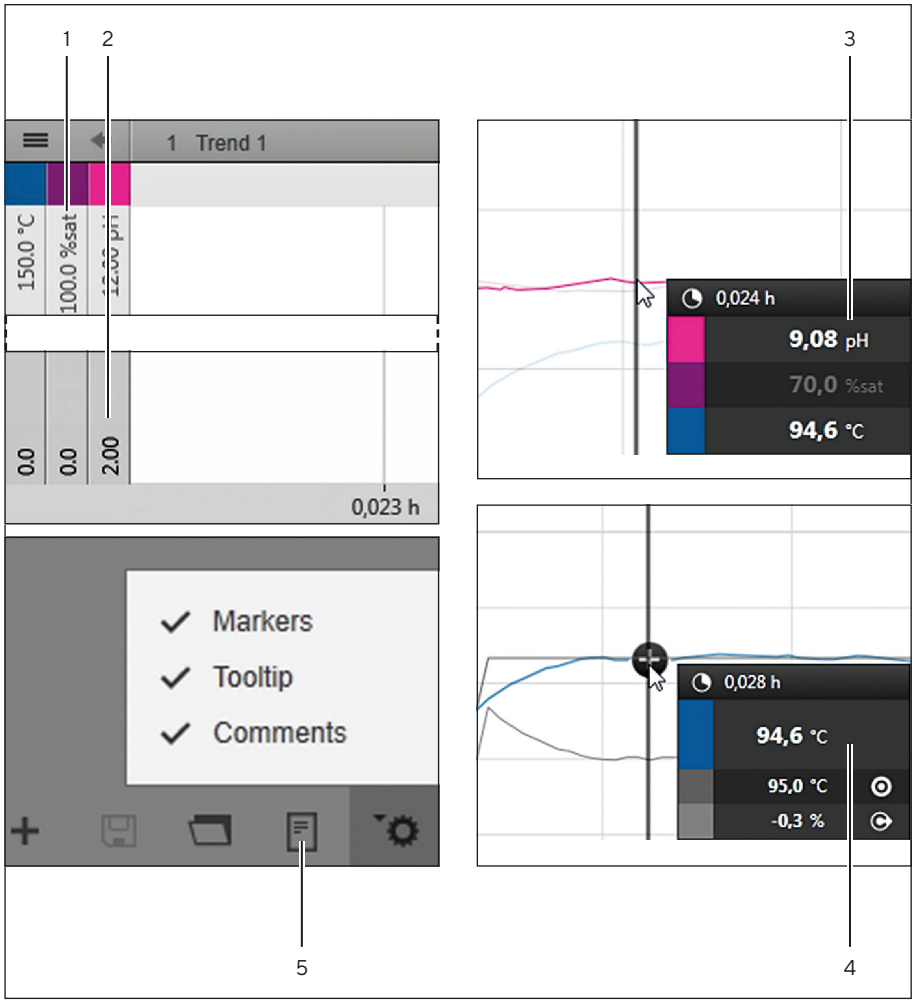


Fig. 6-38: Tool tip

Pos.	Description
1	Displays the maximum value of the display range.
2	Displays the minimum value of the display range.
3	Shows the tool tip with process values at time [hh:mm:ss].
4	Shows the actual value, setpoint, and controller output at time [hh:mm:ss] in the tool tip.
5	Activates / deactivates the tool tip, display area, and marker.

Scale of timeline

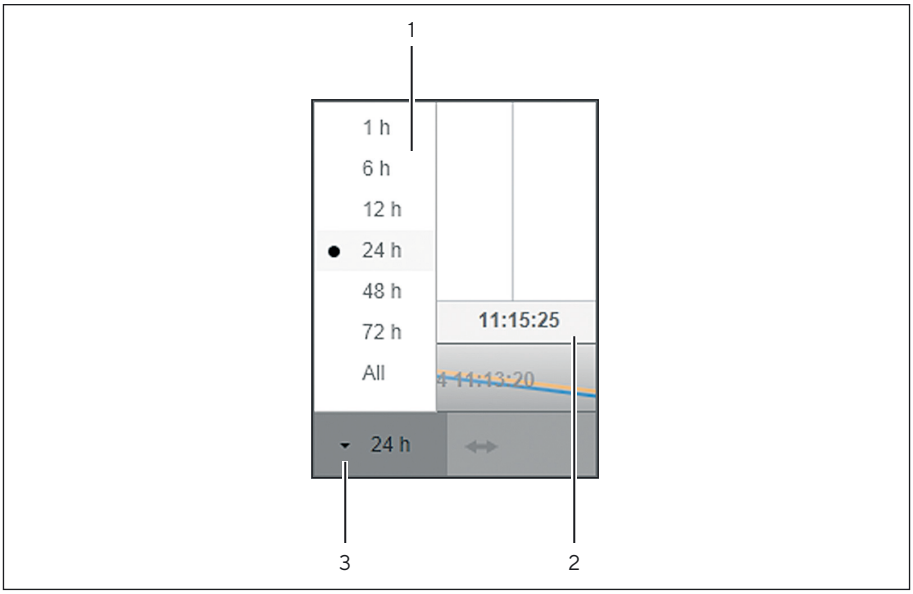


Fig. 6-39: Timescale

Pos.	Description
1	Sets the timescale (1 h – 72 h, All).
2	Displays the timeline with the set timescale.
3	Shows and hides the selection menu for the timescale.

Timeline

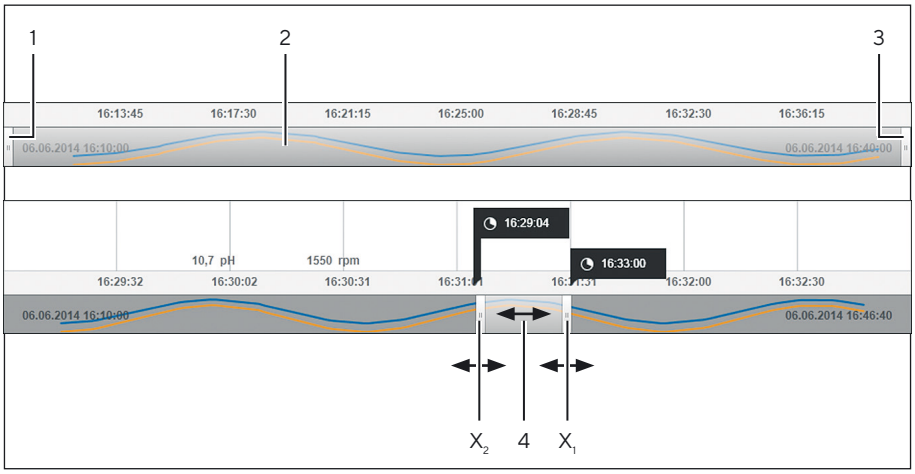


Fig. 6-40: Scalable timeline

Pos.	Description
1	Displays the start time for the selected time window (X_2).
2	Displays the maximized time window.
3	Displays the end time for the selected time window (X_1).
4	Moves the selected time window.
X_1	Moves the end time.
X_2	Moves the start time.

6.7.4 Variables Selection Menu

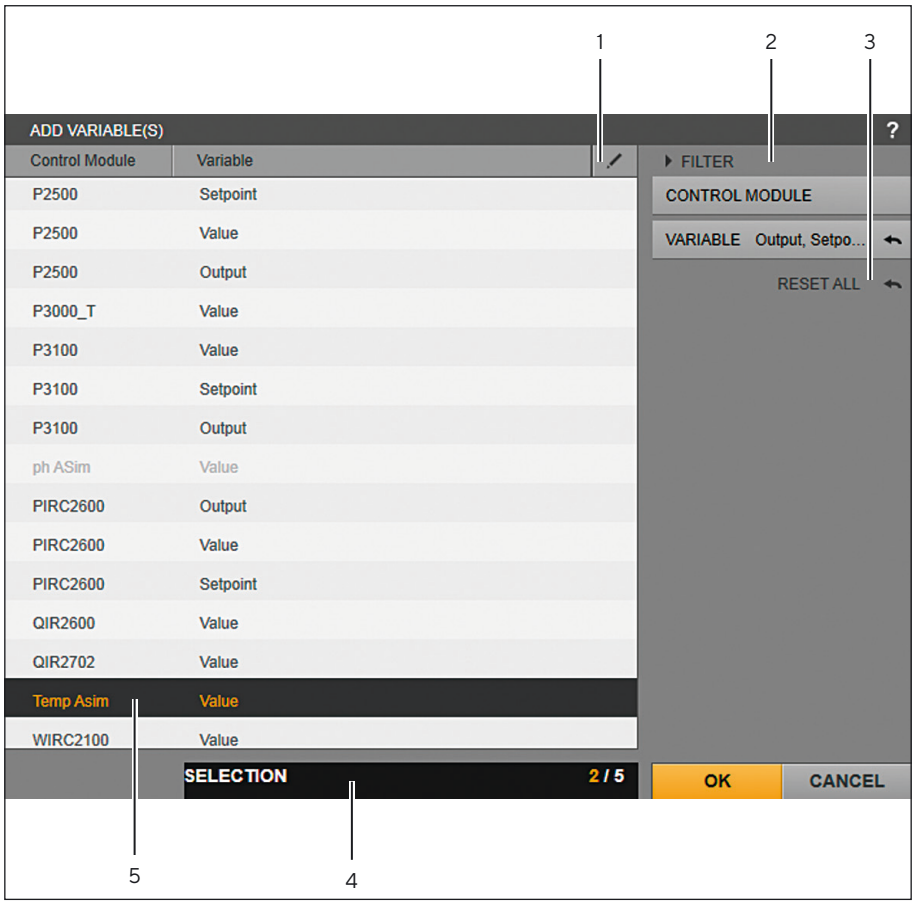


Fig. 6-41: Functional elements of the selection menu for control modules

Pos.	Description
1	Shows the selection menu for the search criteria.
2	Filters the selection list by name and control module.
3	Resets the filter.
4	Displays the number of selected control modules. A maximum of 6 control modules can be selected.
5	Displays the selected control modules.

6.7.5 Trend Template Management Menu

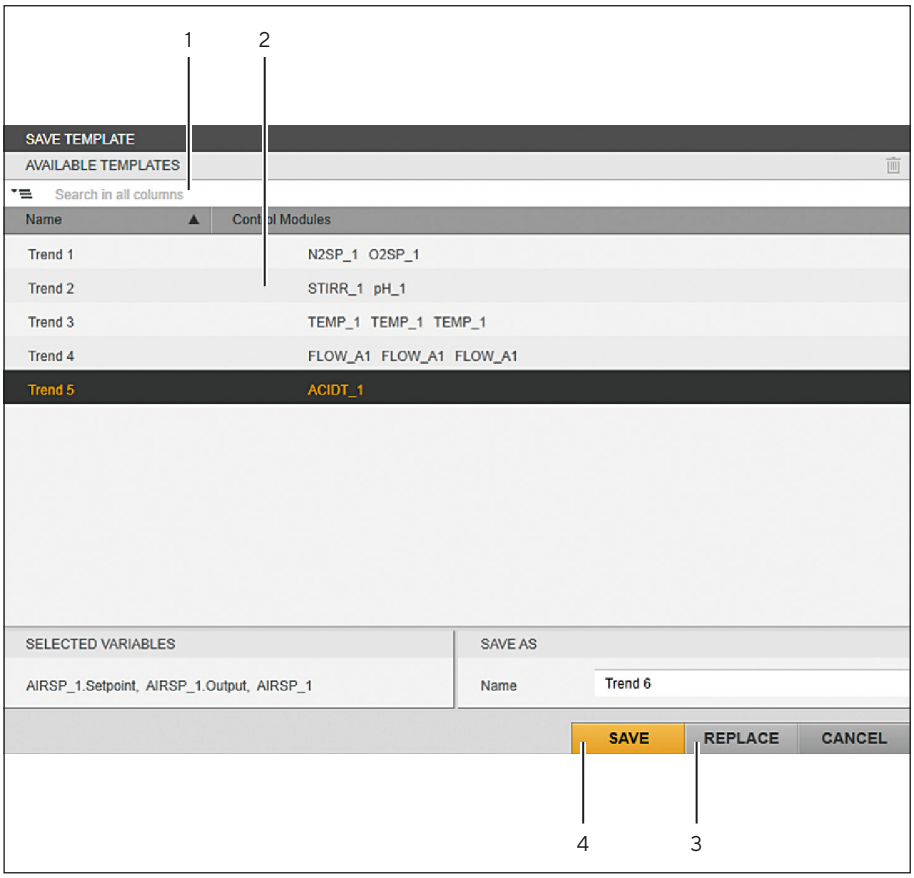


Fig. 6-42: Trend template management menu

Pos.	Symbol	Description
1		Enters the name of the trend template and filters the template list.
2		Displays the saved trend templates.
		Deletes the selected trend templates.
3		Replaces the control modules of the selected trend template with the control modules for the active trend.
4		Saves the trend as a trend template.

6.7.6 Trend Template Selection Menu

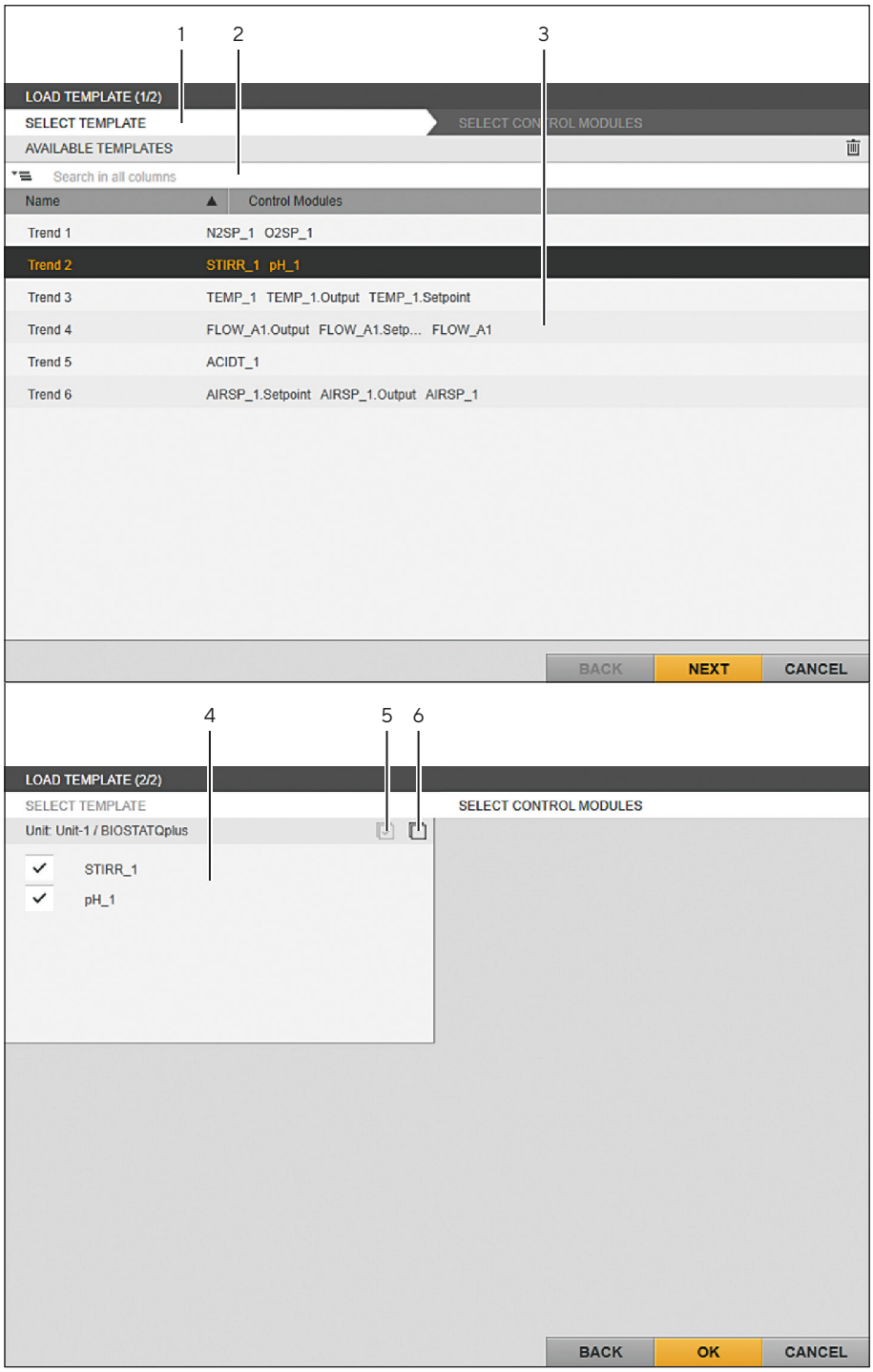


Fig. 6-43: Unit menu: trend template selection

Pos.	Description
1	Displays the trend template selection list.
2	Enters the name of the trend template and filters the template list.
3	Displays the saved trend templates.
4	Selects control modules for the trend template.
5	Selects all control modules for the trend template.
6	Deselects the control modules.

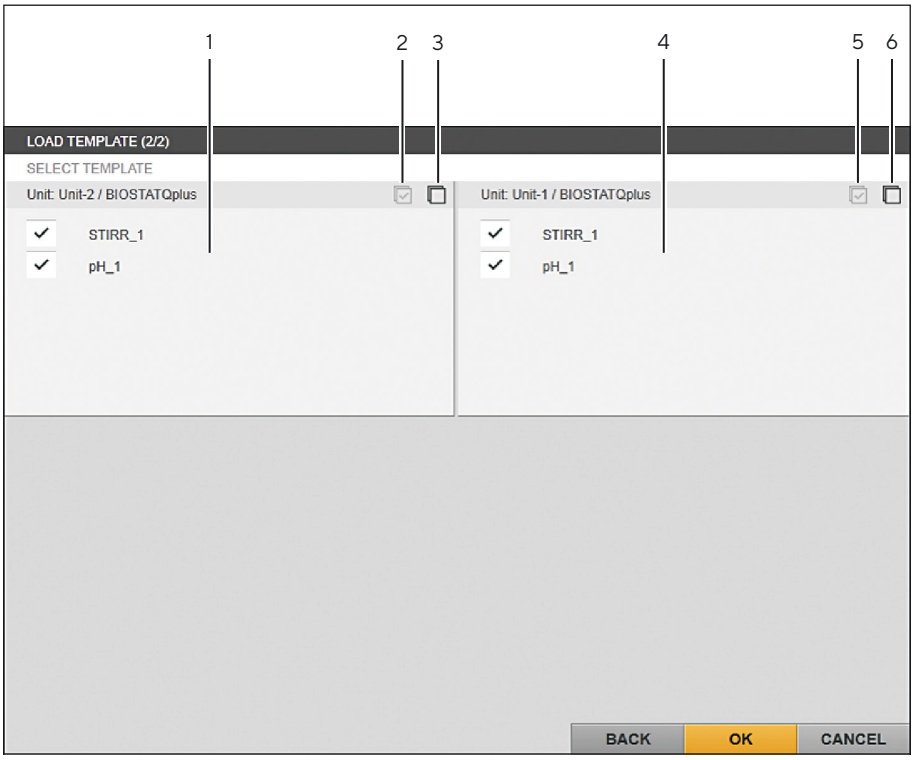


Fig. 6-44: Unit group menu: trend template selection (example using one unit group with two units)

Pos.	Description
1	Selects control modules of the trend template for [Unit-2].
2	Selects all control modules of the trend template for [Unit-2].
3	Deselects control modules for [Unit-2].
4	Selects control modules of the trend template for [Unit-1].
5	Selects all control modules of the trend template for [Unit-1].
6	Deselects control modules for [Unit-1].

A maximum of 6 control modules can be displayed in a trend graph. When you have selected 6 control modules, the other entries are grayed out.

Existing templates which cannot be used are depicted with a gray background.

Example

The template was created on unit 1, which includes the [pO2] control module.

The template will be used on unit 2. Unit 2 does not include the [pO2] control module. Therefore, it cannot be used and is hidden.

6.7.7 Configuring Trends

Process values which you want to display in the trend graph are selected for the trend. The control modules selected during the configuration of the unit can be selected.

Accessing the "TREND" Menu

Procedure

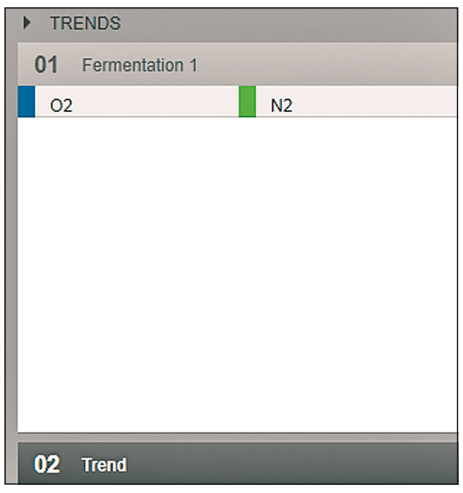
▶ If the [TREND] menu is **not** maximized in the [MONITORING] function pane: Click on the [TREND] preview window.
▷ The [TREND] menu is maximized. The following tasks can be carried out for configuring the trends.

Task for Configuring the Trends	Chapter, Page
Generate trends	6.7.7.1, 145
Select control module	6.7.7.2, 146
Modify color profile and display range	6.7.7.3, 146
Save trend as trend template	6.7.7.5, 147
Select and load trend template	6.7.7.6, 147
Change the selection of control modules in the trend template	6.7.7.7, 147
Set up advanced display of control modules	6.7.7.8, 148
Delete trend template	6.7.9, 151

6.7.7.1 Generating a Trend

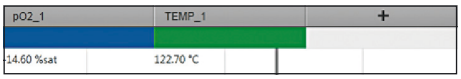
Procedure

▶ Select the unit in the status bar for which a trend is to be created.
▷ If no trend has yet been created for the selected unit, the trend [01 Trend] is entered automatically in the trend list.
▶ Select the control modules for the [01 Trend] trend.
▶ In the lower toolbar, click on the [Add] button.



▷ The new trend appears in the trend list. The trend is active and the header of the active trend is highlighted in black. Inactive trends are highlighted in gray and show the process of the last 10 minutes.
▶ Select the control module.

6.7.7.2 Selecting a Control Module



Procedure

- ▶ In the upper toolbar, click on the [Add] button.
- ▷ The [ADD CONTROL MODULE(S)] selection menu appears.
- ▶ Select the control modules.
- ▶ Click on the [OK] button.
- ▷ The selected control modules are entered in the title bar of the trend graph.

- ▶ If additional control modules are to be added: Click on the [Add] button and select and add additional control modules.
- ▶ To change the color profile and display range:
  See Chapter 6.7.7.3, page 146.
- ▶ Save the trend as a trend template.
- ▶ To select a trend template for other units: See Chapter 6.7.7.6, page 147.

6.7.7.3 Changing the Color, Line Thickness, and Display Range

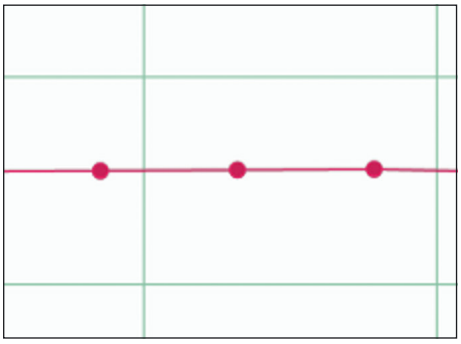
Procedure

- ▶ In the header of the control module, click on the [Edit] button.
- ▷ The [EDIT VARIABLE] menu appears.
- ▶ Change the color profile, the line thickness of the curves, and the settings for the display range.
- ▶ Confirm by clicking on the [SAVE] button.

6.7.7.4 Mark Measurement Points within the Curve

Procedure

- ▶ In the header of the control module, click on the [Edit] button.
- ▷ The [EDIT VARIABLE] menu appears.
- ▶ Put a check mark in the input field next to the “Marker” entry.
- ▶ Select a symbol for marking the measurement point
- ▶ Click on the [SAVE] button.
- ▷ The symbol used is displayed in the title bar next to the entry.
- ▷ The marked points represent the measured values (recorded during batch processes). Interpolation is carried out between the marked points.



6.7.7.5 Saving a Trend as a Trend Template

The trend templates and chart templates are saved in the same folder.

Procedure

- ▶ In the lower toolbar, click on the [Save] button.
- ▷ The [SAVE TEMPLATE] menu appears.
- ▶ Enter a name for the trend.
- ▶ Click on the [SAVE] button.
- ▷ The trend is saved as a trend template.

6.7.7.6 Selecting and Loading a Trend Template

Procedure

- ▶ In the lower toolbar, click on the [Load template] button.
- ▷ The [LOAD TEMPLATE (1/2)] menu appears
- ▶ In the [SELECT TEMPLATE] submenu, click on the trend template entry you want to load.
- ▶ Click on the [NEXT] button.
- ▷ The [SELECT TEMPLATE] submenu appears.
- ▶ Select the process values for the current display.
- ▶ Click on the [OK] button.
- ▷ The trend template appears in the trend list. The trend is active and the header of the active trend is highlighted in dark gray.
- ▷ The only control modules that can be selected from the template are those which are also present in the unit. Control modules which are not present are grayed out.

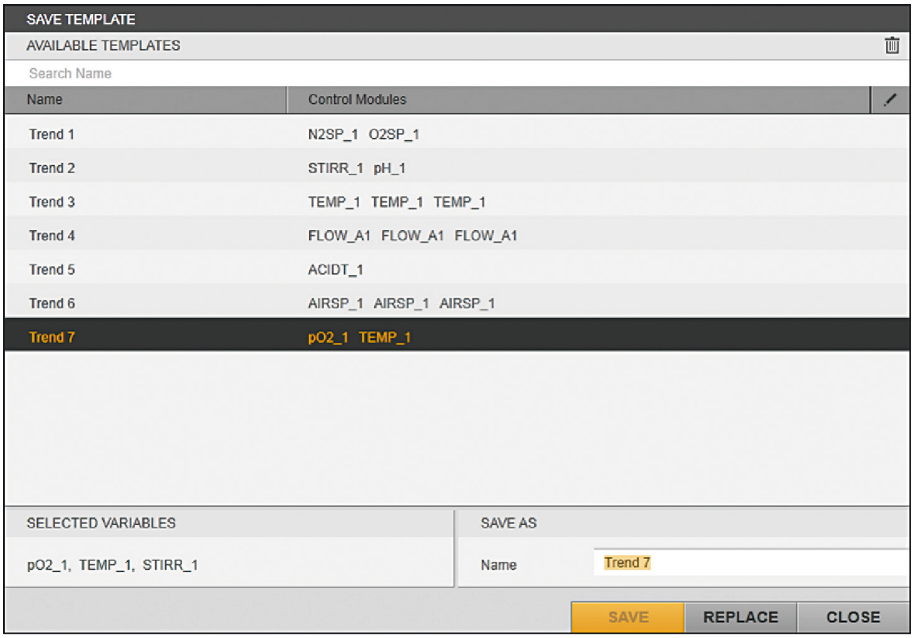
6.7.7.7 Changing the Selection of the Control Modules

Control modules can be added to and removed from the trend template.

Procedure

- ▶ Load the trend template to be changed.
- ▷ The trend is active and the header of the active trend is highlighted in dark gray.
- ▶ To add a control module: Select additional control modules.
- ▶ To remove a control module: In the header of the control module, click on the [Remove] button.
- ▶ Click on the [Save] button.

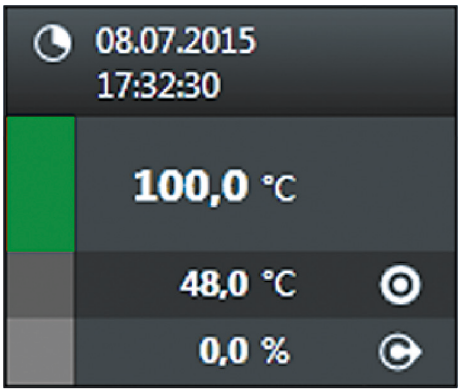
▷ The [SAVE TEMPLATE] menu appears. The trend template is highlighted:



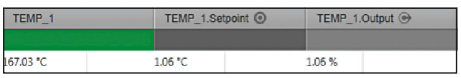
▶ Click on the [REPLACE] button to replace the current trend template.
▷ The new trend template replaces the current trend template (“Trend 7” in this example).

6.7.7.8 Showing a Detailed View of a Controller

Procedure



▶ Click on a point in the curve for the desired controller.
▷ The setpoint and controller output are also displayed in the tool tip.



▷ The title bar is extended to include the setpoint and controller output entries.
▷ The other control modules are hidden.

▶ To exit the detailed display: Click on the button in the title bar to exit the detailed display.

6.7.8 Displaying Two Trends

A loaded and active trend is displayed automatically in the trend graph. An additional trend can be displayed in the trend graph (see Chapter “6.7.2 Split Trend Display”, page 135).

6.7.8.1 Adding a Trend above a Trend

Procedure

- ▶ Open the [MONITORING] function pane.
- ▶ Click on the desired trend and hold down the mouse button to drag it into the upper half of the trend area.
- ▷ The trend already being displayed is halved and a [1] appears at the top of the trend area:

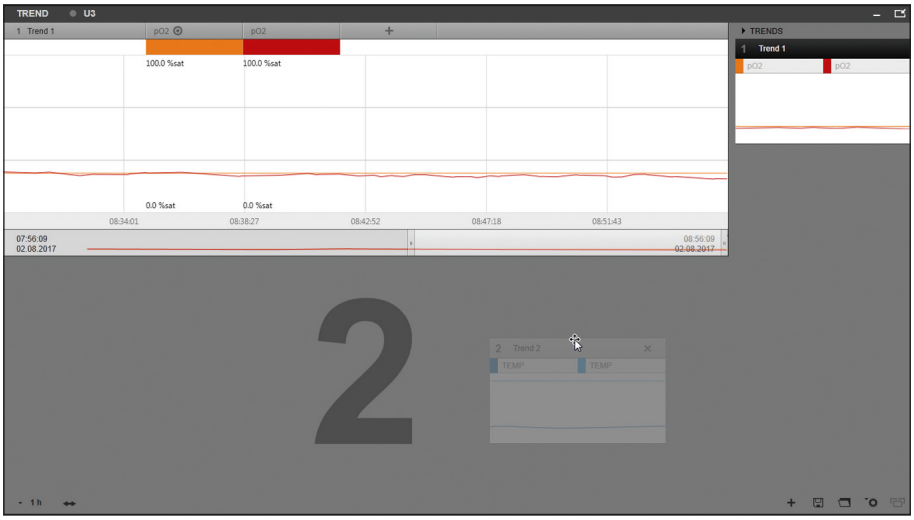
- ▶ Release the mouse button.
- ▷ Two trends are displayed in the trend graph:

- ▶ To remove the trend from the trend graph: In the header of the trend, click on the [Remove] button.

6.7.8.2 Adding a Trend below a Trend

Procedure

- ▶ Open the [MONITORING] function pane.
- ▶ Click on the desired trend and hold down the mouse button to drag it into the lower half of the trend area.
- ▷ The trend already being displayed is halved and a [2] appears at the bottom of the trend area:



- ▶ Release the mouse button.
- ▷ Two trends are displayed in the trend graph:

- ▶ To remove the trend from the trend graph: In the header of the trend, click on the [Remove] button.

6.7.9 Deleting a Trend Template

Procedure

- ▶ Open the [MONITORING] function pane.
- ▶ In the lower toolbar, click on the [Save] button.
- ▷ The [SAVE TEMPLATE] menu appears.
- ▶ Select the trend template.
- ▶ Click on the [Delete] button.
- ▶ To confirm the message “Do you really want to delete this trend template?”: Click on the [YES] button.
- ▷ The trend template is deleted.

7 ANALYSIS Function Pane

In the [ANALYSIS] function pane, you can create diagrams (charts) of the recorded process sequences (batch processes) and export and print the recorded data.

▶ Click on the [ANALYSIS] tile on the start screen.

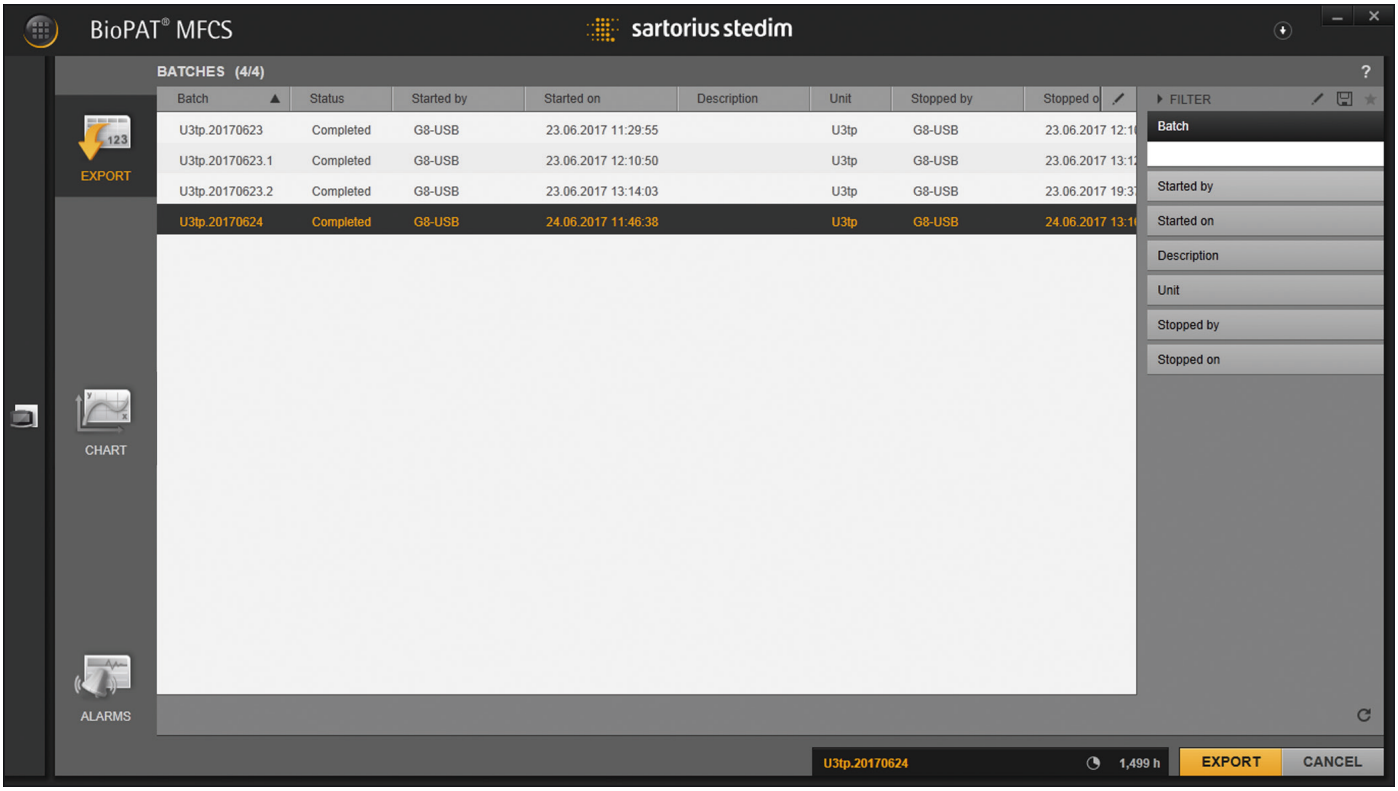


Fig. 7-1: [ANALYSIS] main menu

The following functions are available in the [ANALYSIS] function pane:

"EXPORT" Menu

- Display of saved batch processes in a list
- Filtering of batch processes based on various criteria
- Export of saved batch process data to a CSV file
- Export of selected time frames for the saved batch process data to a CSV file
- Printing of batch process data

"CHART" Menu

- Display of saved batch processes in a list
- Filtering of batch processes based on various criteria
- Display of batch processes
- Selection of the displayed control modules
- Adjustment of the display: time interval, colors of the process values, diagram (scaling auto or manual entry), marker function (symbol selection for measurement points), display of the control modules
- Simultaneous chart display (two charts/unit)

7.1 Switching between Menus

You can toggle between the [EXPORT], [CHART], and [ALARMS] menus using the button on the left edge of the screen.
- The button of the currently active menu is displayed in color ([EXPORT] in this example).
- The button of the currently inactive menu is displayed in gray tones ([CHART] and [ALARMS] in this example).

Procedure

▶ Click on the button of an inactive menu to switch to it.

7.2 Batch Process Selection List

The selection list of saved batch processes is available in the [EXPORT], [CHART], and [ALARMS] menus. Using the selection list, you can export or load all trend and alarm recordings.

7.2.1 Sorting the Selection List

You can sort the order in which the entries of the selection list are displayed according to the criteria displayed in the list header:

Field	Description
Batch	Named of the saved batch process
Status	Status of the batch process (stopped, aborted)
Started by	Name of the user who started the trend recording
Started on	Date and time: trend recording started
Description	Description that can be saved for every batch process
Unit	Name of the associated unit
Stopped by	Name of the user who stopped the trend recording
Stopped on	Date and time: trend recording stopped
Process Duration	Duration of the batch process

Procedure

▶ Click on the criterion according to which the selection list is to be sorted.

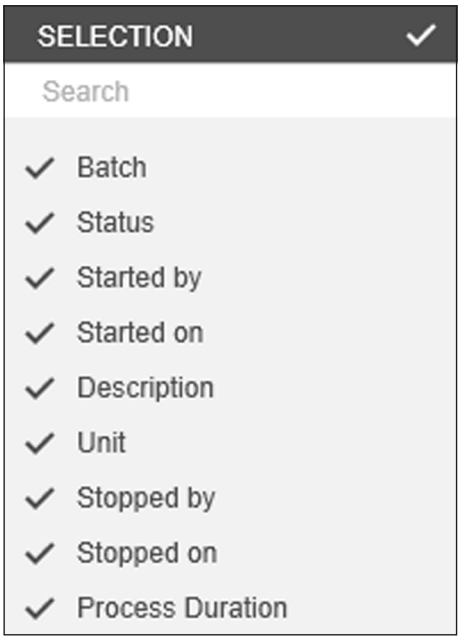
Batch ▲	Status	Started by	Started on	Description	Unit	Stopped by	Stopped o
U3tp.20170623	Completed		23.06.2017 11:29:55		U3tp		23.06.2017 12:1
U3tp.20170623.1	Completed		23.06.2017 12:10:50		U3tp		23.06.2017 13:1
U3tp.20170623.2	Completed		23.06.2017 13:14:03		U3tp		23.06.2017 19:3
U3tp.20170624	Completed		24.06.2017 11:46:38		U3tp		24.06.2017 13:1
U3tp.20170624.1	Completed		24.06.2017 14:01:39		U3tp		24.06.2017 14:0
U4pH.20170624	Completed		24.06.2017 14:01:24		U4pH		24.06.2017 14:0
U5pO.20170624	Completed		24.06.2017 14:01:32		U5pO		24.06.2017 14:0

▷ Depending on the selected criterion, the selection list is sorted alphabetically or chronologically.

▶ Click on the criterion again to reverse the order of the list.

7.2.2 Selecting or Deselecting Criteria

Procedure



▶ To select or deselect individual criteria from the header: Click on the [Edit] button.

▷ The criteria with a check mark have been selected.

▶ Click on the criterion to be selected or deselected.

7.3 Filter

Next to the selection list with the saved batch processes there is the [FILTER] selection pane on the right-hand edge of the screen. The filter function can be used to search the batch processes in a targeted manner according to the following criteria:

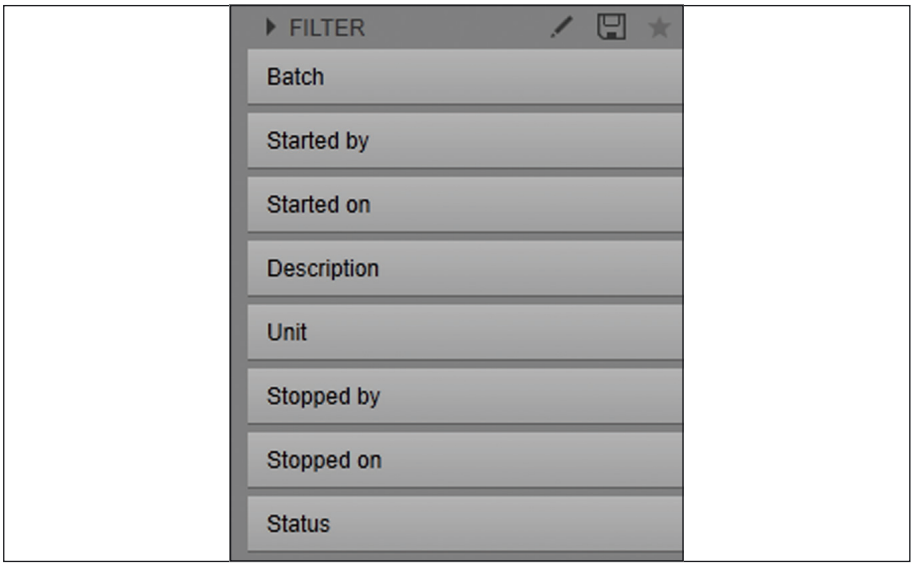
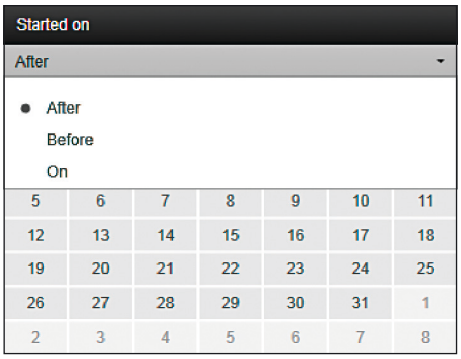


Fig. 7-2: Selection area with filter criteria

Field	Description
Batch	Filters by the name of the saved batch process.
Started by	Filters by the name of the user who started the trend recording.
Started on After Before On	Filters by date and time: trend recording started Time after the selected date Time before the selected date Selected date
Description	Filters by a description that can be saved for every batch process.
Unit	Filters by the name of the unit.
Stopped by	Filters by the name of the user who stopped the trend recording.
Stopped on – After – Before – On	Filters by date and time: trend recording stopped Time after the selected date Time before the selected date Selected date
Status – Running – Completed – Aborted	Filters by the current status of the batch process: Batch process is running. Batch process is completed. Batch process has been aborted.

7.3.1 Selecting Filters



Procedure

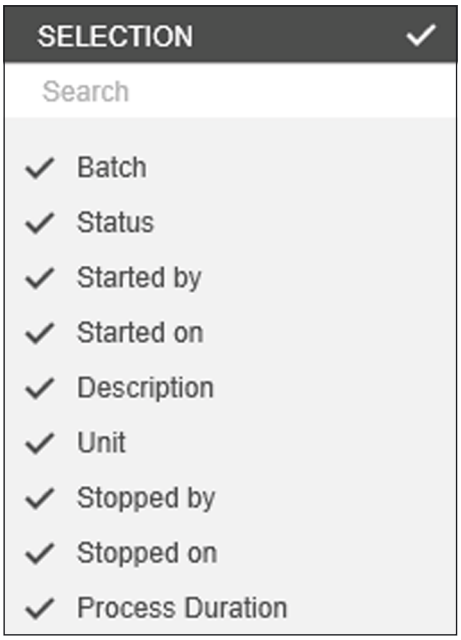
- ▶ Click on the criterion according to which the list is to be searched.
- ▶ Enter the appropriate search term.
  (For the “Started on” and “Stopped on” criteria, the desired period “After”, “Before”, “On”, and the corresponding date can be selected using the calendar function that opens.)

7.3.2 Saving Filters as Filter Templates

The criteria of the filter can be saved in filter templates.

Procedure

- ▶ To select individual criteria for the filter template: Click on the [Edit] button.

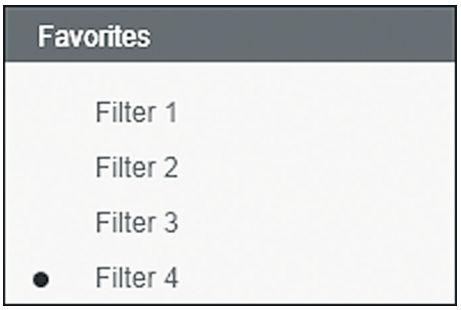


- ▷ The checked criteria appear in the list.
- ▶ Select the criteria for the filter template.
- ▶ Click on the [Save] button.
- ▷ The [SAVE FAVORITE] input window appears.
- ▶ Enter a name for the filter template.
- ▶ Click on the [SAVE] button.
- ▷ The filter template is saved.

7.3.3 Selecting and Loading a Filter Template

Procedure

▶ Click on the [Favorites] button.

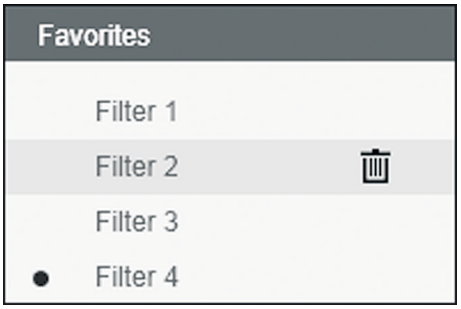


▶ Select the filter template.
▷ The criteria for the selected filter template are loaded and displayed in the list.

7.3.4 Deleting a Filter Template

Procedure

▶ Click on the [Favorites] button.



▶ Select the filter template and click on the [Delete] button.
▷ The filter template is deleted.

7.4 “EXPORT” Menu

In the [EXPORT] menu, you can export completed, aborted, and running batch processes and save the data in a CSV file.
You can choose to export data for either the complete batch process time or a selected time frame of the batch process.

7.4.1 Selecting a Batch for Export

Procedure

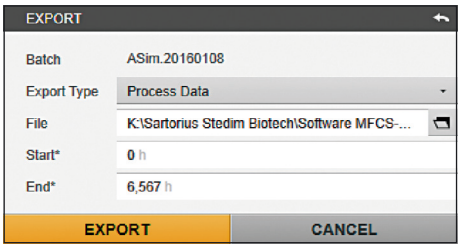
- ▶ In the [ANALYSIS] function pane, click on the [EXPORT] button.
- ▶ Click on an entry from the list of saved batch processes:
  - ▶ “Completed” status: Select a completed batch.
  - ▶ “Aborted” status: Select an aborted batch.
  - ▶ “Running” status: Select the running batch.
- ▷ The selected entry is highlighted with a black background:

Batch	Status	Started by	Started on	Description	Unit	Stopped by	Stopped on	Process Duration
B1.20150612	Completed		12.06. 11:57:14		B1		12.06. 11:58:15	0,017 h
B1.20150612.1	Completed		12.06. 12:01:25		B1		12.06. 12:07:32	0,102 h
Q1.20150612	Completed		12.06. 12:17:48		Q1		12.06. 12:22:10	0,073 h
Q1.20150612.1	Aborted		12.06. 12:24:38		Q1		12.06. 12:26:37	0,033 h
S1.20150701	Completed		01.07. 15:03:36		S1		01.07. 15:11:09	0,126 h
S1.20150703	Completed		03.07. 08:30:12		S1		03.07. 08:33:11	0,05 h
S1.20150708	Completed		08.07. 08:11:11		S1		08.07. 13:39:45	5,476 h
S1.20150708.1	Completed		08.07. 13:42:27		S1		08.07. 13:48:36	0,102 h
S1.20150708.2	Running		08.07. 13:50:56		S1			0,036 h

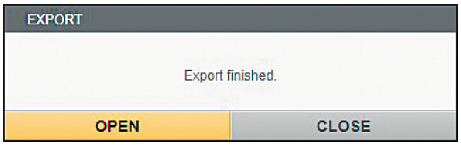
7.4.2 Exporting a Complete Batch

Procedure

- ▶ Select a batch for the export.
- ▶ Click on the [EXPORT] button.
- ▶ Click on the [File location] button, and select the file location and file name.



- ▶ In the [EXPORT] window, click on the [EXPORT] button.
- ▷ The batch process is exported as a CSV file to the selected file location.
- ▷ When the export is complete, this will be indicated in the [EXPORT] window.



- ▶ To open the CSV file directly: Click on the [OPEN] button.
- ▶ To return to the [EXPORT] menu: Click on the [CLOSE] button.

7.4.3 Exporting a Batch Process Time Frame

Start time

A value of "0 h" is specified for the start time by default. The value can be modified. The value for the start time must be smaller than the value for the

- current batch duration (running batch process).
- total batch duration (completed batch process).

End time

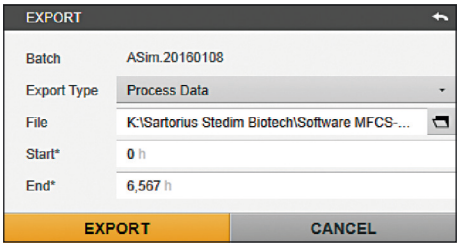
Completed and aborted batch process:
The total batch duration is specified by default. The value can be modified. The value for the end time must be smaller than the value for the total batch duration.

Running batch process:
The current batch duration at the time when the Export dialog box is opened is specified by default. The value can be modified. The value for the end time

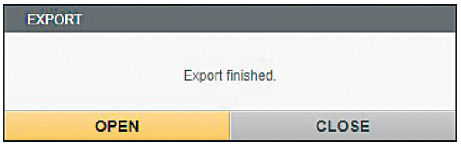
- must not be larger than the value corresponding to the time when the Export dialog box was opened.
- must be larger than the value for the defined start time.
- moves to the current batch duration if the export process is aborted and executed again.

Procedure

▶ Select a batch for the export (see Chapter 7.4.1, page 158).
▶ Click on the [EXPORT] button.



▶ To determine the start time for the batch time frame: Enter a value in the [Start*] input field.
▶ To determine the end time for the time frame: Enter a value in the [End*] input field.
▶ In the [EXPORT] window, click on the [EXPORT] button.
▷ The batch process is exported as a CSV file to the selected file location.
▷ When the export is complete, this will be indicated in the [EXPORT] window.



▶ To open the CSV file directly: Click on the [OPEN] button.
▶ To return to the [EXPORT] menu: Click on the [CLOSE] button.

7.5 [CHART] Menu

In the [CHART] main menu, you can display the trend curves for the saved batch processes with selected process values in a diagram (chart).

Fig. 7-3: Functional elements of the chart display (example)

Pos.	Description
1	Shows the list of the batch processes.
2	Selects a curve.
3	Closes the detailed view.
4	Shows the [LEGEND] toolbar.
5	Displays the chart.
6	Minimizes/maximizes the chart list.
7	Displays the chart list with charts and chart templates.
8a-d	Shows the lower toolbar:
8a	Creates a chart.
8b	Saves a chart.
8c	Selects a chart.
8d	Prints a chart.
9	Shows the scalable timeline.
10	Displays the scale of the timeline.

7.5.1 Chart

Displaying Selected Control Modules

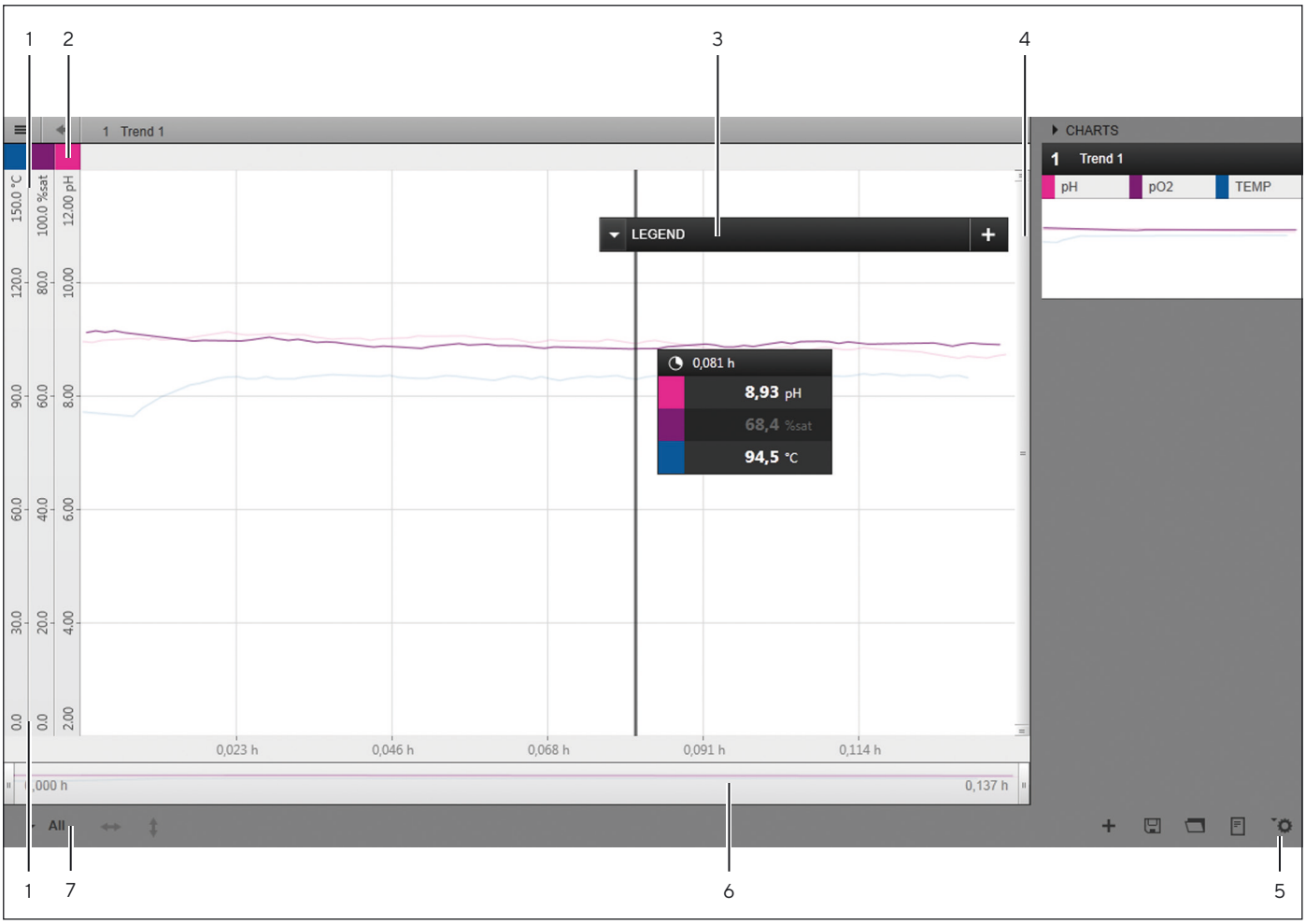


Fig. 7-4: Overview of batch process chart (example)

Pos.	Description
1	Shows the display area between the maximum and minimum process value.
2	Shows the color definition for displaying the process values.
3	Shows the toolbar.
4	Shows the scalable process value bar.
5	Activates/deactivates the tool tip, display area, and marker.
6	Scales the timeline.
7	Sets the timescale (1 h – 72 h, All).

[LEGEND] Toolbar

The control modules/variables for the chart are selected and their display is configured in the [LEGEND] toolbar. The toolbar position can be moved around freely within the chart.

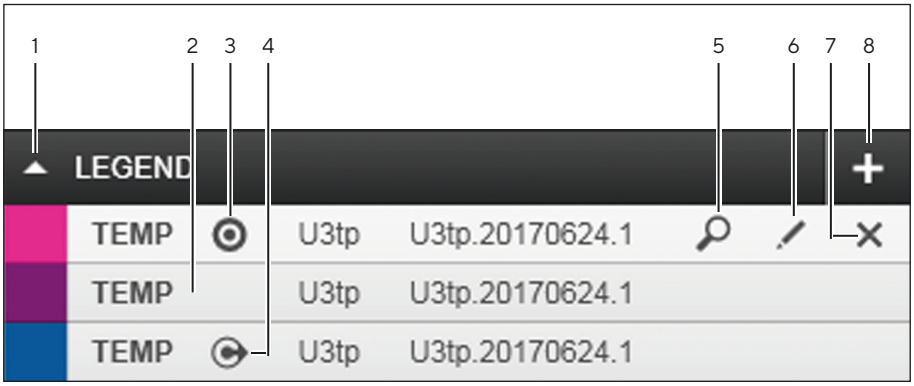


Fig. 7-5: Maximized [LEGEND] toolbar (example)

Pos.	Symbol	Description
1		Maximizes / minimizes the toolbar.
2		Displays the actual value of the controller.
3		Displays the setpoint of the controller.
4		Displays the controller output.
5		Displays the variables of the control module.
6		Displays the settings menu.
7		Deletes the variable / control module from the toolbar.
8		Selects the control module / variable for the toolbar.

[EDIT VARIABLE] Menu

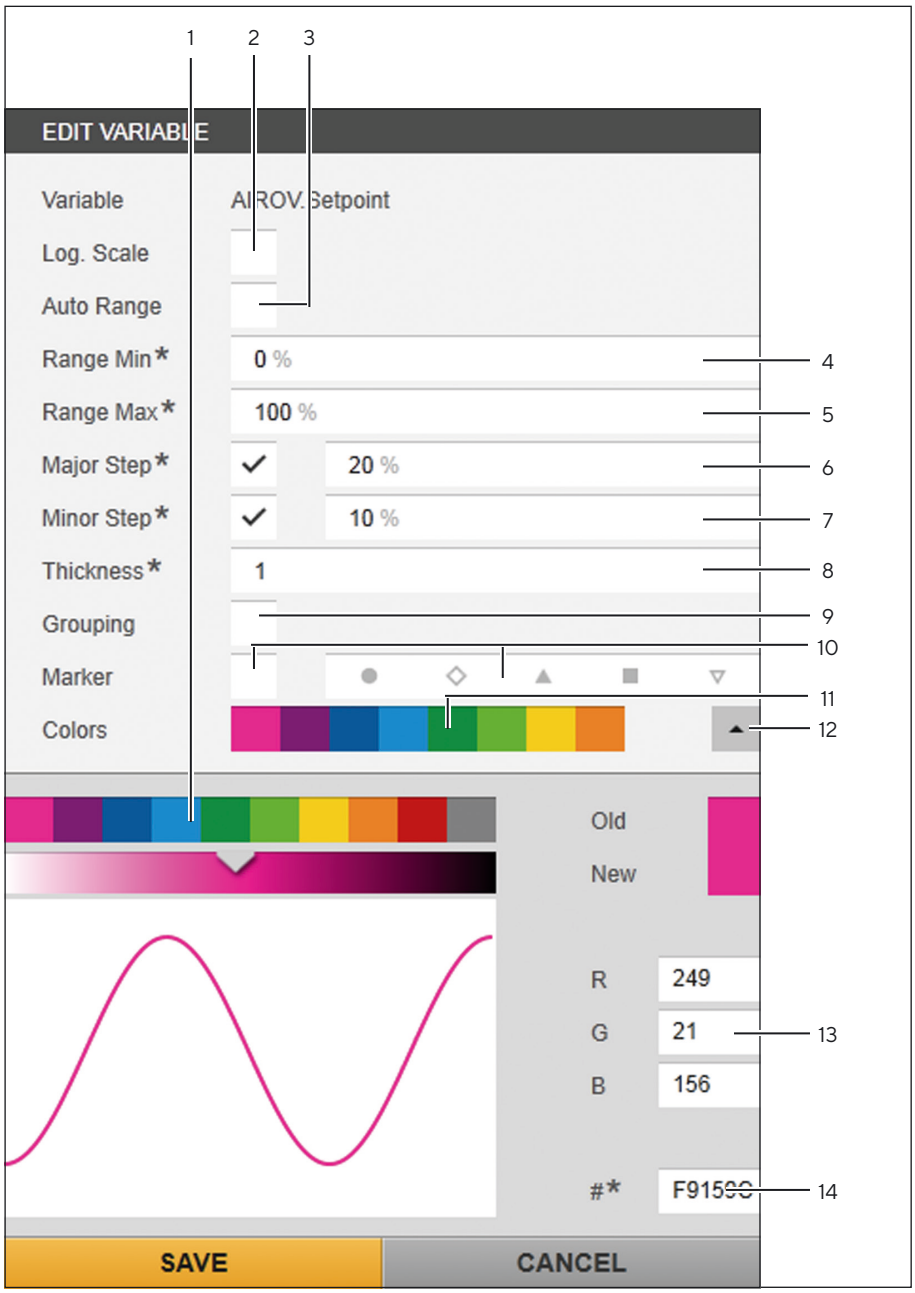


Fig. 7-6: Color profile menu, process value display range (example)

Pos.	Description
1	Sets the color based on the advanced color profile settings. When activated, the [Auto Range] function is activated.
2	Activates/deactivates logarithmic scaling.
3	Activates/deactivates the automatic setting for the display range. If deactivated, the [Range Min] and [Range Max] input fields are required information.
4	Enters the minimum value of the display range.
5	Enters the maximum value of the display range.

Pos.	Description
6	Activates/deactivates the [Major Step] function. When activated, the input field contains required information.
7	Activates/deactivates the [Minor Step] function. When activated, the input field contains required information.
8	Enters the thickness of the curve.
9	Activates/deactivates the grouping of variables for a control module.
10	Activates/deactivates the marker function (marking of measurement points with 5 different symbols).
11	Sets the color based on the palette colors.
12	Activates/deactivates the advanced color profile setting.
13	Sets the color based on the RGB color space.
14	Sets the color based on a hexadecimal color code (RGB color space).

Tool tip

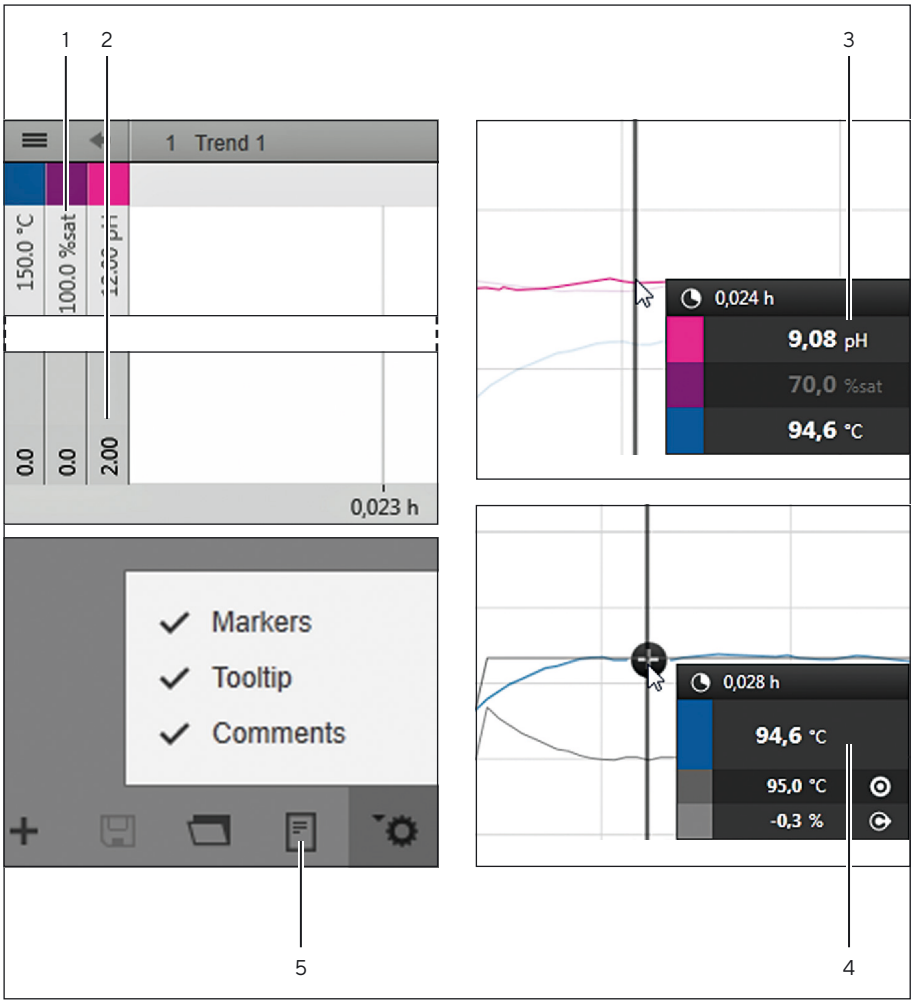


Fig. 7-7: Tool tip (example)

Pos.	Description
1	Displays the maximum value of the display range.
2	Displays the minimum value of the display range.
3	Shows the tool tip with process values at time “hh:mm:ss.”
4	Shows the actual value, setpoint, and controller output at time “hh:mm:ss” in the tool tip.
5	Activates/deactivates the tool tip, display area, and marker.

Scale of timeline

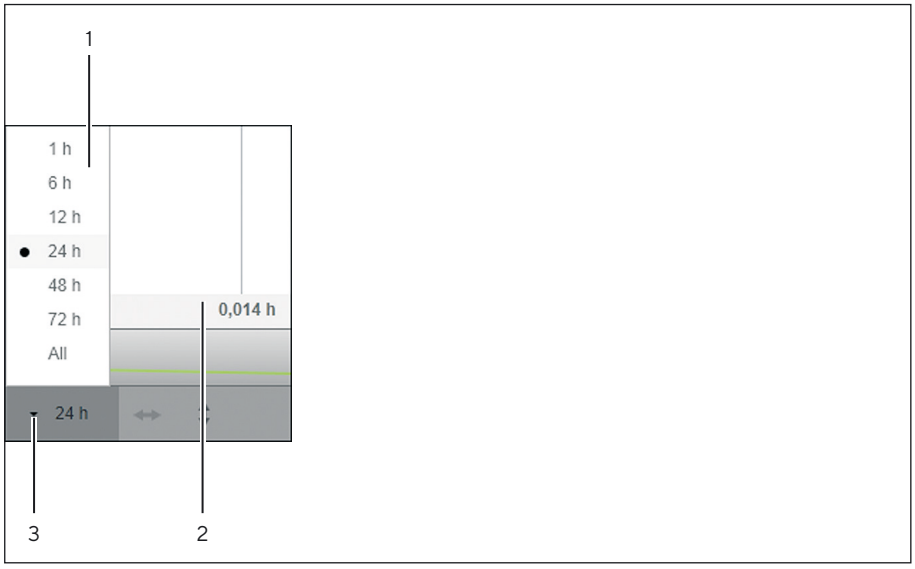


Fig. 7-8: Timescale (example)

Pos.	Description
1	Sets the timescale (1 h – 72 h, All).
2	Displays the timeline with the set timescale.
3	Shows and hides the selection menu for the timescale.

Timeline

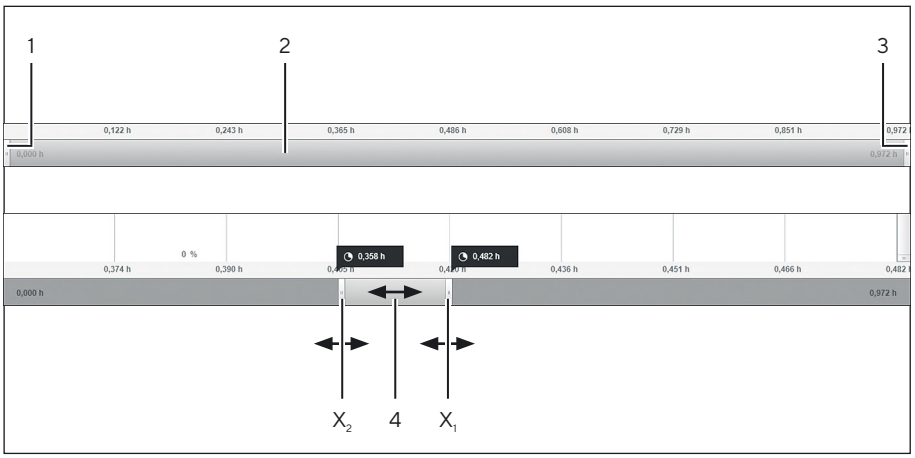


Fig. 7-9: Timeline, scalable (example)

Pos.	Description
1	Displays the start time for the selected time window (X_2).
2	Displays the maximized time window.
3	Displays the end time for the selected time window (X_1).
4	Moves the selected time window.
X_1	Moves the end time.
X_2	Moves the start time.

Process value bar

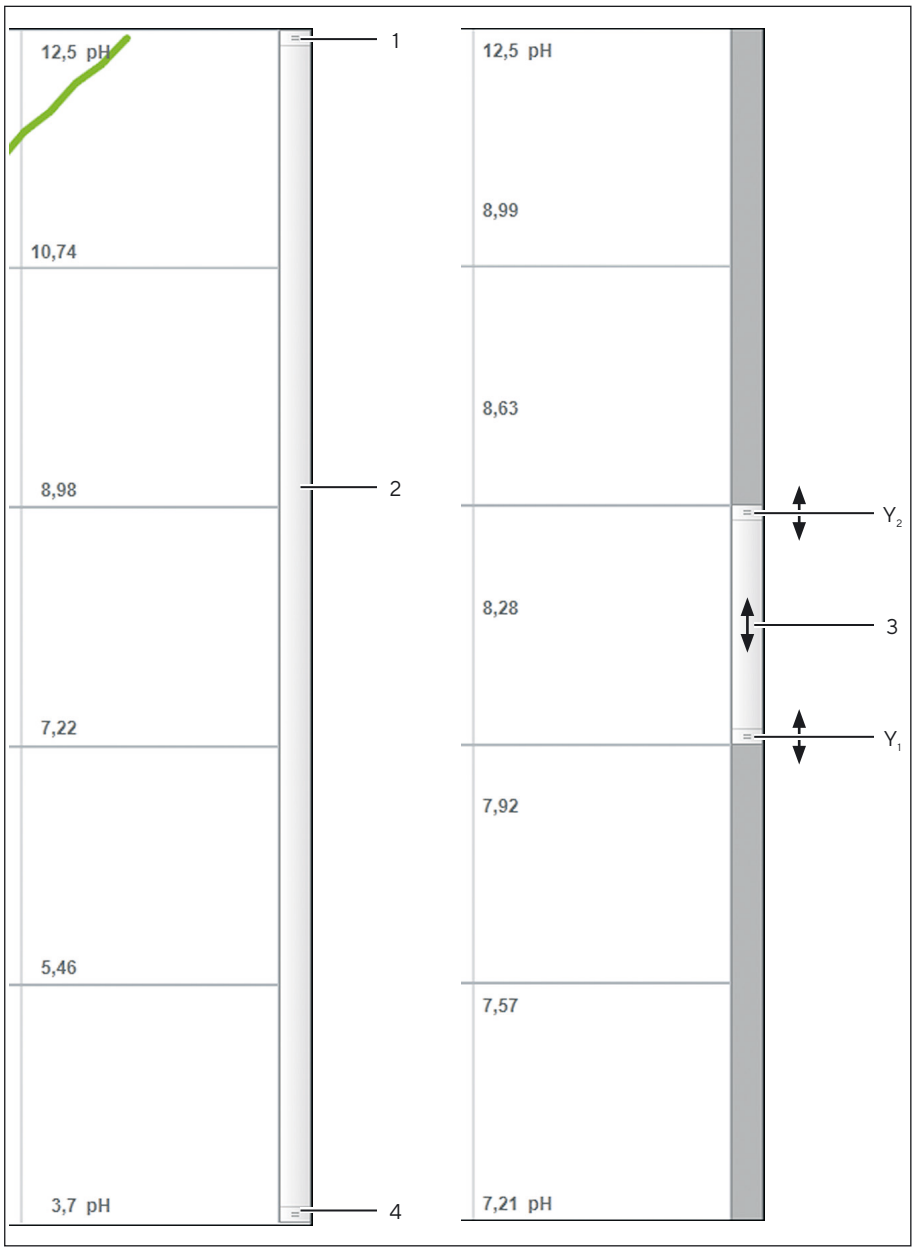


Fig. 7-10: Process value bar, scalable (example)

Pos.	Description
1	Displays the maximum process value for the control module.
2	Displays the maximized process value range.
3	Moves the process value range.
4	Displays the minimum process value for the control module.
Y_1	Moves the slider for the minimum process value.
Y_2	Moves the slider for the maximum process value.

7.5.2 Variables Selection Menu

Up to 12 variables of control modules can be selected in the menu.

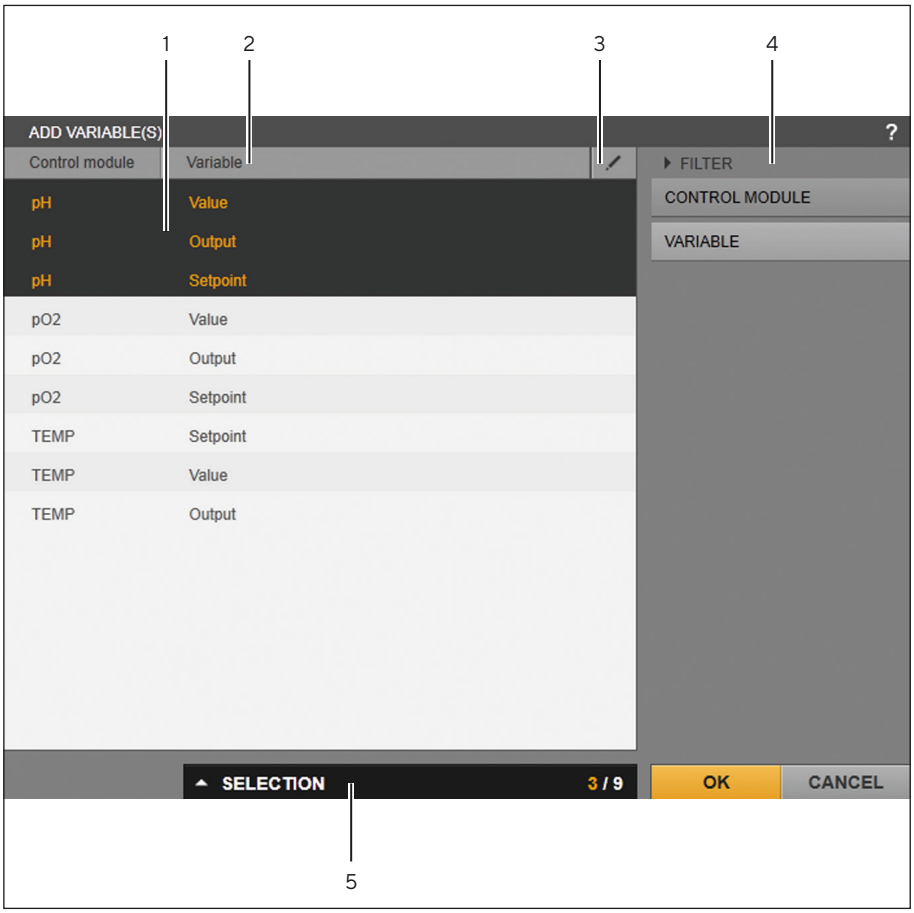


Fig. 7-11: Functional elements of the selection menu for process values (example)

Pos.	Description
1	Displays the selected variables.
2	Displays the name and type of control module variable.
3	Shows the selection menu for the search criteria.
4	Filters the selection list by name and control module.
5	Displays the number of selected control modules. A maximum of 12 control modules can be selected.

Variables of a Control Module

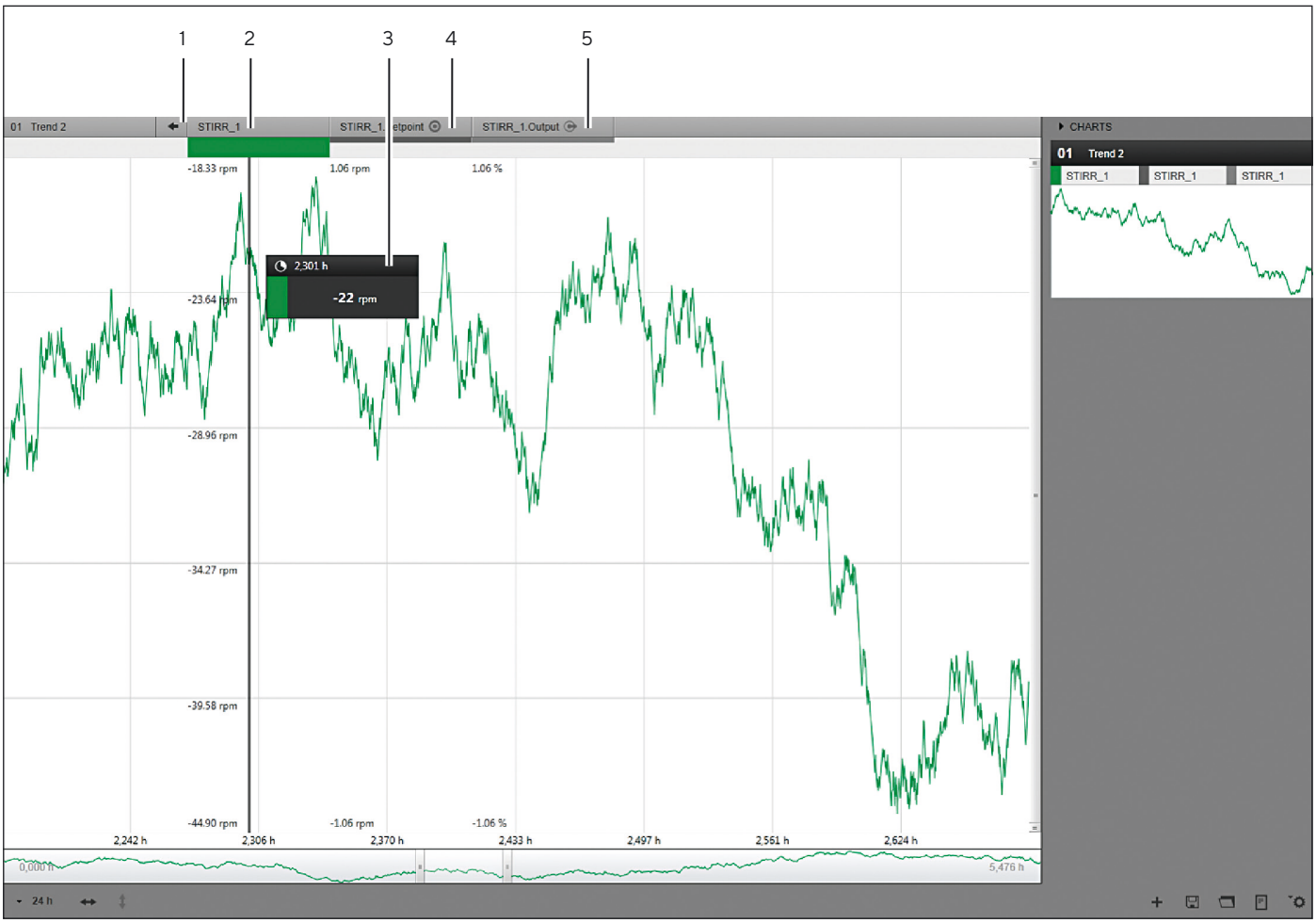


Fig. 7-12: Chart with variables of the control module ("STIRR" in this example)

Pos.	Symbol	Description
1		Hides the variables of a control module and shows all selected control modules.
2		Displays the actual value of the controller.
3		Displays the tool tip with detailed process values.
4		Displays the setpoint of the controller.
5		Displays the controller output.

7.5.3 Chart Template Management Menu

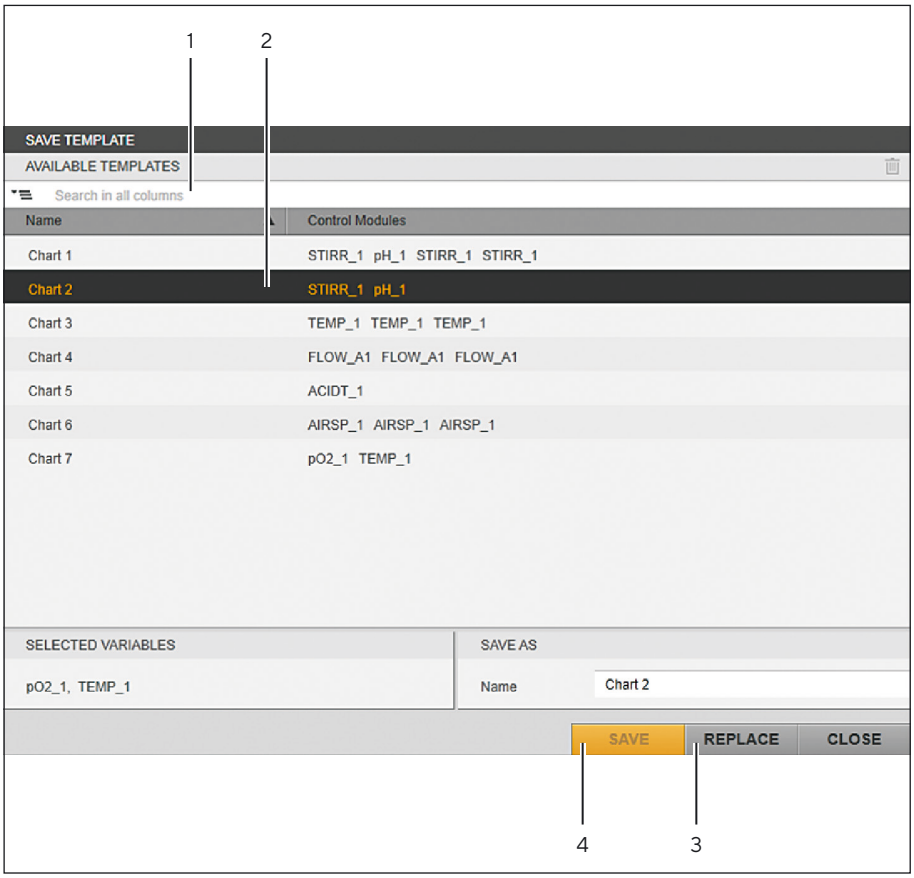


Fig. 7-13: Chart template management menu (example)

Pos.	Symbol	Description
1		Enters the name of the chart template and filters the template list.
2		Displays the saved chart templates.
		Deletes the selected chart templates.
3		Replaces the highlighted chart template control modules with control modules from the active chart.
4		Saves the chart as a chart template.

7.5.4 Chart Template Selection Menu

Fig. 7-14: Unit/chart template selection menu (example)

Pos.	Description
1	Displays the chart template selection list.
2	Enters the name of the chart template and filters the template list.
3	Displays the saved chart templates.
4	Selects control modules for the chart template.
5	Selects all control modules for the chart template.
6	Deselects the control modules.

7.5.5 Print Selection Menu

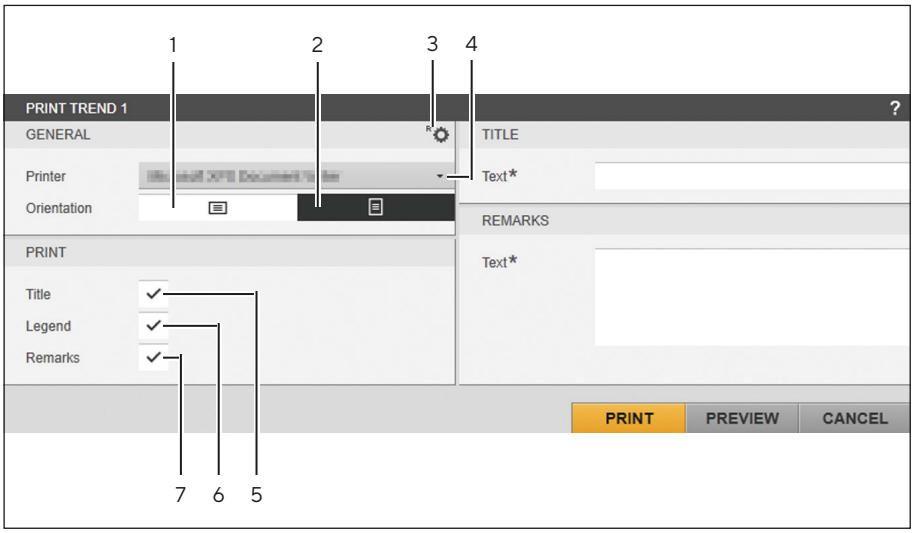


Fig. 7-15: [PRINT TREND #] Menu

Pos.	Description
1	Selects the “Landscape” orientation.
2	Selects the “Portrait” orientation.
3	Shows the [Print] window.
4	Selects the printer.
5	Activates/deactivates the [TITLE] function. When activated, the [Text*] input field contains required information.
6	Activates/deactivates the [Legend] function.
7	Activates/deactivates the “Remarks” function. When activated, the “Text*” input field contains required information.

7.5.6 Configuring Charts

The recorded batch processes can be displayed using charts. In the charts, the process values are selected. For the chart, only those control modules can be selected which were configured at the time of recording the batch process for the unit (see Chapter “5.2 Unit Management”, page 48).

Viewing the Batch Process List

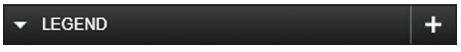
Procedure

▶ If the list with the batch processes is **not** displayed in the [ANALYSIS] function pane: Click on the [CHART] button.
▷ The list with all batch processes appears. The following tasks can be carried out for configuring the charts.

Task for Configuring the Charts	Chapter, Page
Maximize/minimize the “LEGEND” toolbar	7.5.6.1, 173
Open chart with selected batch processes	7.5.6.2, 174
Select control module	7.5.6.3, 174
Modify color profile and display range	7.5.6.4, 175
Mark measurement points within the curve	7.5.6.5, 175
Display variables of a control module	7.5.6.6, 176
Save chart as chart template	7.5.6.7, 176
Select and load chart template	7.5.6.8, 177
Change selection of process values for chart template	7.5.6.9, 177
Select detailed display in chart	7.5.6.10, 178
Delete chart template	7.5.6.11, 179
Print chart	7.5.6.12, 179

7.5.6.1 Maximizing/Minimizing the [LEGEND] Toolbar

Procedure



▶ To maximize the toolbar: Click on the [Expand] button.

▶ To minimize the toolbar: Click on the [Collapse] button.

7.5.6.2 Opening a Chart with Selected Batch Processes

Up to six batch processes can be selected simultaneously in order to compare the curves.

Procedure

- ▶ Select a batch process for the chart:
  - ▶ To select a batch process: Click on an entry from the list of saved batch processes.
  - ▷ The selected entry is highlighted with a black background.
  - ▶ To select more than one batch process: Click on the entries in the list of saved batch processes one after the other.
  - ▷ The selected entries are highlighted with a black background:

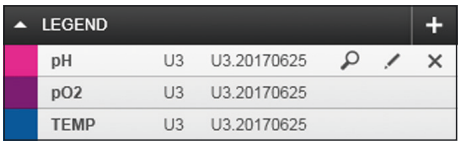
Batch	Status	Started by	Started on	Description	Unit	Stopped by	Stopped o
U3tp.20170623	Completed		23.06.2017 11:29:55		U3tp		23.06.2017 12:1
U3tp.20170623.1	Completed		23.06.2017 12:10:50		U3tp		23.06.2017 13:1
U3tp.20170623.2	Completed		23.06.2017 13:14:03		U3tp		23.06.2017 19:3
U3tp.20170624	Completed		24.06.2017 11:46:38		U3tp		24.06.2017 13:1
U3tp.20170624.1	Completed		24.06.2017 14:01:39		U3tp		24.06.2017 14:0
U4pH.20170624	Completed		24.06.2017 14:01:24		U4pH		24.06.2017 14:0
U5pO.20170624	Completed		24.06.2017 14:01:32		U5pO		24.06.2017 14:0

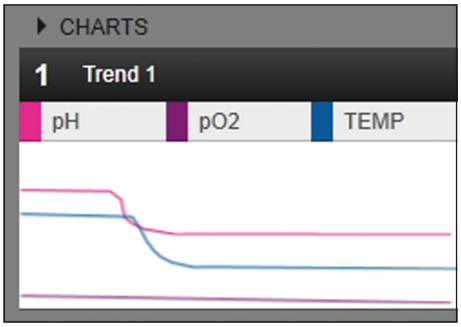
- ▶ Click on the [CHART] button.
- ▷ The chart menu appears.

7.5.6.3 Selecting Control Modules

Procedure

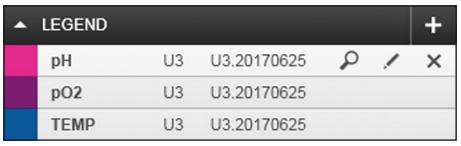
- ▶ In the [LEGEND] toolbar, click on the [Add] button.
- ▷ The [ADD VARIABLE(S)] selection menu appears.
- ▶ Select the control modules.
- ▶ Click on the [OK] button.
- ▷ The selected control modules are entered in the [LEGEND] toolbar.





- ▷ The new chart with the selected control modules appears in the chart list. The chart is active and the header of the active chart is highlighted in dark gray.
- ▶ To add more control modules: Click on the [Add] button. (A maximum of six control modules can be selected.)
- ▶ To change the color profile and display range, see Chapter 7.5.6.4, page 175.
- ▶ To save the chart as a chart template, see Chapter 7.5.6.7, page 176.
- ▶ To select a chart template for other batch processes, see Chapter 7.5.6.8, page 177.

7.5.6.4 Changing the Color, Line Thickness, and Display Range



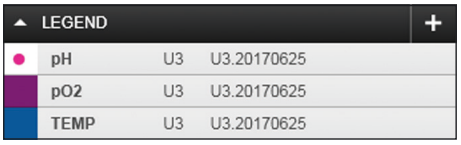
Procedure

- ▶ In the opened [LEGEND] toolbar, select the desired entry and click on the [Edit] button.
- ▶ Change the color profile, the line thickness of the curves, and the settings for the display range.
- ▶ Click on the [SAVE] button.

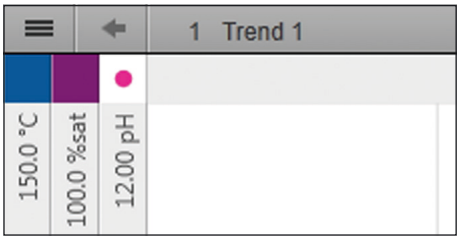
7.5.6.5 Marking Measurement Points within the Curve

Procedure

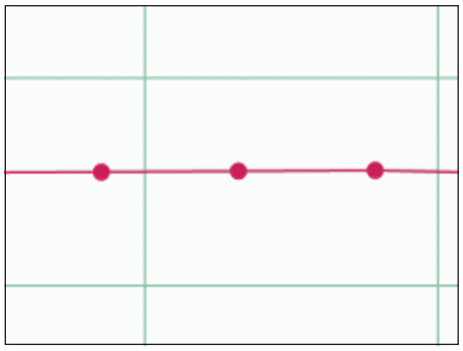
- ▶ In the opened [LEGEND] toolbar, select the desired entry and click on the [Edit] button.
- ▶ Put a check mark in the input field next to the [Marker] entry.
- ▶ Select a symbol for marking the measurement point.
- ▶ Click on the [SAVE] button.



- ▷ In the opened toolbar and in the chart, the symbol for the control module is displayed next to the entry.



- ▷ In the chart, the symbol for the control module is displayed in the title bar.

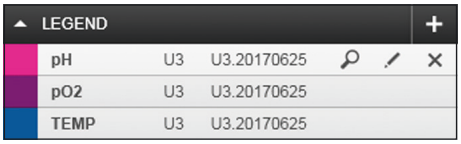


- ▷ The measurement points of the curve are highlighted.

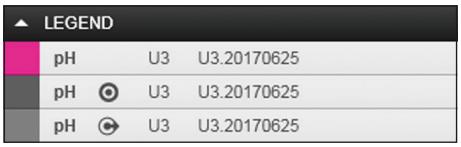
7.5.6.6 Displaying Variables of a Control Module

The actual value, setpoint, and controller output for a control module can be displayed in the chart.

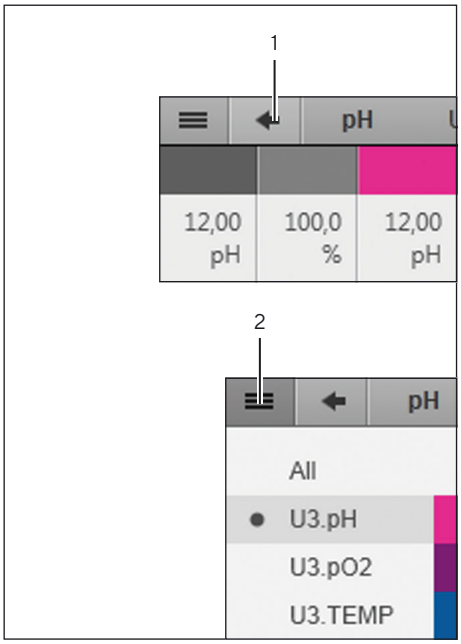
Procedure



▶ Select the control module in the [LEGEND] toolbar and click on the [Details] button.



▷ The variables of the control module are listed in the toolbar.
▷ The curves of the variables are displayed in the chart.



▶ To exit the detailed view of the variables:
▶ In the title bar, click on the (1) button.
or
▶ In the title bar, click on the (2) button and select [All].

▷ In the [LEGEND] toolbar, all control modules are listed and the curves in the chart for all control modules are displayed.

7.5.6.7 Saving a Chart as a Chart Template

The trend and chart templates are saved in the same folder.

Procedure

▶ In the lower toolbar, click on the [Save] button.
▷ The [SAVE TEMPLATE] menu appears.
▶ Enter a name.
▶ Click on the [SAVE] button.
▷ The chart is saved as a chart template.

7.5.6.8 Selecting and Loading a Chart Template

Procedure

- ▶ In the lower toolbar, click on the [File location] button.
- ▷ The [LOAD TEMPLATE (1/2)] menu appears.
- ▶ In the [SELECT TEMPLATE] submenu, click on the chart template entry you want to load.
- ▶ Click on the [NEXT] button.
- ▷ The [SELECT VARIABLES (#/6)] submenu appears.
- ▶ Select the control modules for the current display.
- ▶ Click on the [OK] button.
- ▷ The chart template appears in the chart list. The chart is active and the header of the active chart is highlighted in dark gray.

7.5.6.9 Changing the Selection of the Control Module Variables

Control module variables can be added to and removed from the chart and chart template.

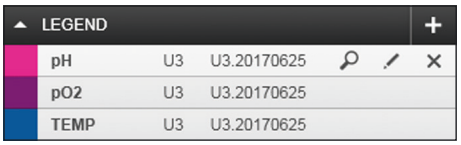
Procedure

- ▶ Load the chart to be changed (see Chapter 7.5.6.8, page 177).
- ▷ The chart is active and the header of the active chart is highlighted in dark gray.

Adding Control Module Variables

- ▶ To add a control module variable, see Chapter 7.5.6.3, page 174.

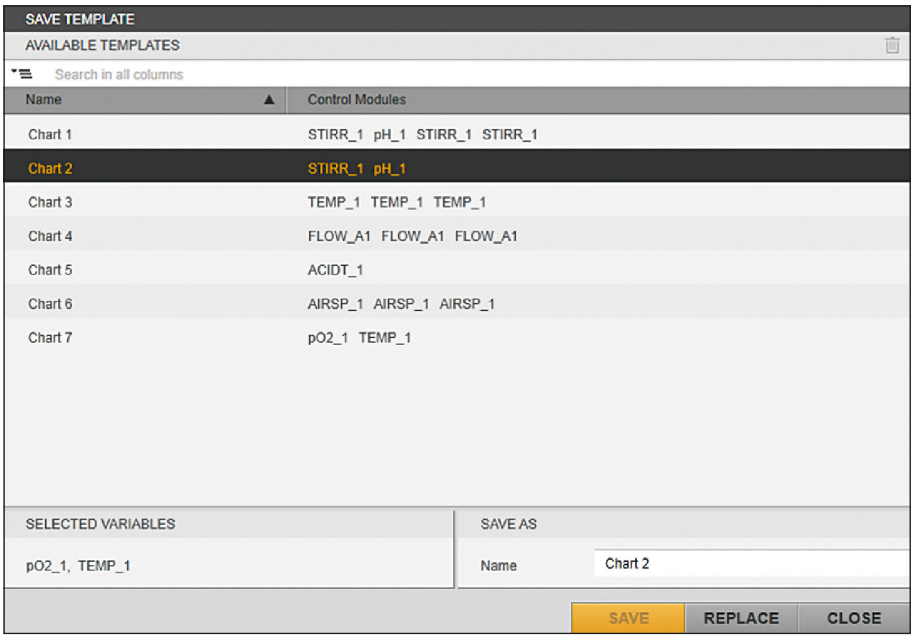
Removing Control Module Variables



- ▶ Select the control module variable and click on the [Remove] button.
- ▶ The control module variable is removed from the toolbar.

Saving the Settings

▶ In the lower toolbar, click on the [Save] button.
▷ The [SAVE TEMPLATE] menu appears and the chart template is highlighted:

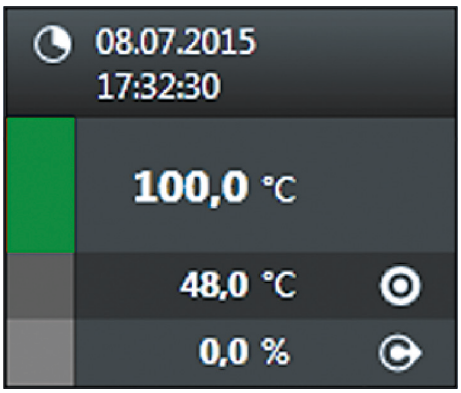


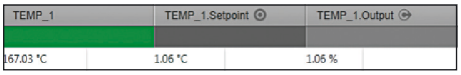
▶ Click on the [REPLACE] button.
▷ The chart template is saved with the new settings.

7.5.6.10 Selecting a Detailed Display in the Chart

Procedure

▶ Click on a point in the curve for the desired control module.
▷ The setpoint and controller output are also displayed in the tool tip.





▷ The title bar is extended to include the setpoint and “Output” value entries.
▷ The other control modules are hidden.

7.5.6.11 Deleting a Chart Template

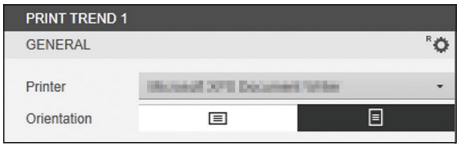
Procedure

- ▶ In the lower toolbar, click on the [Save] button.
- ▷ The [SAVE TEMPLATE] menu appears.
- ▶ Click on the chart template to be deleted.
- ▶ Click on the [Delete] button.
- ▷ The confirmation window appears.
- ▶ Click on the [YES] button.
- ▷ The chart template is deleted.

7.5.6.12 Printing a Chart

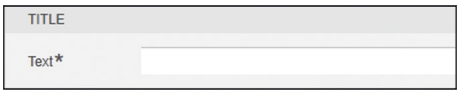
Procedure

- ▶ In the lower toolbar, click on the [Print] button.
- ▷ The [PRINT TREND #] menu appears.
- ▶ Select the printer from the list.



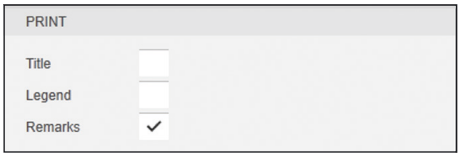
- ▶ Select the [Landscape] or [Portrait] orientation.
- ▶ To change the printer settings: Click on the [Printer settings] button.

- ▶ To enter a title for the chart:
  - ▶ Activate the [Title] function.



- ▶ Enter the title in the input field under [TITLE].

- ▶ To print the chart with the element of the [LEGEND] toolbar:
  - ▶ Activate the [Legend] function.



▶ To enter a remark for the chart:
  ▶ Activate the [Remarks] function.

  ▶ Enter the remark in the input field under [REMARKS].

▶ Print the chart:
  ▶ To print the chart directly: Click on the [PRINT] button.
  ▷ The chart is printed.

  ▶ To view the chart in a print preview: Click on the [PREVIEW] button.
  ▷ The print preview of the chart is displayed.
  ▶ To print the chart from the print preview: In the print preview, click on the [Print] button.
  ▷ The chart is printed.

7.6 [ALARMS] Menu

The [ALARMS] main menu shows the alarm sequence for the saved batch processes in an alarm list. Any number of batch processes for which alarms have been triggered can be selected in the alarm list. The alarm data can be printed.

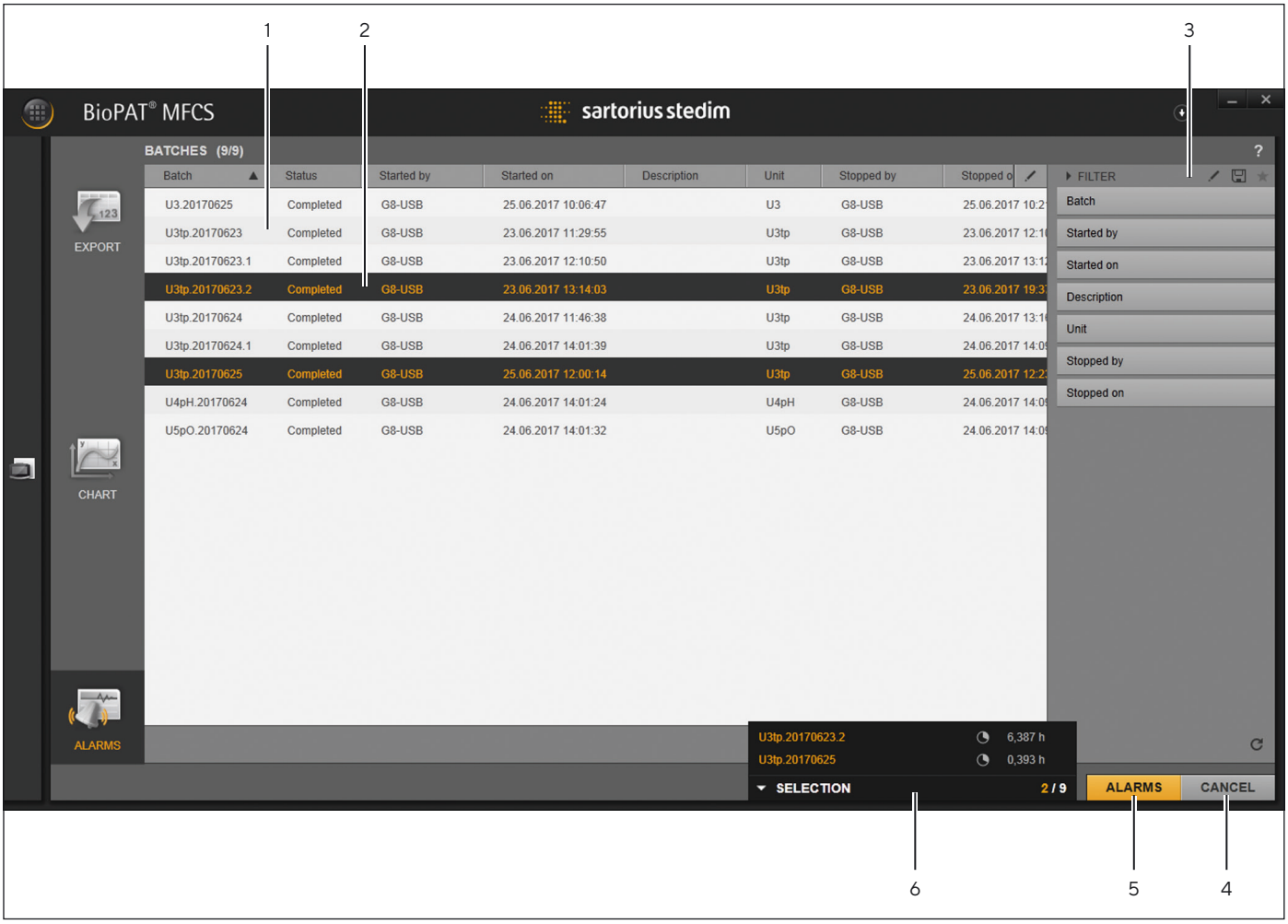


Fig. 7-16: Functional elements of the chart display

Pos.	Description
1	Displays a list of the batch processes.
2	Displays the selected batch process for the alarm list.
3	Filters the list by – Name, – Users who started and stopped the batch process, – Start and stop time, – Description, – Unit, – Status: – Batch process is completed. – Batch process has been aborted.
4	Cancels the selection.
5	Shows the alarm list for the selected batch process.
6	Displays the name of the selected batch processes.

Alarm list

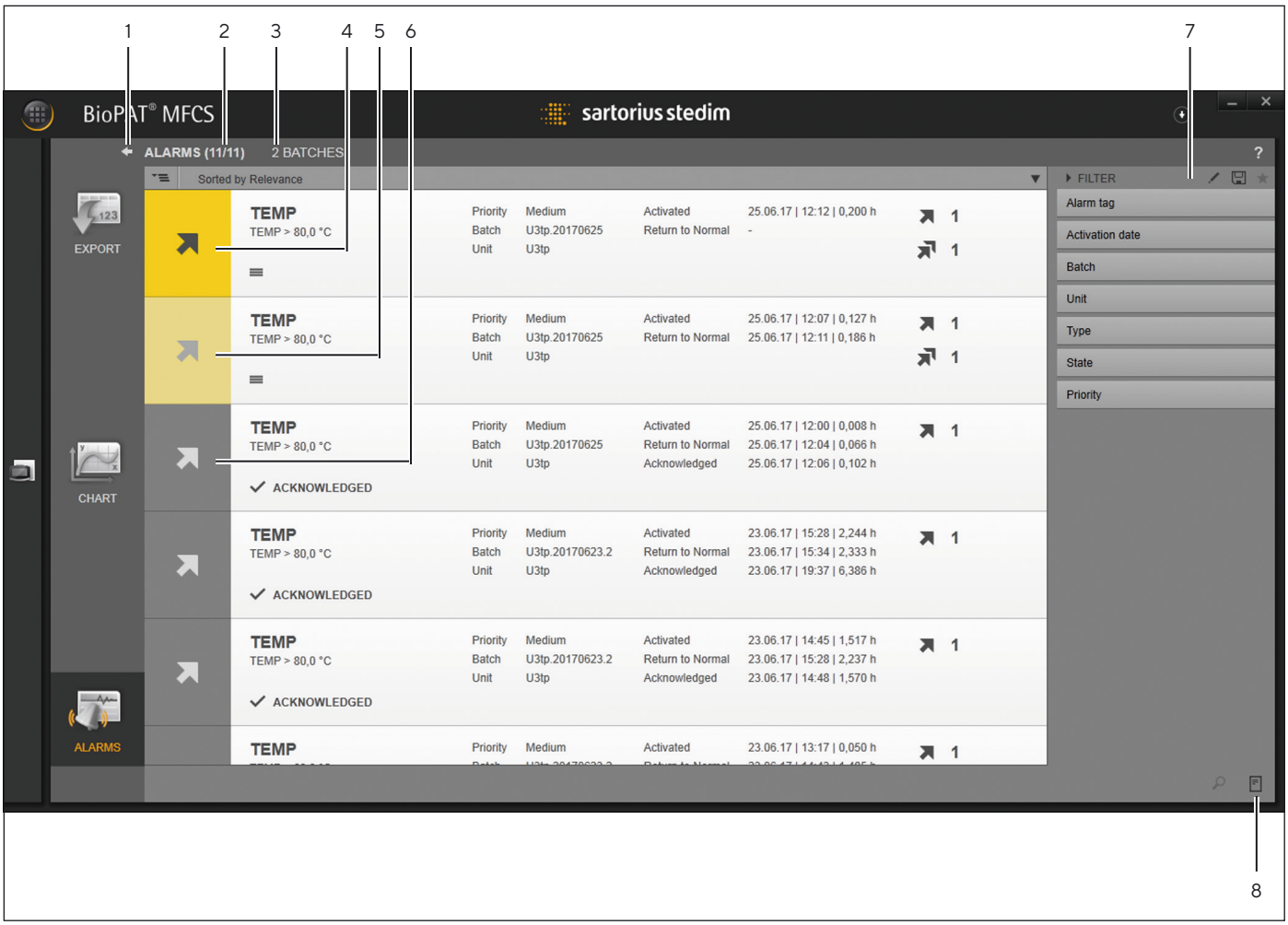


Fig. 7-17: Alarm list (example with acknowledged and unacknowledged alarms)

Pos.	Description
1	Shows the list of the batch processes.
2	Shows the number of triggered alarms.
3	Shows the number of batch processes.
4	Indicates an alarm that was **not** acknowledged before the end of the batch process (example: process value is **not** in the normal range).
5	Indicates an alarm that was **not** acknowledged before the end of the batch process (example: process value is in the normal range).
6	Indicates an alarm that was acknowledged before the end of the batch process (example: process value is in the normal range).
7	Filters the alarm list.
8	Prints the alarm data for the selected batch process.

7.6.1 Alarm List Filter

The filter function can be used to search the alarms in a targeted manner according to criteria.

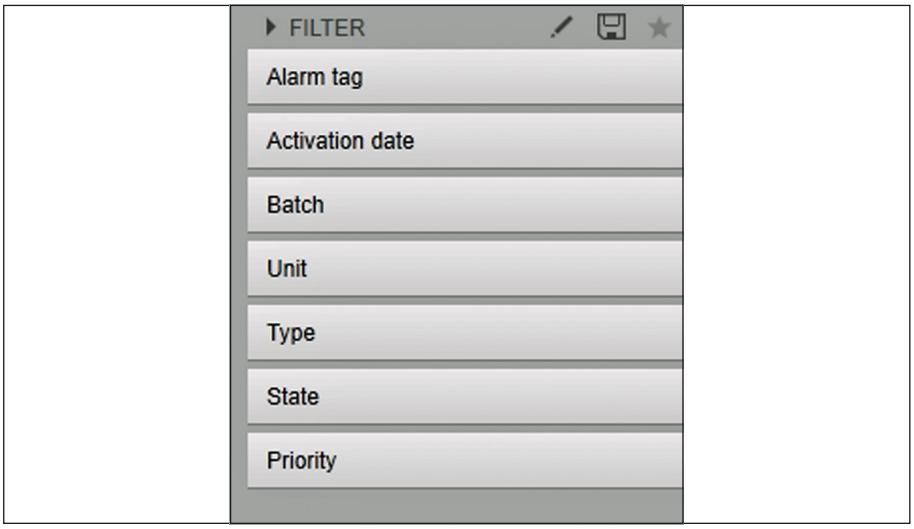
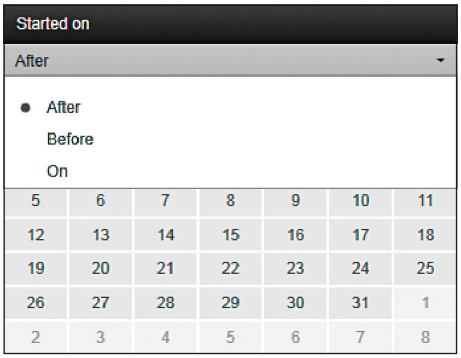


Fig. 7-18: Filter with search criteria

Field	Description
Alarm tag	Enter the name of the control module.
Activation date	Enter the date on which the alarm was triggered.
Batch	Enter the name of the batch process.
Unit	Enter the short name of the unit.
Type	Select the type of alarm:
High High	Value above the [High High] alarm limit
High	Value above the [High] alarm limit
Low	Value below the [Low] alarm limit
Low Low	Value below the [Low Low] alarm limit
Connection Break	Communication with the device is interrupted for an extended period of time
Connection Issue	Communication with the device is interrupted temporarily
State	Select the status after the batch process has ended:
Unacknowledged	Unacknowledged alarm
Acknowledged	Acknowledged alarm
Shelved	Suppressed alarm
Out of Service	Control module disconnected from the alarm function
Priority	Select the alarm priority:
High	High
Medium	Medium
Low	Low

Filtering the Alarm List

Procedure



- ▶ Click on the criterion according to which the list is to be searched.
- ▶ Enter the appropriate search term or select the desired criterion. (For the [Activation date] criterion, the desired period [After], [Before], [On] and the corresponding date can be selected using the calendar function that opens.)

7.6.2 Managing Alarm Data

Viewing the Batch Process List

Procedure

- ▶ If the list with the batch processes is **not** displayed in the [ANALYSIS] function pane: Click on the [ALARMS] button.
- ▷ The list with all batch processes appears. The following tasks can be carried out for managing the alarm data.

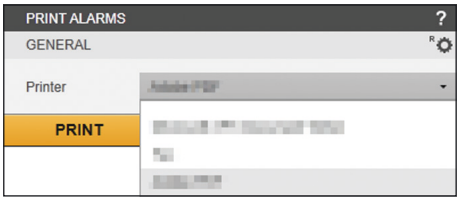
Tasks for Managing Alarm Data	Chapter, Page
Select batch processes in the alarm list	7.6.2.1, 184
Print alarm list	7.6.2.2, 185

7.6.2.1 Selecting Batch Processes in the Alarm List

Procedure

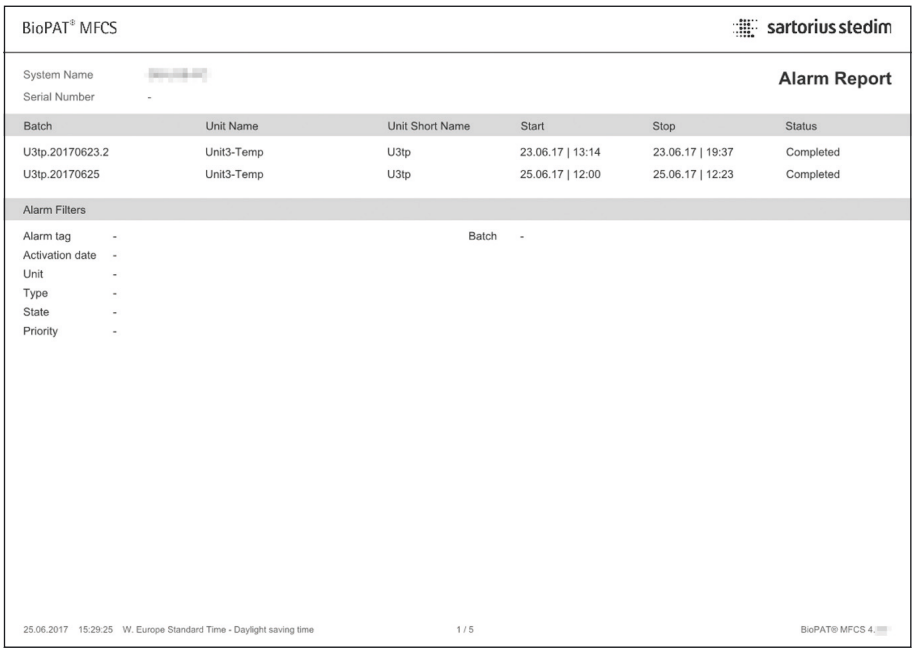
- ▶ Select the batch processes for the alarm list.
- ▶ Click on the [ALARMS] button.
- ▷ The alarm list is displayed with the selected batch processes.

7.6.2.2 Printing the Alarm List



Procedure

- ▶ In the lower toolbar, click on the [Print] button.
- ▷ The [PRINT ALARMS] menu appears.
- ▶ Select the desired printer from the list.
- ▷ The printer is displayed.
- ▶ Configure the settings for the page layout.
- ▶ To modify the printer settings: Click on the [Printer settings] button.
- ▶ Click on the [PRINT] button.
- ▷ The alarm list is printed.


BioPAT® MFCS — sartorius stedim

System Name
Serial Number -

Alarm Report

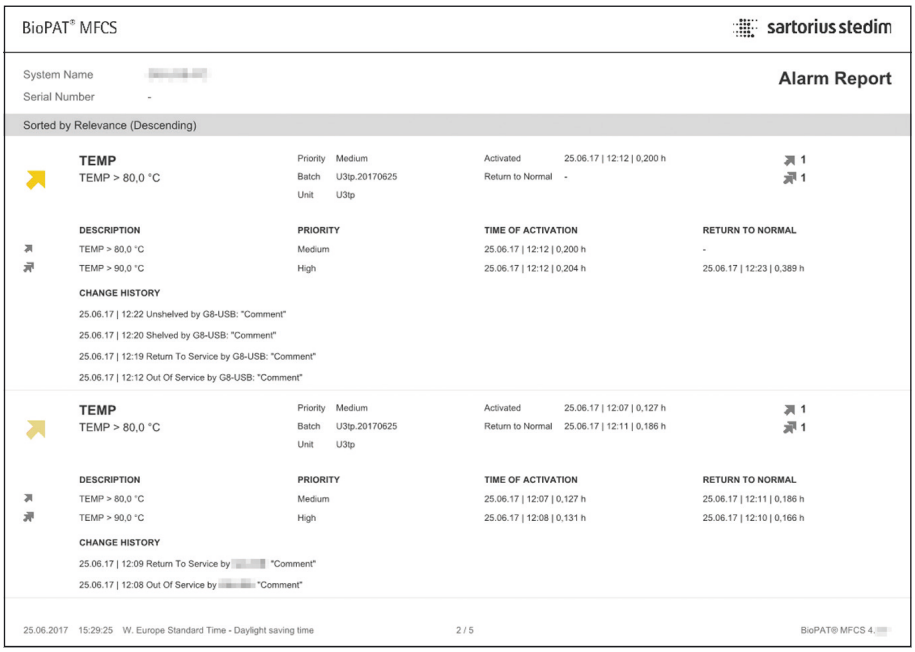
Batch	Unit Name	Unit Short Name	Start	Stop	Status
U3tp.20170623.2	Unit3-Temp	U3tp	23.06.17 | 13:14	23.06.17 | 19:37	Completed
U3tp.20170625	Unit3-Temp	U3tp	25.06.17 | 12:00	25.06.17 | 12:23	Completed

Alarm Filters

Alarm tag -
Activation date -
Unit -
Type -
State -
Priority -
Batch -

25.06.2017 15:29:25 W. Europe Standard Time - Daylight saving time 1 / 5 BioPAT® MFCS 4.

Fig. 7-19: Print-out of the first page of an alarm list (example)


BioPAT® MFCS — sartorius stedim

System Name
Serial Number -

Alarm Report

Sorted by Relevance (Descending)

TEMP
TEMP > 80,0 °C
Priority Medium
Batch U3tp.20170625
Unit U3tp
Activated 25.06.17 | 12:12 | 0,200 h
Return to Normal -
1
1

DESCRIPTION	PRIORITY	TIME OF ACTIVATION	RETURN TO NORMAL
TEMP > 80,0 °C	Medium	25.06.17 | 12:12 | 0,200 h	-
TEMP > 90,0 °C	High	25.06.17 | 12:12 | 0,204 h	25.06.17 | 12:23 | 0,389 h

CHANGE HISTORY
25.06.17 | 12:22 Unshelved by G8-USB: "Comment"
25.06.17 | 12:20 Shelved by G8-USB: "Comment"
25.06.17 | 12:19 Return To Service by G8-USB: "Comment"
25.06.17 | 12:12 Out Of Service by G8-USB: "Comment"

TEMP
TEMP > 80,0 °C
Priority Medium
Batch U3tp.20170625
Unit U3tp
Activated 25.06.17 | 12:07 | 0,127 h
Return to Normal 25.06.17 | 12:11 | 0,186 h
1
1

DESCRIPTION	PRIORITY	TIME OF ACTIVATION	RETURN TO NORMAL
TEMP > 80,0 °C	Medium	25.06.17 | 12:07 | 0,127 h	25.06.17 | 12:11 | 0,186 h
TEMP > 90,0 °C	High	25.06.17 | 12:08 | 0,131 h	25.06.17 | 12:10 | 0,166 h

CHANGE HISTORY
25.06.17 | 12:09 Return To Service by "Comment"
25.06.17 | 12:08 Out Of Service by "Comment"

25.06.2017 15:29:25 W. Europe Standard Time - Daylight saving time 2 / 5 BioPAT® MFCS 4.

Fig. 7-20: Print-out of the second page of an alarm list (example)

8 Error Messages

The following chapters list the causes and corrective measures to be carried out in the event of error messages that might occur with one of the hardware and software configurations described in Chapter 2.5.2, page 12 and Chapter 3.1.1, page 16. If the hardware equipment and software installation/configuration deviate from this, error messages may occur that are not listed in the following chapters.

Different types of error messages are displayed in the program:

Types of Error Message	Chapter, page
Error message in the event of incorrect user entries	8.1, 186
Error message after interrupted communication between the device and the MFCS system	8.2.1, 189
Error message due to incorrect default settings of the operating system	8.2.2, 191

8.1 Error Message in the Event of Incorrect User Entries

In the event of an incorrect user entry, the input area is highlighted in red and an error message is displayed in the lower part of the input window. The contents of the error message indicate the error. After the incorrect entry has been corrected, the error message disappears.

This kind of error message is not dealt with here because the user can correct these input errors directly with the help of the accompanying information.

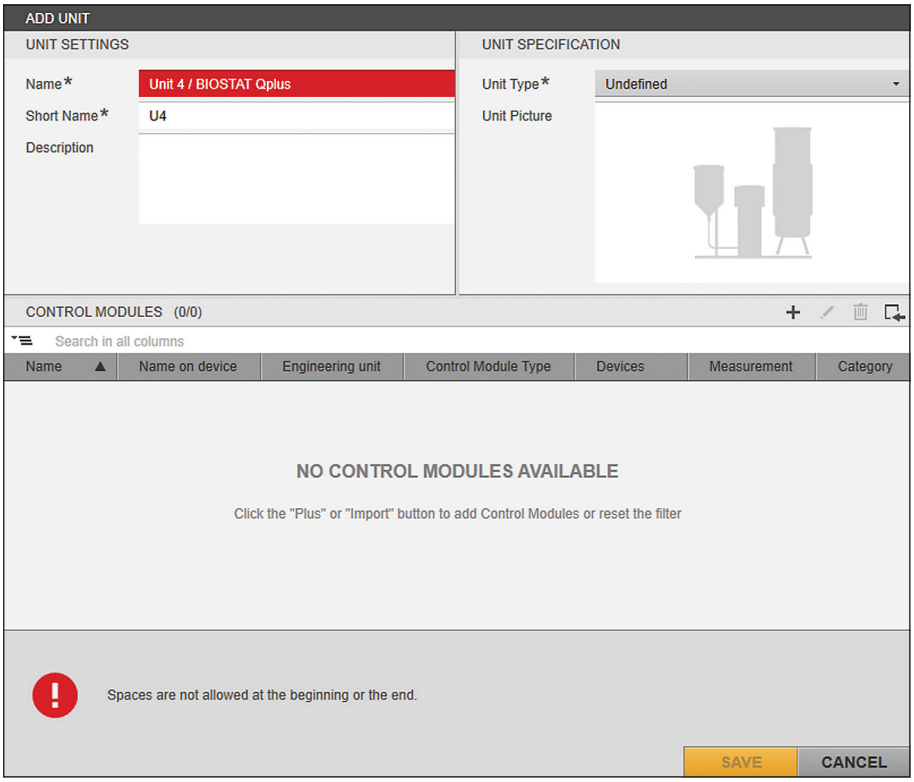


Fig. 8-1: Error message in the event of incorrect user entries (example)

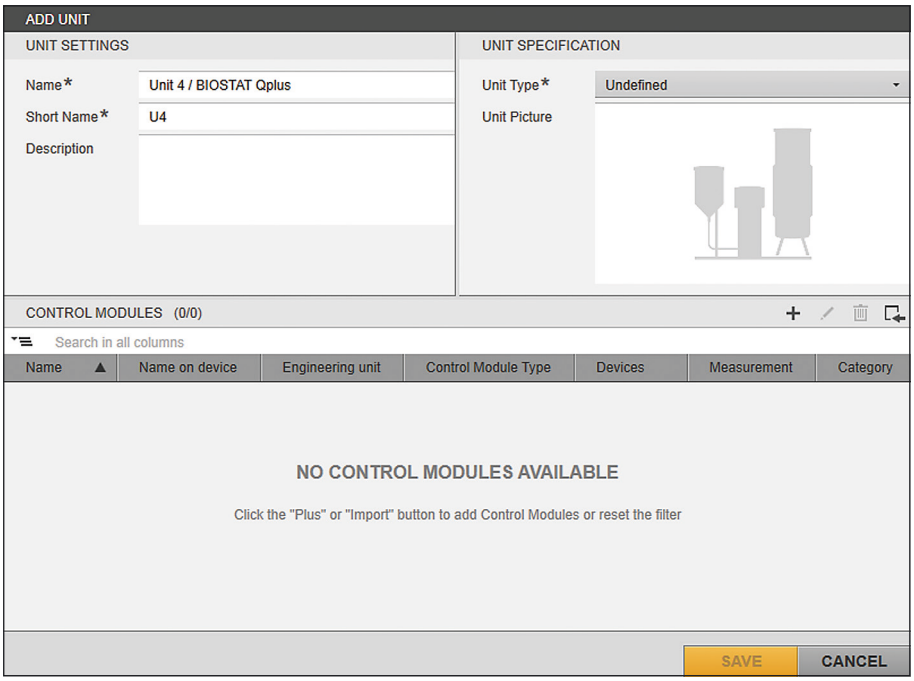


Fig. 8-2: Error message has disappeared after entry is corrected (example)

8.2 Error Message Relating to Communication and Default Settings

Error messages displayed due to an interrupted network connection or incorrect default settings appear in a pop-up window.

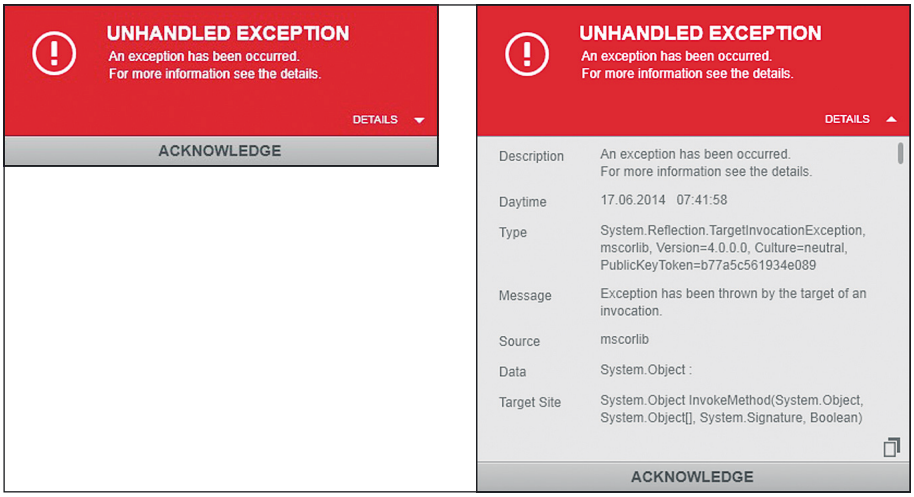


Fig. 8-3: Error message (examples)

Requesting Help with Persistent Errors

Procedure

- ▶ Click on to copy the system status to the clipboard.
- ▶ Copy the system status from the clipboard into a WordPad document.
- ▶ Send the WordPad document to: mfcs.software@sartorius.com.

Acknowledging Errors

Procedure

- ▶ To acknowledge the error message and close the pop-up window: Click on the [ACKNOWLEDGE] button.

8.2.1 Communication Error Message

The following table lists error messages relating to communication.

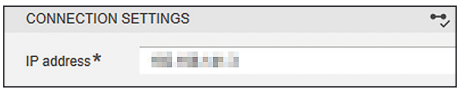
Symbol	Message/Error Message	Cause	Measure
	Connection test failed	The network connection to the device is interrupted. Incorrect configuration of the network connection.	– Make sure that the network cable is connected to the device and the computer. – Make sure that the settings for the network connection in the program and on the device are configured correctly (see Chapter 3.1, page 16).

8.2.1.1 Determining the Connection Status

To test whether the network connection to the device can be set up, you must determine the connection status.

Procedure

▶ In the [ADMINISTRATION] function pane, click on [DEVICES].
▷ The devices are listed in the overview.
▶ Select the device for the connection test.
▶ In the toolbar, click on the [Edit] button.
▷ The [GENERAL PROPERTIES] input screen appears.
▶ Click on [NEXT].
▷ The [DEVICE TYPE-SPECIFIC PROPERTIES] input screen appears.



▶ Click on the [Connection test] button.
▷ The network connection status is checked.

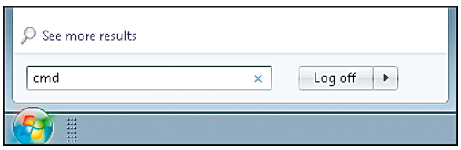
▷ The message “The connection test was successful” appears when the network connection to the device has been established successfully.
▶ Confirm this message with [ACKNOWLEDGE].

▷ The message “The device connection test failed” appears when the network connection to the device has not been established successfully.
▶ Confirm the message with [ACKNOWLEDGE], check the network connection between the device and the MFCS system (see Chapter 8.2.1.2, page 190), and contact the administrator if necessary.

8.2.1.2 Testing the Network Connection

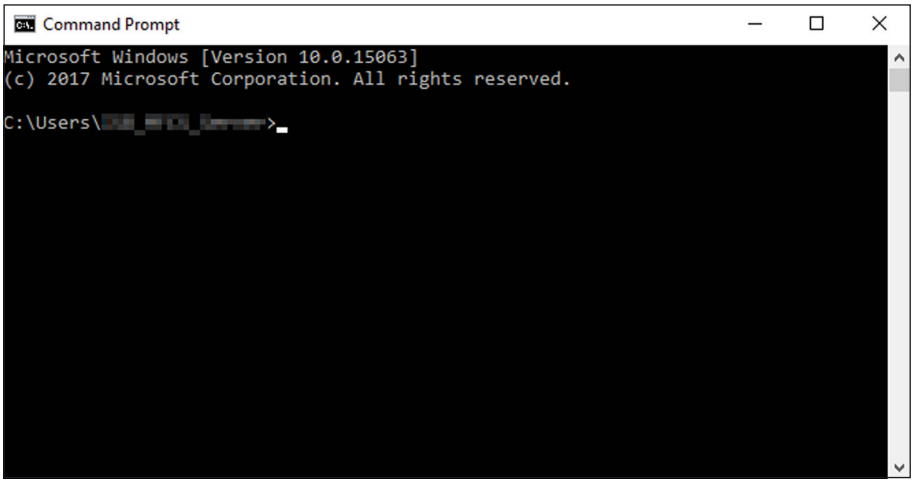
In order to check whether the network connection (communication) between the device and the MFCS system has been configured properly, send a “Ping command.”

Procedure

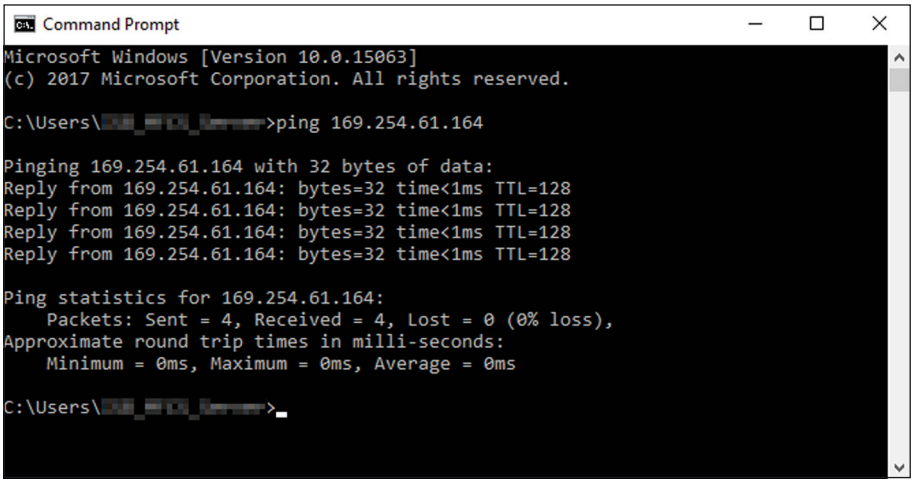


▶ In the input area of the start menu, enter [cmd] as a command.

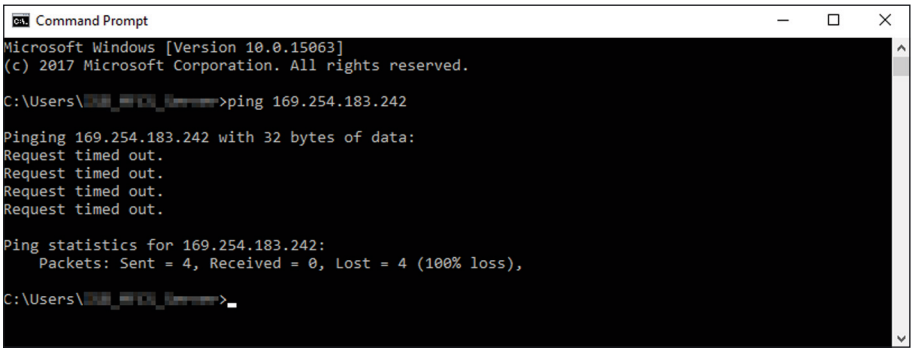
▷ The Windows command console appears:



▶ Enter the command [ping] followed by one space.
▶ Enter the IP address of the device. To determine the IP address of the device: See the instructions for the device.
▶ Confirm the input using the ENTER key.
▷ The following figure illustrates what successful detection of the device looks like:



▷ The following figure shows the status when the device is not detected at network level:



▶ In this case, contact the administrator.

8.2.2 Error Message Relating to Default Settings

The following table lists error messages relating to incorrect default settings.

Symbol	Message/Error Message	Cause	Measure
	ERROR One or more services did not respond. Please contact a system administrator	The program cannot be started because program-specific services in the operating system have not started.	– Make sure that the “SQL Server (BIOPAT_MFCS)” service has started. – Make sure that the “Sartorius BioPAT MFCS Services” service has started. – Contact your system administrator or Sartorius Service.
	The upgrade cannot proceed because the “Distributed Transaction Coordinator” Windows service is not running. Please start this service and try again.	The program cannot be updated because a necessary service in the operating system has not started.	– Make sure that the “Distributed Transaction Coordinator” service has started. – Contact your system administrator or Sartorius Service.

8.2.2.1 Starting Services

In order for the program to be able to start or be updated, certain services must be loaded in the operating system prior to the corresponding operation.

Procedure

▶ Open the services management of the operating system.
  ▶ To enable the program to start: Start the services [SQL Server (BIOPAT_MFCS)] and [Sartorius BioPAT MFCS Services].
  ▶ To enable the program to be updated: Start the [Distributed Transaction Coordinator] service.

8.3 Error Message Relating to Program Versions

As soon as the program versions of the MFCS server installation and the MFCS client installation are no longer identical, one of the following error messages appears when the MFCS client is started:

Symbol	Message/Error Message	Cause	Measure
	Connection failed A connection to the BioPAT® MFCS Server could not be established because the version of your BioPAT® MFCS installation is out of date. Please contact your system administrator.	The MFCS client cannot be started because the MFCS server version is newer than the MFCS client version.	– Update the MFCS client version to the MFCS server version. – Contact the administrator or Sartorius Service.
	Connection failed A connection to the BioPAT® MFCS Server could not be established because the version of your BioPAT® MFCS installation does not match the server version. Please contact your system administrator.	The MFCS client cannot be started because the MFCS client version is newer than the MFCS server version.	– Update the MFCS server version to the MFCS client version. – Contact the administrator or Sartorius Service.

8.4 SQL Database Error Message

Once the SQL database has become 75% full or more, a warning message appears:

Symbol	Message/Error Message	Cause
	DATABASE IS NEARLY FULL The database “Sscada. ProcessData” has reached a critical level of 91% of its total capacity.	The database “Sscada. ProcessData” has reached a critical level of 91% of its total capacity.

8.4.1 Expanding the Database Capacity

Procedure

▶ If the capacity of the database is to be expanded: Contact Sartorius Service.

9 Sartorius Service

Sartorius Service will be happy to help you with any queries about the program. For information about the service addresses, services provided or to contact a local representative, please visit the Sartorius website (www.sartorius.com).
If you have any queries about the program or need to make contact in connection with a malfunction, export the information on the BioPAT® MFCS 4 installation and keep it to hand.

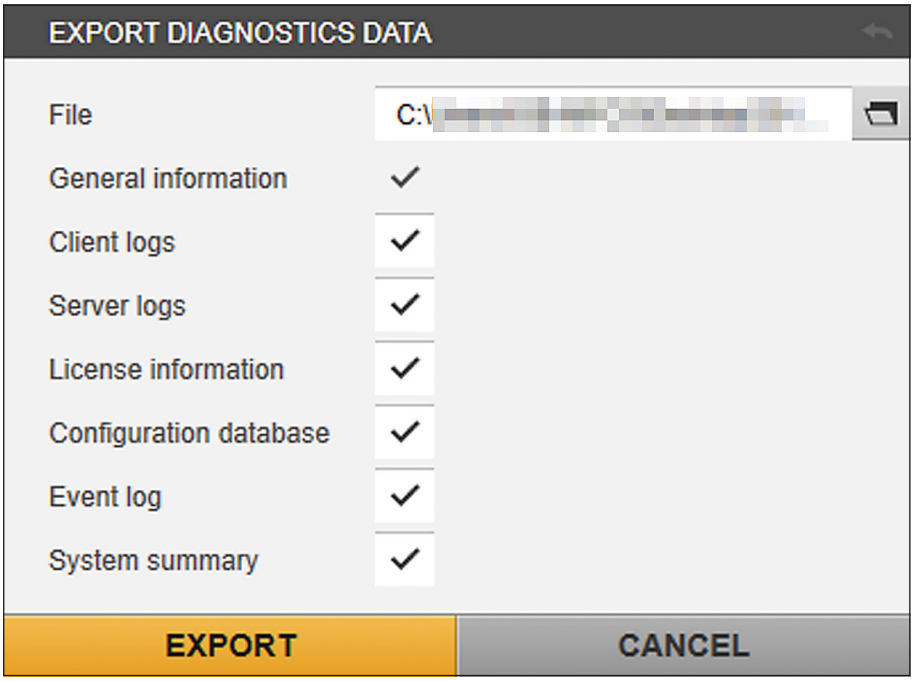
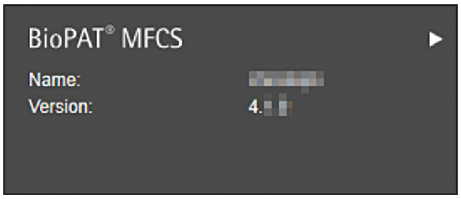


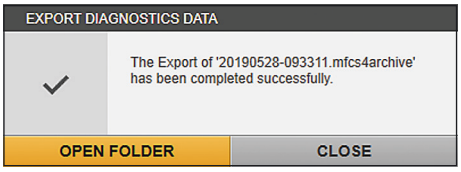
Fig. 8-4: File Location and Selection of Diagnostic Data

Field	Symbol	Description
File		Selects the export file location.
General information		The category “General system information” is included by default.
Clients logs		Includes/excludes the category “Application log files”.
Server logs		Includes/excludes the category “Service log files”.
License information		Includes/excludes the category “License information”.
Configuration database		Includes/excludes the category “Configuration database”.
Event log		Includes/excludes the category “Event log”.
System summary		Includes/excludes the category “System summary”.



Procedure

- ▶ On the start screen, click on the information pane.
- ▶ In the [ABOUT] information pane, click on the [EXPORT] button.
- ▶ Select the export file location in the selection menu.
- ▶ In the [EXPORT DIAGNOSTICS DATA] selection menu, select the categories.
- ▶ Click on the [EXPORT] button.
- ▷ The diagnostic data are exported.



- ▶ To open the export file location: Click on the [OPEN FOLDER] button.

10 Backing Up & Restoring the SQL Database

This chapter describes the procedure for backing up and restoring the SQL database.

The Microsoft SQL Server Management Studio program must be installed in order to back up and restore the SQL database. The Microsoft SQL Server Management Studio program is **not** part of the installation file provided in the MFCS package (for download and installation, see www.microsoft.com).

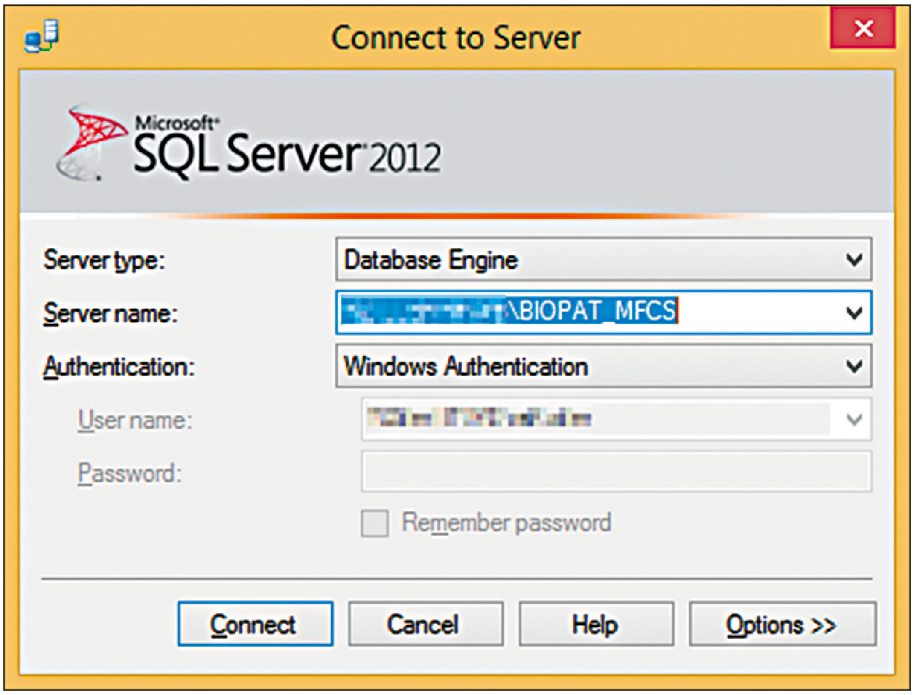
10.1 Backing up a Database

Requirements

The Microsoft SQL Server Management Studio program is installed.

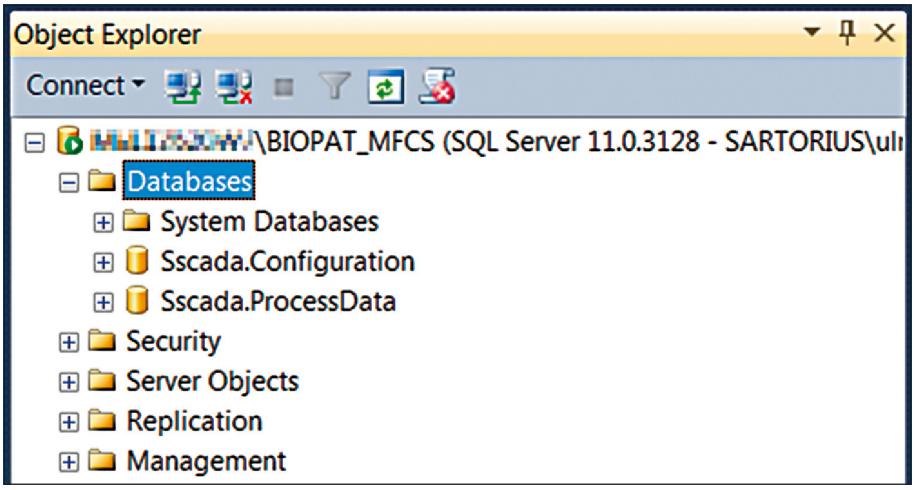
Procedure

▶ Open [Microsoft SQL Server Management Studio] via the Start menu.
▷ The [Connect to Server] dialog box appears or can be accessed from the [File] menu:



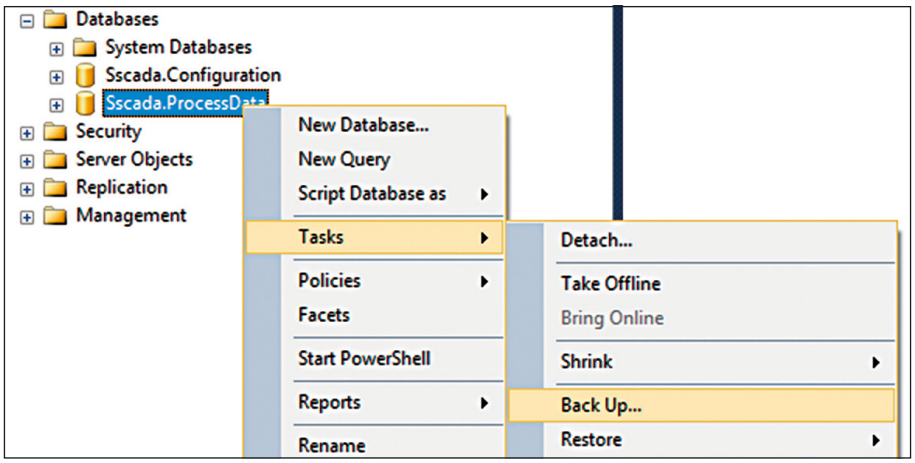
▷ The default server name is “computer name\BIOPAT_MFCS”. The “computer name” here is the name of the computer on which the SQL server is installed.
▶ Select the [Windows Authentication] authentication method.
▷ The currently logged on local user is used to log onto the database. This user must have the appropriate rights to back up the database.
▶ Click on the [Connect] button to connect to the database.

▷ The Object Explorer with the database is displayed:

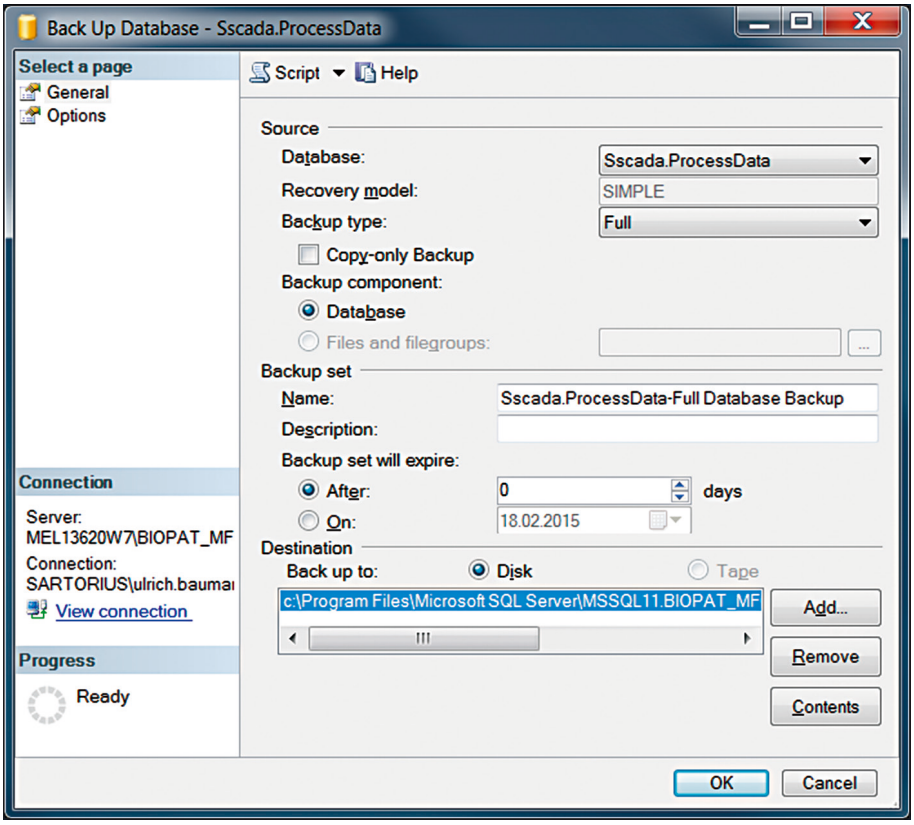


▷ Among other things, the database contains the:
- configuration data [Sscada.Configuration]
- process data [Sscada.ProcessData]
- file attachments from Sample Data Management [Sscada.AssetData]

▶ Select the data to be backed up and open the dialog box for data backup via [Tasks] and [Backup...].



▷ The [Back Up Database] dialog box appears:



▶ Change the settings according to your requirements.
▶ To start the data backup: Click on the [OK] button.

10.2 Stopping and Starting Services

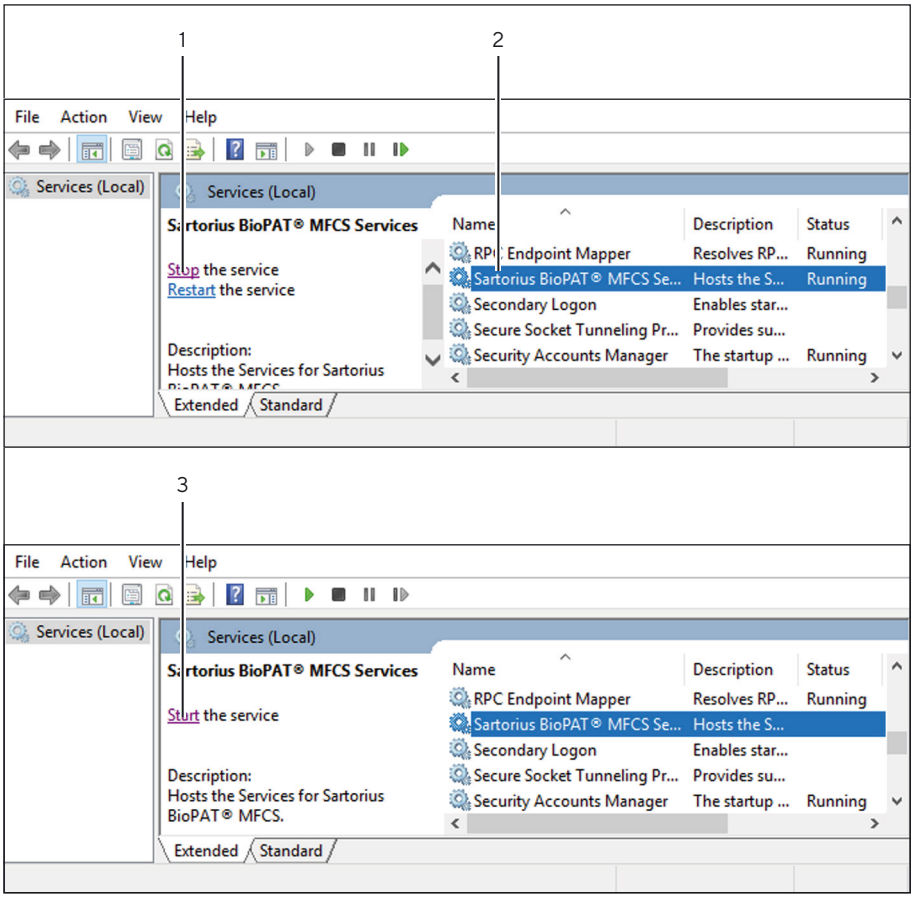


Fig. 9-1: Services management of the operating system (example)

Pos.	Description
1	Stops the selected service.
2	Selected service [Sartorius BioPAT® MFCS Services]
3	Starts the selected service.

Procedure

- ▶ To stop the service: Select the [Sartorius BioPAT® MFCS Services] service and click on [Stop].
- ▶ To start the service: Select the [Sartorius BioPAT® MFCS Services] service and click on [Start].

10.3 Restoring a Database

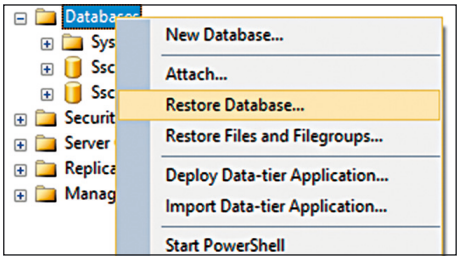
You can start restoring a database in the Object Explorer by right-clicking on [Database] and [Restore Database...].

Alternatively, you can also start restoring directly through an existing database Sscada.Configuration/Sscada.ProcessData by right-clicking on [Tasks], [Restore], and [Database...].

Requirements

The [Sartorius BioPAT® MFCS Services] service must be stopped before restoring the database.

Procedure



▶ To restore the database from the Object Explorer: Right-click on the [Database] entry and select the [Restore Database] entry.

▷ The [Restore Database] dialog box appears:

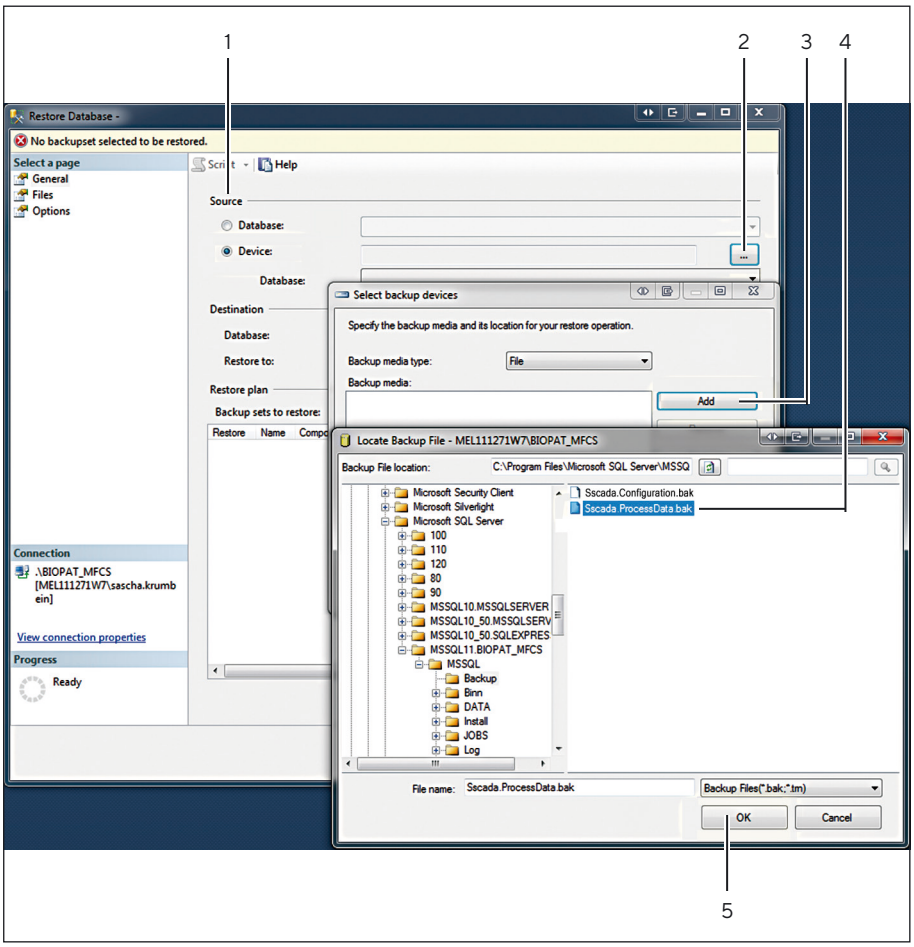


Fig. 9-2: Dialog fields for restoring the databases (example)

Pos.	Description
1	Selects the source.
2-4	Navigates to the backup file location.
5	Confirms the selection of the backup file.

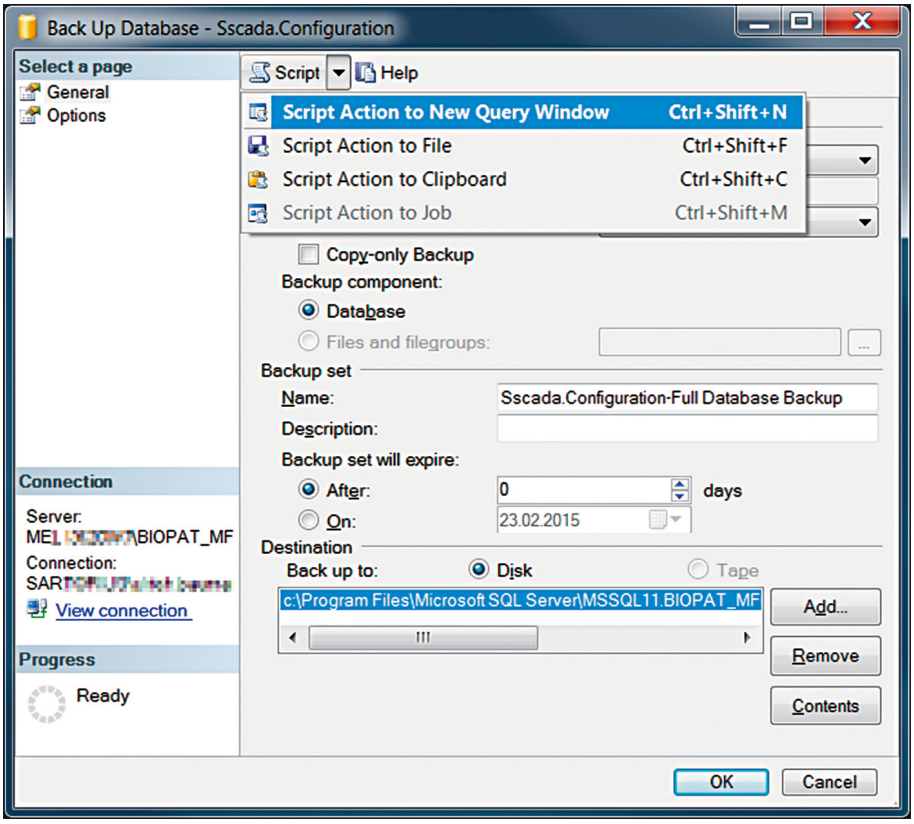
- ▶ Change the settings according to your requirements in the [Restore Database] and [Options] dialog box.
- ▷ Depending on the configuration performed, the existing database is overwritten.
- ▶ In the [Restore Database] and [General] dialog box, select the backup file:
  - ▶ Select the source [Device] (1).
  - ▶ Navigate to the backup file location (2) to (4) and select the backup file.
  - ▶ Confirm the selection with [OK] (5).
- ▶ In the [Select Backup Devices] dialog box, confirm the selection with [OK].
- ▶ In the [Restore Database] dialog box, restore the process by clicking on [OK].
- ▷ The database restoration process is carried out.
- ▶ To start the program after the restoration of the database(s): Start the [Sartorius BioPAT® MFCS Services] service in the service management of the operating system.

10.4 Setting Up an Automatic Backup

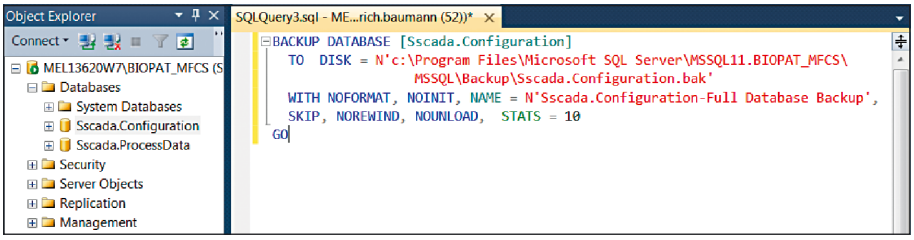
10.4.1 Creating a Script

Procedure

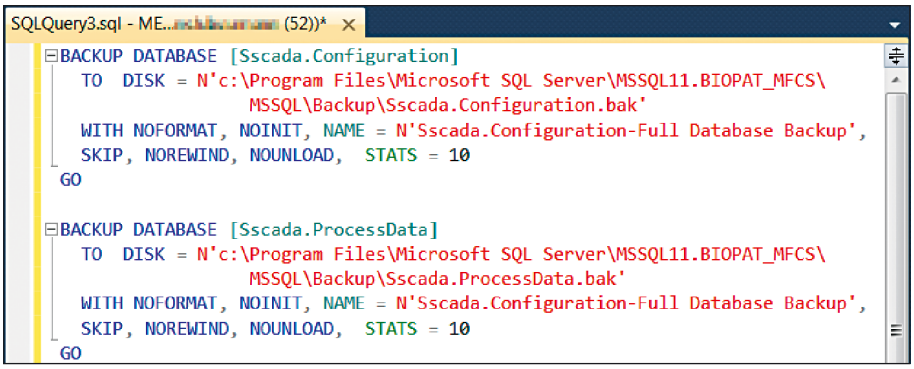
- ▶ Open the [Back Up Database] dialog box (see Chapter 10.1, page 195).



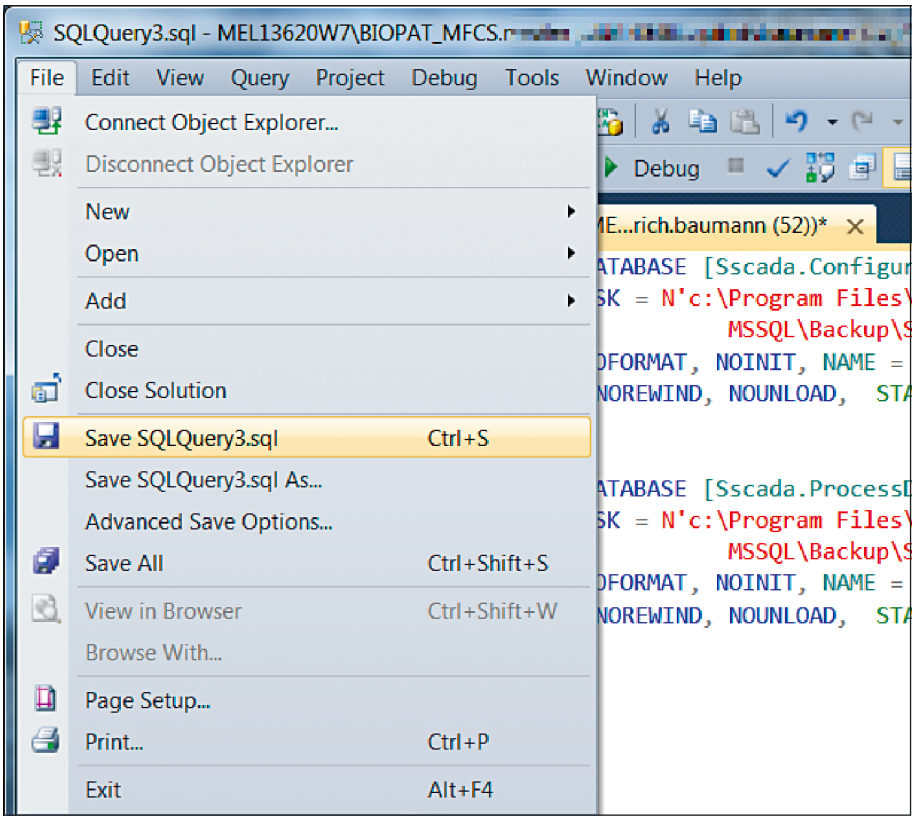
- ▶ Click on the [Add] button to change the folder for the backup file.
- ▶ Create a backup script in the new window using the script menu. Use the shortcut [Ctrl] + [Shift] + [N] to do so.
- ▷ In Microsoft SQL Server Management Studio, a new window opens with the script that has been created for backing up the [Sscada.Configuration] database.
- ▶ To close the [Back Up Database] dialog box: Click on the [Cancel] button.



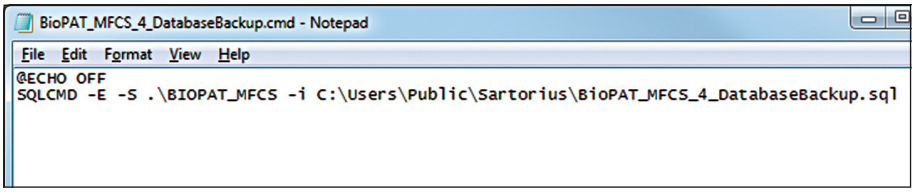
- ▶ If both BioPAT® MFCS 4 databases ([Sscada.Configuration]& [Sscada.ProcessData]) are to be automatically saved in a script, repeat the previous steps with the [Sscada.ProcessData] database.
- ▷ In Microsoft SQL Server Management Studio, a second window opens with the script that has been created for backing up the [Sscada.ProcessData] database.
- ▶ Combine the scripts via copy & paste in one window:



▶ Save the script to a known folder.
e.g., "C:\Users\Public\Sartorius\BioPAT_MFCS_4_DatabaseBackup.sql".



▶ In order to be able to run the newly created script through SQLCMD:
Create a further script:
  ▶ Open Windows Notepad.
  ▶ Enter the following code in Notepad:
  @ECHO OFF
  SQLCMD -E -S .\BIOPAT_MFCS -i C:\Users\Public\Sartorius\BioPAT_MFCS_4_DatabaseBackup.sql



Meaning of the parameters:

-E [Trusted connection]

-S [Server name\instance name]

-i [Script file]

▶ Save the script file in the same folder:
C:\Users\Public\Sartorius\BioPAT_MFCS_4_DatabaseBackup.cmd

10.4.2 Testing the Script Manually

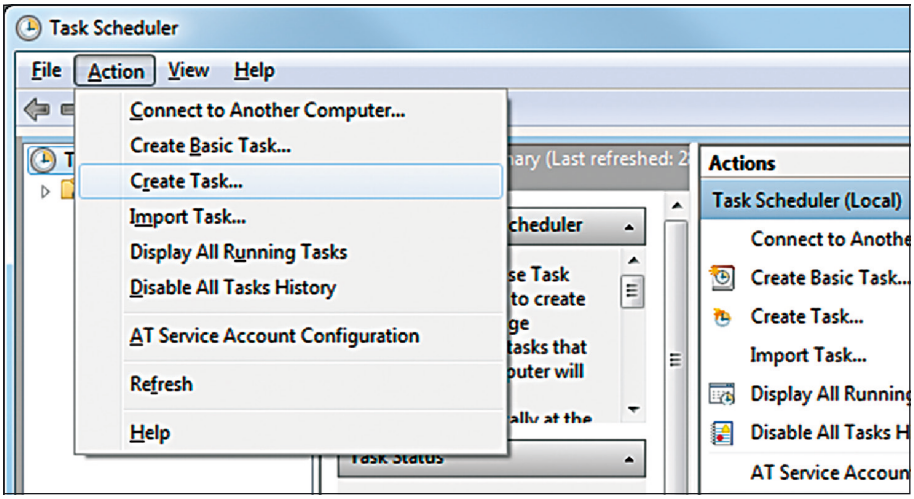
Procedure

▶ To test the script: Run the script as an administrator.
▷ The databases are saved in the set folder.
Default folder: "C:\Program Files\Microsoft SQL Server\MSSQL11.
BIOPAT_MFCS\MSSQL\Backup\"

10.4.3 Automating Script Execution

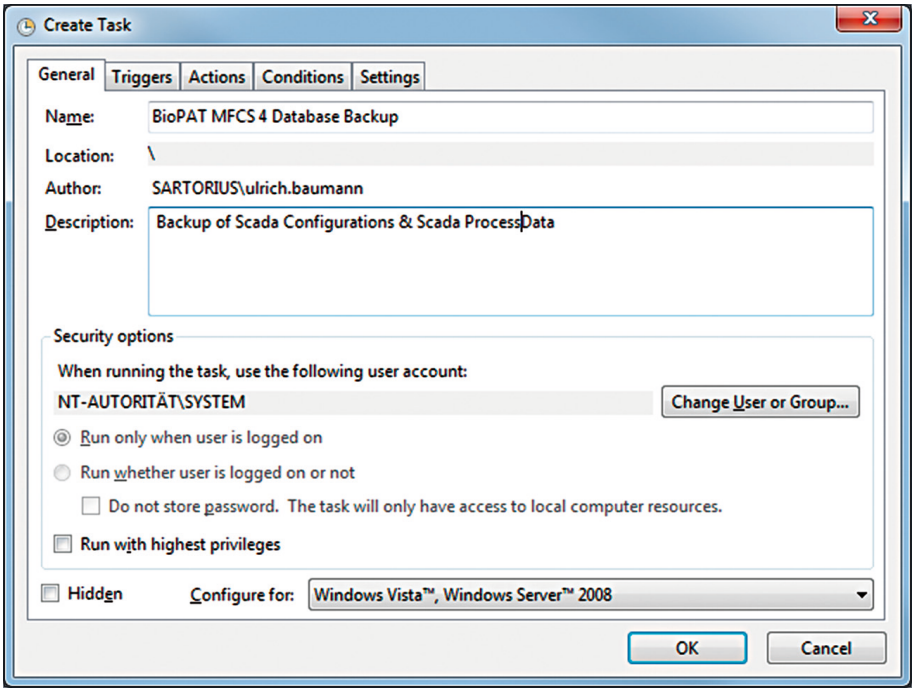
Procedure

▶ Open the Windows [Task Scheduler]:
▶ In the [Action] menu, select [Create Task].
▷ The [Create Task] dialog box opens.
▶ Create a task for automated script execution.

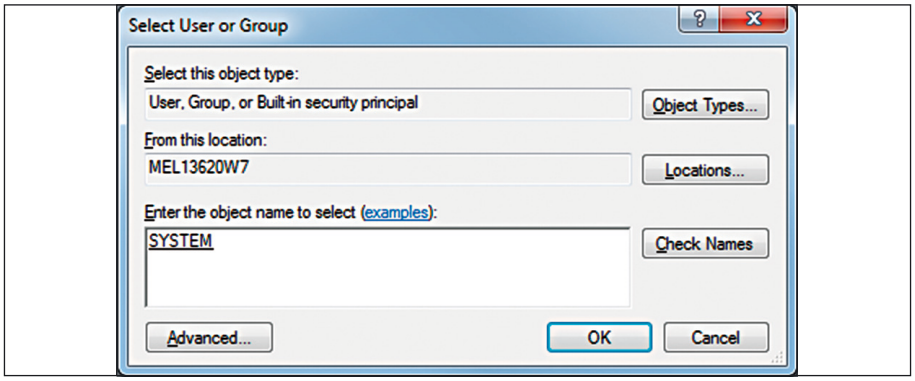


10.4.4 Editing the [General] Tab

Procedure



- ▶ Enter general data in the [Name] and [Description] fields.
- ▶ In the [Security options] section, change the user to [SYSTEM]. To do this, click on the [Change User or Group...] button.

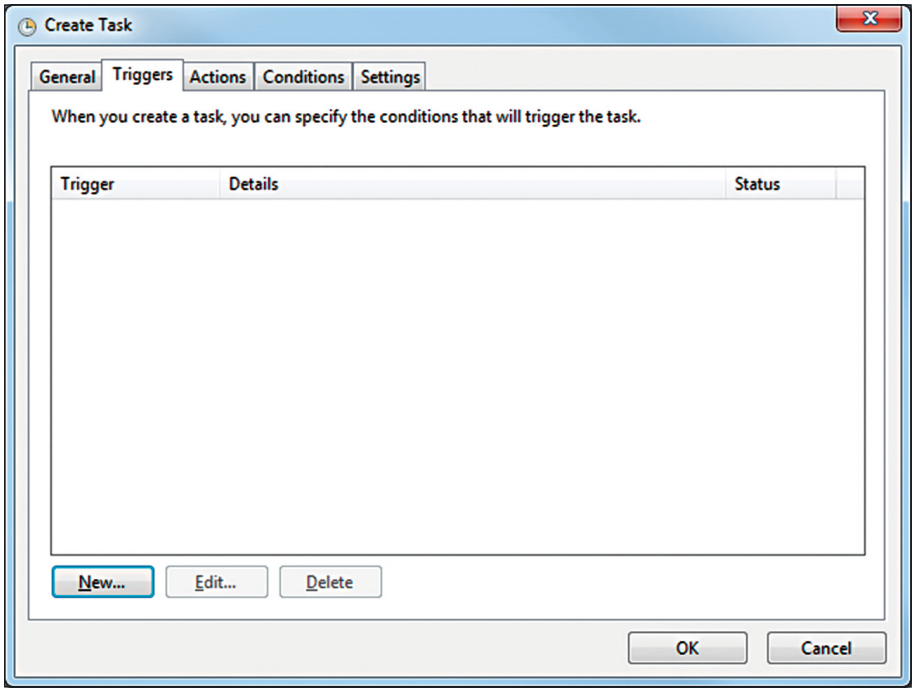


- ▶ Enter [SYSTEM] and click on the [Check Names] button.
- ▶ Click on the [OK] button.

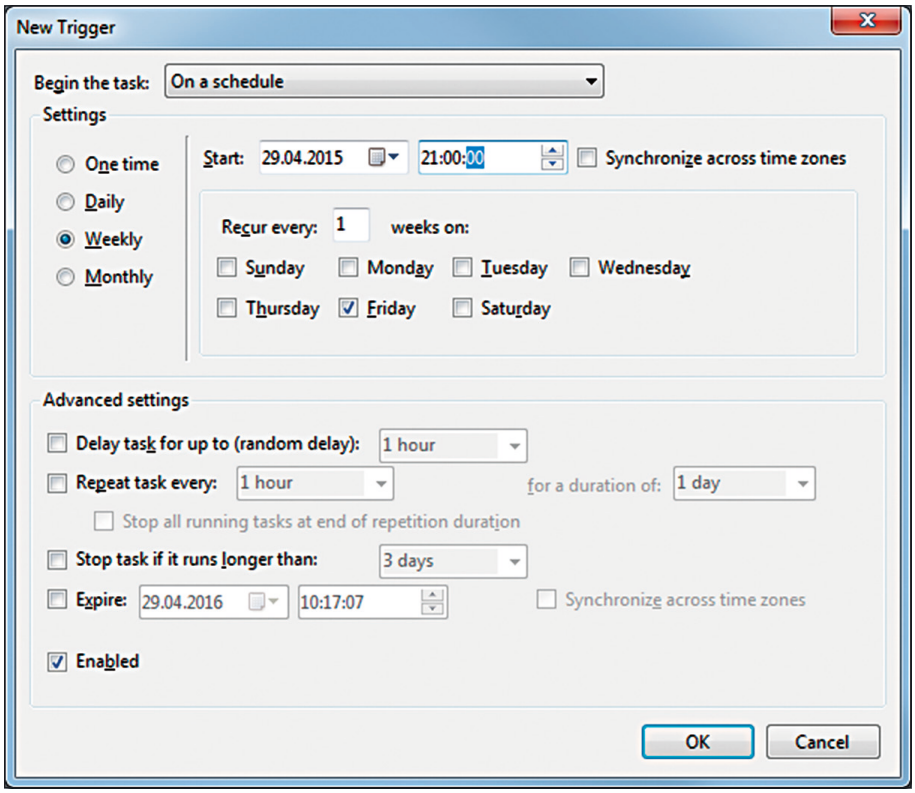
10.4.5 Editing the [Triggers] Tab

Procedure

▶ Select the [Triggers] tab.



▶ Click on the [New...] button in the [Triggers] tab.



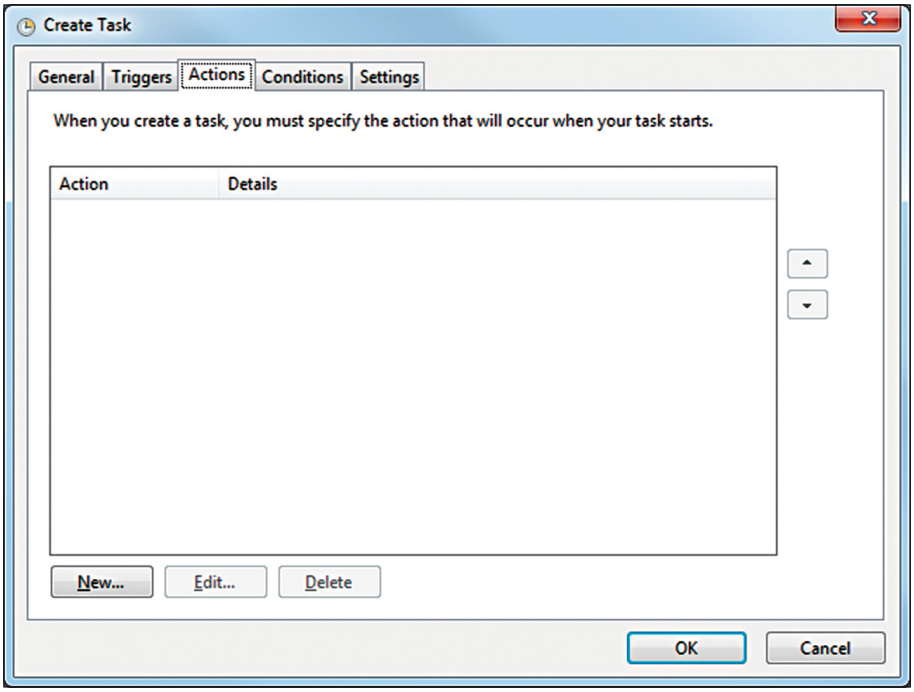
▶ In the [New Trigger] input box under [Settings], enter the time and cycle for automatic backup of the databases.

▶ Click on the [OK] button.

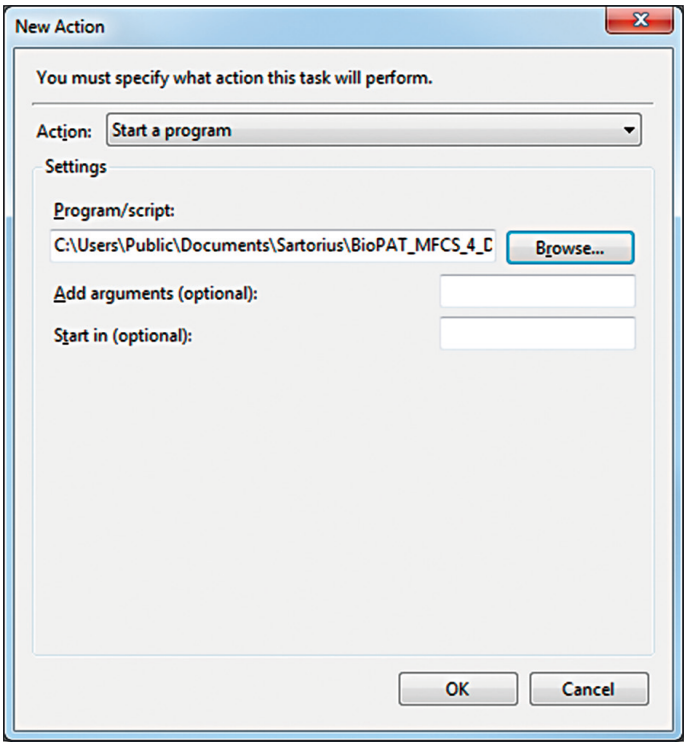
10.4.6 Editing the “Actions” Tab

Procedure

▶ Select the [Actions] tab.



▶ Click on the [New] buttons in the [Actions] tab.



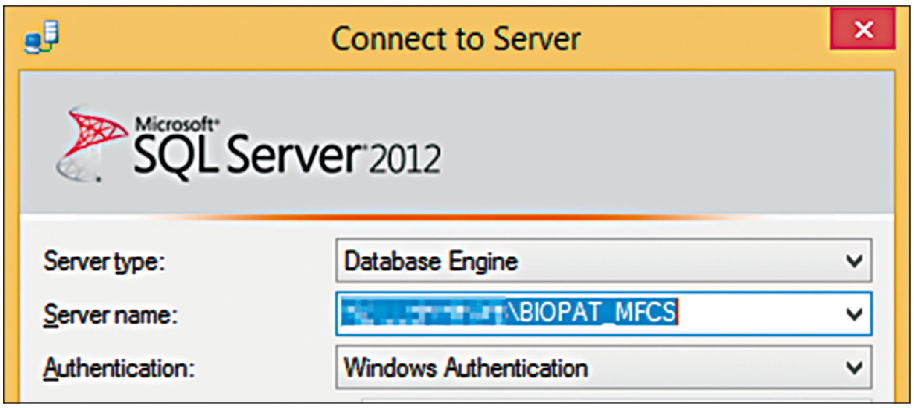
▶ In the [New Action] dialog box, select [Start a program] from the [Action:] selection list.
▶ Under [Program/script:], click on [Browse...] to select the previously saved script [C:\Users\Public\Sartorius\BioPAT_MFCS_4_DatabaseBackup.cmd].
▶ Click on the [OK] button.

- ▶ Configure the [Conditions] and [Settings] tabs according to your requirements.
- ▶ To create the task and close the [Task Scheduler]: Click on the [OK] button.

10.4.7 Testing the Task

Procedure

- ▶ Delete the backup files created by the test in the backup folder. Default folder: [C:\Program Files\Microsoft SQL Server\MSSQL11. BIOPAT_MFCS\MSSQL\Backup\].
- ▶ Open the [Task Scheduler].



- ▶ Select the previously created task from the list.
- ▶ Right-click on the entry and select the [Run] entry.
- ▷ The backup files are updated and stored in the backup folder.

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Sartorius Stedim Systems GmbH
Robert-Bosch-Strasse 5–7
34302 Guxhagen, Germany

Phone: +49 5665 407 0
www.sartorius.com

The information and figures contained in these instructions correspond to the version date specified below.
Sartorius reserves the right to make changes to the technology, features, specifications and design of the equipment without notice.
Masculine or feminine forms are used to facilitate legibility in these instructions and always simultaneously denote the other gender as well.

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