PROCESS AUTOMATION

Freelance 2019

Operators Manual
Freelance Operations

PROCESS AUTOMATION

Freelance 2019
Operators Manual
Freelance Operations

Document Number: 3BDD011932-111
Revision: A
Release: January 2019

Notice

This document contains information about one or more ABB products and may include a description of or a reference to one or more standards that may be generally relevant to the ABB products. The presence of any such description of a standard or reference to a standard is not a representation that all of the ABB products referenced in this document support all of the features of the described or referenced standard. In order to determine the specific features supported by a particular ABB product, the reader should consult the product specifications for the particular ABB product.

ABB may have one or more patents or pending patent applications protecting the intellectual property in the ABB products described in this document.

The information in this document is subject to change without notice and should not be construed as a commitment by ABB. ABB assumes no responsibility for any errors that may appear in this document.

Products described or referenced in this document are designed to be connected, and to communicate information and data via a secure network. It is the sole responsibility of the system/product owner to provide and continuously ensure a secure connection between the product and the system network and/or any other networks that may be connected.
The system/product owners must establish and maintain appropriate measures, including, but not limited to, the installation of firewalls, application of authentication measures, encryption of data, installation of antivirus programs, and so on, to protect the system, its products and networks, against security breaches, unauthorized access, interference, intrusion, leakage, and/or theft of data or information.
ABB verifies the function of released products and updates. However system/product owners are ultimately responsible to ensure that any system update (including but not limited to code changes, configuration file changes, third party software updates or patches, hardware change out, and so on) is compatible with the security measures implemented. The system/product owners must verify that the system and associated products function as expected in the environment they are deployed.

In no event shall ABB be liable for direct, indirect, special, incidental or consequential damages of any nature or kind arising from the use of this document, nor shall ABB be liable for incidental or consequential damages arising from use of any software or hardware described in this document.

This document and parts thereof must not be reproduced or copied without written permission from ABB, and the contents thereof must not be imparted to a third party nor used for any unauthorized purpose.

The software or hardware described in this document is furnished under a license and may be used, copied, or disclosed only in accordance with the terms of such license. This product meets the requirements specified in EMC Directive 2014/30/EU and in Low Voltage Directive 2014/35/EU.

Trademarks

Table of Contents

About This Book

Use of warning, caution, information, and tip icons

This publication includes **Warning**, **Caution**, and **Information** where appropriate to point out safety related or other important information. It also includes Tip to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:

Electrical warning icon indicates the presence of a hazard which could result in *electrical shock.*

Warning icon indicates the presence of a hazard which could result in *personal injury*.

Caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in *corruption of software or damage to equipment/property*.

Information icon alerts the reader to pertinent facts and conditions.

Tip icon indicates advice on, for example, how to design your project or how to use a certain function

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Terminology

The Glossary contains terms and abbreviations that are unique to ABB or have a usage or definition that is different from standard industry usage. Please make yourself familiar to that.

You will find the glossary at the end of this manual.

Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.
- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the ENTER key.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the **space bar**, **comma key**, and so on.
- Press CTRL+C indicates that you must hold down the CTRL key while pressing the C key (to copy a selected object in this case).
- Press ESC, E, C indicates that you press and release each key in sequence (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
    - The following convention is used for menu operations: MenuName > MenuItem > CascadedMenuItem. For example:
      select **File** > **New** > **Type**.
    - The **Start** menu name always refers to the **Start** menu on the Windows Task Bar.

- System prompts/messages are shown in the Courier font, and user responses/input are in the boldfaced Courier font. For example, if you enter a value out of range, the following message is displayed:

  ```
  Entered value is not valid. The value must be 0 to 30.
  ```

  You may be told to enter the string TIC132 in a field. The string is shown as follows in the procedure:

  TIC132

  Variables are shown using lowercase letters.

  sequence name

Section 1 Freelance Operations – Overview

What is Freelance Operations?

The software running on the PC operator station of the Freelance system is called **Freelance Operations**.

It offers a user-friendly graphical user interface in accordance with the MS-Windows standard. Freelance allows you to configure up to 100 operator stations for process operation and observation. When assigning the operator stations to process stations, however, it must be taken into account that a maximum of 10 operator stations (clients) can be assigned to a process station (server).

Among other things, Freelance Operations offers the following process operation features:

- Standard displays such as overview display, group display, faceplate, trend display, system display, time scheduler display, SFC display, WEB display,
- Multi monitor support to customize the display types on up to four monitors,
- Customized graphic displays,
- Customized faceplates for user-defined function blocks,
- Simple process operation using the mouse or keyboard,
- Quick and direct access to tags for operation,
- Comprehensive and wide-ranging message management,
- Trend displaying and trend archiving,
- Logging,
- System diagnostics in the system display.

Installing Freelance Operations

For information on how to install Freelance Operations please refer to the **Getting Started** manual.

Section 2 Operating Philosophy

Using Freelance Operations for process control

Under Freelance Operations, the automated process can be operated either with mouse or keyboard. This ensures that in the unlikely event of either device failing the other can be used for all operator actions.

Mouse operation

Tag selection

A tag is selected by clicking the left mouse button in one of the following selected areas:

- a faceplate in a group display,
- a message in the message line, message list or hint list,
- the dynamic object in a graphic display,
- the menu item *Display > Faceplates..*,
- a trend in a trend display,
- steps or transitions in the SFC display.

Calling up a faceplate

By double clicking one of these areas, the faceplate of the relevant function is displayed and can be operated.

Moving a faceplate

A faceplate can be moved freely around the display area of the screen by clicking on the header. The message line cannot be overlapped.

Executing actions in the graphic display

Depending on the configuration, one of the following actions can be performed by selecting a dynamic graphic object in a graphic display:

- calling up a display,
- operating a process variable,
- acknowledging messages.

The configured action is initiated by a **click of the left mouse button**.

Default display

The **Default display** for the selected tag appears as the first menu item in the context menu of the corresponding faceplate and can be easily called up by **clicking the left mouse button,** owing to its exposed position.

Context menu

You can call up the context menu at any time by right-clicking with the mouse. The context menu contains menu items for the most important operations and directly selectable displays, depending on the element on which the cursor is currently positioned. See also Operation using the context menu, page 25.

Keyboard operation

Tag selection

Upon selection of the appropriate focus, a tag can be selected in the display in different ways:

Use the TAB to select

- a faceplate in a group display,
- a dynamic object in a graphic display.

Use the CURSOR KEYS to select

- a message in message list,
- an entry from a display list,
- a trend in a trend display,
- steps or transitions in the SFC display.

The selected area of a display is indicated by a frame.

Faceplate

By pressing ENTER after having selected the desired tag name, the faceplate for operating the function is displayed.

Moving a faceplate

A selected faceplate can be moved freely around the display area of the screen. You can move it in the appropriate direction either by one pixel using CTRL+ CURSOR KEYS or by one of the 30x4 grid units by pressing CTRL + SHIFT + CURSOR KEYS.

Default display

A configured default display in Freelance Engineering can be called up by using the F11 function key.

Display explorer

The display explorer shows a tree view of the individual displays available on the operator station. You can select and call up the appropriate display as required. The display explorer is called up by selecting the corresponding display in the menu or by a key combination involving the following function keys:

Type of display	Key combination
Tag list	CTRL + F5
Graphic Display	CTRL + F6
Group display	CTRL + F7
Trend display	CTRL + F8
Logs	CTRL + F9

In the display explorer, you can select a display or tag by either pressing the CURSOR KEYS or by typing the name or first characters and then confirming with ENTER.

Display selection

After having selected a tag, you can directly call up the corresponding displays by using the function keys F6...F9.

Focus

In Freelance Operations, several windows are visible on the screen at a time.

The symbol on the left side in the status line shows which **area is activated** and can thus be operated using the keyboard: i.e. the blue area is active. To change between the display areas, press the ALT key together with the CURSOR KEY LEFT or RIGHT and/or UP or DOWN for the faceplate display area.

The following focus areas are available:

- message line (top),
- display area (bottom left),
- faceplate (bottom right).

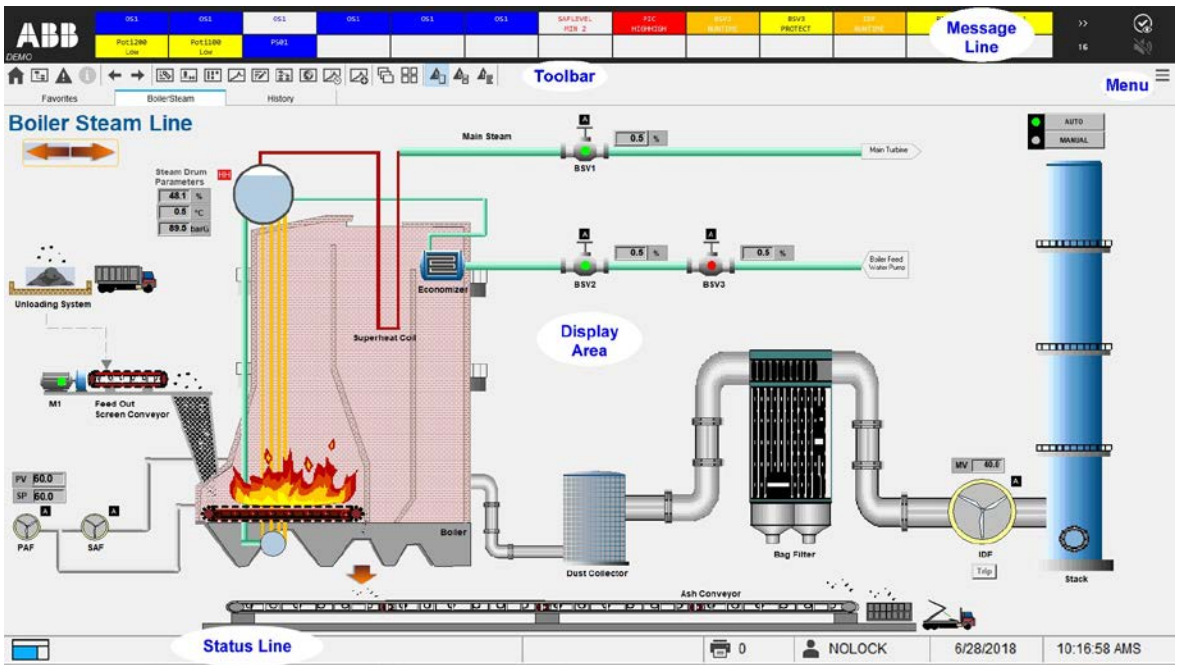
Function keys

Upon installation, the following function keys are used in Freelance Operations for non-display dependent functions:

Key combination	Meaning

F1	Calls up help
F12	Acknowledges the control room horn, same function as button Horn in the message line
SHIFT + F10	Calls up the context menu – please also refer to Operation using the context menu, page 25.

User interface in Freelance Operations



User interface.png

Message line

The message line is always visible and cannot be overlapped by other displays. As seen in the example, it may consist of several message items with tag names and message point details, plus the following items:

Field for overflow area

Field for indicating the total number of all messages on that operator station

Button for the **acknowledgment** or **visual acknowledgment** of displayed messages

Button for acknowledgment of the control room horn. The horn gets white a soon as the control room horn becomes active.

The ABB symbol is active and marked with an **i** if messages arrive for which hints have been configured. The hint list can then be displayed. If there are no hints there is no **I** in the ABB field.

See also View, page 33.

Menu icon

The menu icon in the toolbar is always visible. This means you can perform the actions available in the menu in any operating situation.

Toolbar

You can use the menu line, but also the toolbar buttons to perform actions. A tooltip is available for each icon. The toolbar can contain various buttons or icons, depending on the currently shown display.

Display area

This screen area accommodates displays selected by the user.

Status line

On the left hand side of the status line there is a small icon, the keyboard focus indicator.

Useful information for operation is shown in the middle of the status line. The 10 most recent messages can be viewed. Select the respective arrow and keep the left mouse button pressed.

In the right area of the status line, the number of hardcopies still to be processed is indicated.

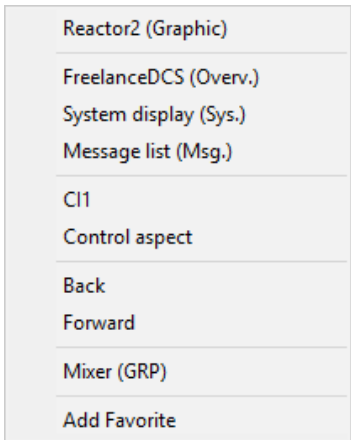
If the User Management is enabled via Settings tool, the user name is indicated. Otherwise, “NOLOCK” is displayed.

The current date and time of day are displayed in the status line on the right hand side. The character "S" to the right of the time indicates daylight saving time.

Operation using the context menu

Right-click within selected display or on tag
or
SHIFT+ F10

The **context menu** appears. It contains menu items for the most important operations and directly selectable displays. The illustration below shows an example of a context menu:



Content menu.png

The **External aspect** is a display allocation function which can be used in Freelance Engineering for allocating any document or Windows program to a tag. This function allows documents to be linked to a tag or Excel spreadsheets to be opened for a tag. The External aspect – in this example a "readme" file – is always the last menu item of the context menu.

If you use this option, the program configured for the External Aspect may provide access to the operating system.

When the Control Aspect program (CBF Viewer) is additionally installed on the operator station PC and the **Control Aspect** option is activated, the context menu of a tag includes the **Control Aspect** entry. Upon selecting this entry, the program which has been used to configure the tag will be displayed with the current process variables. It is thus possible, for example, to analyze the locking logic status of an IDF type tag, provided the logic is in the same program as the IDF block. The Control Aspect menu item will be displayed below the tag.

User identification

The User Management which includes Security Lock and Extended User Management is designed to control access in Freelance Engineering and Freelance

Operations. Please refer to **Engineering Manual -User Management** for further details.

Until User Management is not enabled, the menu items for logging in and out and for changing password are not active. This means that each user can call up and operate any of the displays.

After User Management has been enabled, users must log in under Freelance Operations. The system will detect the user identity and assign corresponding permission to user.

Tools > **Login** > Enter user name > TAB key > Enter password > ENTER

With User Management enabled, each display will indicate whether or not the logged-in user has operating rights for this display – by means of an open or a closed padlock:

 or 

For each display and tag (faceplate) it is possible to define for each user group one of the following three access levels:

- No access
- Observation only
- Observation and operation

In Freelance Operations, the following access control information is shown:

- The user name is displayed permanently in the status line.
- If an appropriate signal sequence log has been configured, all control actions along with user names are documented in it.

Standard user

NOLOCK	User Management is not enabled.

GUEST	Appear when using Security Lock, no user is logged in, e.g. during start of Freelance Operations.
SYSTEM	Control action performed by the system (may appear in the log).

Process visualization

Standard and free displays are available to represent process-status information.

Standard displays are fixed in appearance. During configuration, only the names of tags to be shown in the display need to be entered.

Free displays are graphic displays or user-defined faceplates both created in Freelance Engineering during configuration using the graphic editor or the faceplate editor.

Overview display

One overview display can be created for each Freelance operator station.

A standard overview display consists of 16 rows of 6 columns each. A maximum of 96 displays can be represented and selected as a symbol. These displays can be group displays, trend displays, graphic displays, logs, time scheduler displays, SFC displays or WEB displays. The displays can be called up with a left mouse click on the corresponding symbol.

Instead of using the standard overview display, it is also possible to define a graphic display used as overview display in the operator station.

Group display

A group display is a configured collection of several faceplates. It offers the user the opportunity of displaying related functions in one display. The functions or tags can be operated directly.

Graphic display

In addition to the standard displays described above, customized graphic displays can also be created. These graphic displays can comprise a combination of static and dynamic elements and are designed according to the requirements of the user.

The static section can be used for schematic representation of the plant structure in the background. In the foreground, the dynamic elements of the displays can be used to present the current values and states of the process variables to the operator.

Trend display

The trend display is the virtual presentation of a trend recorder. Binary and analog values from the process can be plotted against time. Up to 6 process variables can be graphically represented per trend display. This allows the user to zoom, fade out and scroll curves. The recorded curves can be archived on the operator station PC. It is also possible to export trend files (archives) to another PC. The **Archive Browser** software package can be used to view these exported trend files as well as to convert them into CSV format for further processing in other programs, e.g. MS-Excel.

Trend displays can be configured in Freelance Engineering and defined by an operator station user. In order for a trend display to be defined by an operator, a trend server must have been configured in the project.

When loading data from Freelance Engineering into the operator station, the configured trend displays may be deleted. For this reason, it is recommended to export operator-defined displays and then re-import them, if required.

Faceplate

Faceplates are used for operation and observation of tags. They show the current state of the associated process. Faceplates can be called up from other displays. They are always positioned on top of other displays. A selected tag is always operable via its faceplate.

A maximum of 5 faceplates can be displayed simultaneously on the screen. Even with the Dual Monitor option, only a total of 5 faceplates are available on both screens. If you open an additional faceplate, the system will automatically close the faceplate which had not been activated for the longest period.

You can fix faceplates by using the pin button in the title line of each faceplate. A fixed faceplate can be moved, but it will not be closed automatically. You can fix a maximum of 4 faceplates.

You can either tile or cascade the faceplates on the screen. See also View, page 33.

The faceplates for the standard function blocks are part of the basic Freelance Operations scope of delivery. In addition, user-defined faceplates can be created for user-defined function blocks.

SFC display

In a standard SFC display, the current operating status of the SFC program is shown. The current step and the completed program segments are identified by color change. Disturbance states and unfulfilled process criteria are clearly shown by colored borders in the fade-in criteria window.

In addition to the standard display shown when calling up the SFC display, you can also display the sequential function chart overview display. This gives you the complete structure of the sequential function chart at a glance.

Time scheduler display

The time scheduler display presents the time scheduler’s state and allows the operator to control it. This display comprises a trend area for the progression of set points and actual values, a status field and the associated faceplate of the time scheduler block. If a tag was assigned to the time scheduler display, the corresponding faceplate is displayed as well.

Logs

Logs provide the documentation of events, states and sequences from the process. The data can be stored on the operator station hard disk, output to a printer or displayed on the screen. Log files can also be exported to another PC. The **Archive**

Browser software package can be used to view the exported log files as well as to convert them into CSV format for further processing in other programs, e.g. MS-Excel.

There are four different log types available:

- Signal sequence log (SSL)
- Operation log (OPL)
- Disturbance course log (SAP)
- Excel report (REPORT).

System display

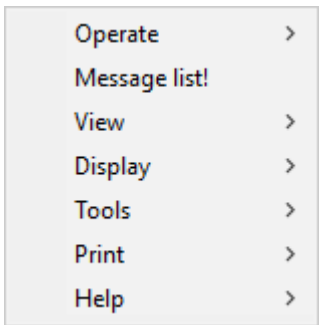
The current status of the Freelance system hardware and software is shown on the standard system display in Freelance Operations. Here, information can be obtained on the operator station and the connected process stations.

WEB display

If you call up a WEB display in Freelance Operations, the local Internet Explorer will be started and the link to the configured URL will be activated. It is thus possible, to call up the video display from a process monitoring camera in Freelance Operations.

The WEB display starts the local WEB browser. Users of Freelance Operations could thus access files on the local machine or other machines in the Intranet or global Internet. Mind the risks and hazards involved.

The Freelance Operations menu at a glance



Operation Menu.png

Operate	This menu item includes all operations for the currently active display. You can find a detailed description in the relevant chapter of each type of display.
Message list!	Calls up the message list.
View	Provision of several view options for the message line and the faceplates.
Display	Selection of a display or tag via the Display Explorer.
Tools	Exit Freelance Operations upon security dialog, login, logout and change password, run Security Lock if Security Lock has been enabled, definition of trend displays, calling up the Options dialog box.
Print	Print-out of hardcopies on the connected printer.
Help	Calling up the help system for Freelance Operations, calling up the context help system for Freelance Operations, display of the Freelance Operations version.

Many menu items can also be selected using the icons in the toolbar. In such cases, the icons are shown next to the menu items in the following text.

Operate

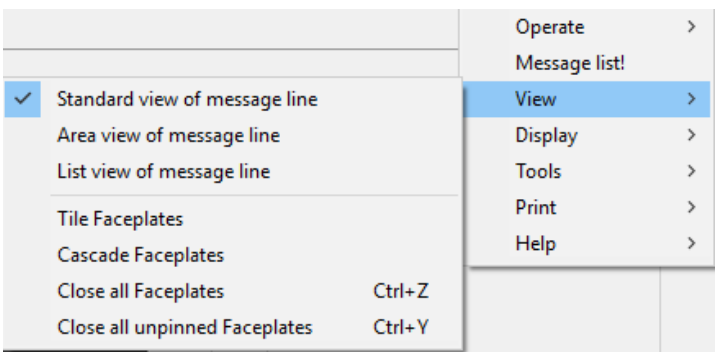
Depending on the selected display, you can carry out different actions via this menu item. You can find a detailed description in the chapters describing the individual displays. This menu option is basically intended for keyboard operation. Usually, operation via the mouse is possible directly in the context of the display.

Message list

This menu item calls up the message list without any further input. In the message list, messages sent from the process stations to this operator station are displayed and managed. The messages can be released by either the Freelance system or the automated process.

Messages can be filtered for this display according to specific criteria. In the message list, one or more messages can be selected and acknowledged or the display assigned to a particular message can be called. Information on the selected message is thus available within short time.

View



Here you can select different views for the message line and the faceplates:

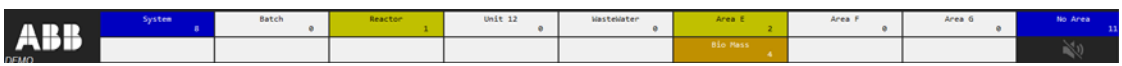
Standard view of message line

The standard view of the message line – several message items with tag names and message item information – is shown. Depending on the configuration, visual acknowledgment (within this operator station only) or point acknowledgment (system-wide by acknowledging the alarm point in the process station) are possible in this message line type.

Standard view.png

Area view of message line

The area-specific view of the message line is shown. In the message line there is a fixed position for each plant area. The number of associated, present messages is displayed for each plant area. The plant area is displayed in the priority color of the most important message. The most important message is detailed in the tooltip. Selecting a plant area button opens a plant area specific message list. With this message line view, no acknowledgment is possible as the Freelance system is based on the principle that only visible messages can be acknowledged.



Area view.png

List view of message line

The list view of the message line will be displayed. The four most important messages are displayed in the same format as on the message page. Depending on the configuration, either the oldest or the latest message appears at the top. Controlled scrolling in the mini list is not possible. Double-click to open the faceplate associated to the message. Depending on the configuration, visual acknowledgment (within this operator station only) or point

acknowledgment (system-wide by acknowledging the alarm point in the process station) are possible in this message line type.

List View.png

Tile faceplates

The faceplates are basically arranged side by side. This holds for both the faceplates already displayed and for those to be called up. With oversized user-defined faceplates, the space may not be sufficient for all faceplates to be arranged side by side. In this case, the first non-fitting faceplate is displayed right-aligned and may overlap other faceplates.

Cascade faceplates

The faceplates are basically arranged such as to overlap each other. This holds for both the faceplates already displayed and for those to be called up.

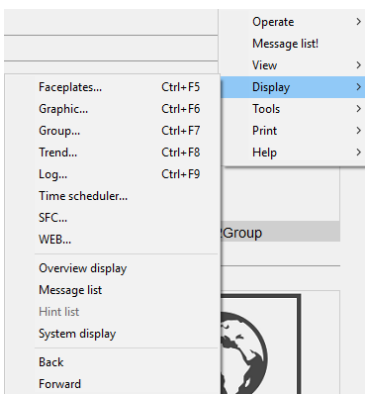
Close all faceplates

All current faceplates will be closed.

Close all unpinned faceplates

All current faceplates that have not been fixed with the pin button will be closed.

Display



Display.bmp

This menu is used for selecting a display from a list of all those available, or for selecting a tag. Except for overview display, message and hint list as well as system display, all of which only exist once per operator station, the Display Explorer with the name of all tags, displays and logs is started for all other menu items. The displays of the selected type are already open.

Faceplates

Opens the Display Explorer with expanded tags.

Graphic...

Opens the Display Explorer with expanded graphic displays.

Group...

Opens the Display Explorer with expanded group displays.

Trend...

Opens the Display Explorer with expanded trend displays.

Log...

Opens the Display Explorer with expanded logs.

Time scheduler...

Opens the Display Explorer with expanded time scheduler displays.

SFC...

Opens the Display Explorer with expanded SFC displays.

WEB...

Opens the Display Explorer with expanded WEB displays.

Overview

Opens the overview display.

Message list

Opens the message list.

Hint list

Open the hint list.

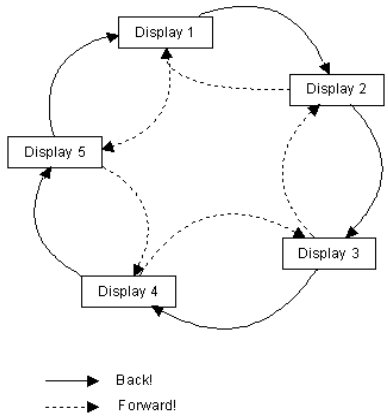
System Display

Opens the system display.

Back/Forward

Replace the current display by the corresponding display from the ring buffer.

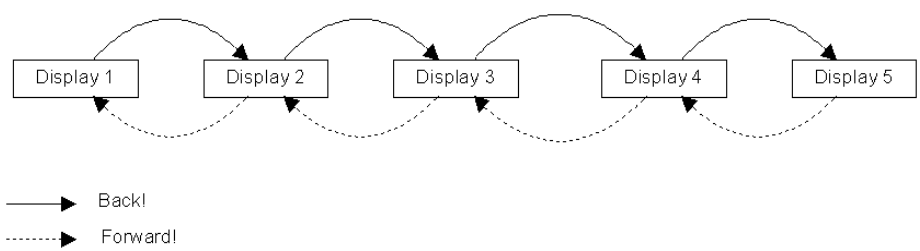
Freelance Operations stores the five most recently called displays in a ring buffer. The controls **Back** and **Forward** replace the current display by the corresponding display from the ring buffer, with no other input being required.



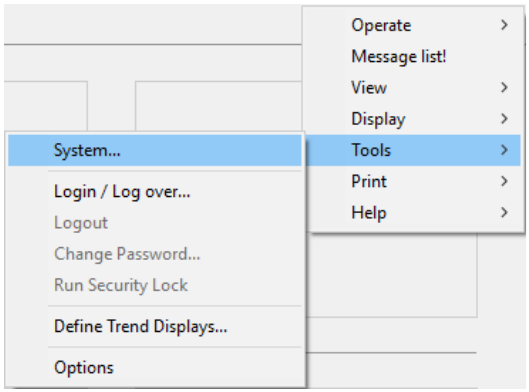
vc0630_us.png

Pressing Back and Forward leaves the content of the display memory unchanged, i. e. after calling one of these menu items five times, the initial display will re-appear. A new entry will be recorded in the display memory each time a display is called up via the menu, the context menu or a dynamic graphic object. The BACK/FORWARD buttons do not create an entry in the graphic memory! When a new display is called up, this replaces the stored display which would be reached by the next Forward! command.

The ring buffer can be switched on or off in the *Tools* > *Options menu* under *Cyclic back/forward display switch* . When the ring buffer is switched off, the 5 display entries are managed in a linear manner, i.e. after having called Back four times, the end of the buffer is reached. The first display is not called again as when the ring buffer is switched on. Once the last displays have been called using the Back button, the current pointer can be shifted again to the front memory locations by pressing Forward.



Tools



Tools.png

System… Here you can terminate Freelance Operations after having entered the password previously defined in Freelance Engineering.

Login / Log over…
Here you can login using your user name and password. Specific access rights are assigned to each user, depending on the configuration.

Logout Here you can log out. Only the rights for the user "GUEST" are active then. If the user wants to execute a function that is not available to the GUEST, he must log in again.

The following menu items can only be selected if User Management has been enabled.
When entering the user name and password the pattern of upper-case and lower-case characters must be correct.

Change Password
Here, users may change the passwords they need to identify themselves. First the old valid password must be entered, followed by the new password (twice).

The changed password is only valid for this operator station. If the same user is authorized to log in on another operator station, the previously used password is

still valid. It is recommended to change the password for the same user successively to ensure that an identical password is used on all PCs.

Run Security Lock

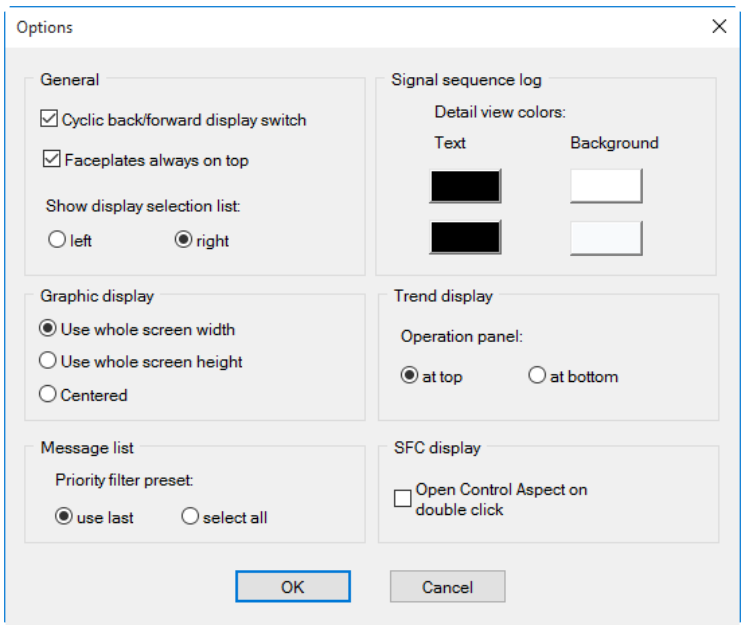
Security Lock is part of the User Management. Start the Security Lock upon password entry, provided that the user is authorized to use the Security Lock feature. Please also refer to **Engineering Manual-User Management** for detailed user permission management. Using the Security Lock program, users can be added or deleted, or access rights can be changed.

The following menu items are always available:

Define Trend Displays…

Opens the dialog box for trend display definition by the user (see Defining the trend display, page 113)

Options Opens the **Options** dialog box featuring the following settings:



Options.png

General

Cyclic back/forward display switch

Management of display memory as ring buffer memory or linear management (see Back/Forward, page 38).

Faceplate always on top

When changing to other Windows applications, the faceplates will always be displayed on top.

Show display selection list

Here you can select whether the Display Explorer appears on the right or left hand side of the screen.

Graphic display

Use whole screen width / height

The graphic display is shown over the entire width/height in the available graphic area with the aspect ratio remaining unchanged. Depending on the display size and the used monitor, the lower or right screen area may not be used or a part of the display is clipped and can only be reached by using the scrollbar.

Centered The complete graphic display is arranged and centrally aligned in the available graphic area.

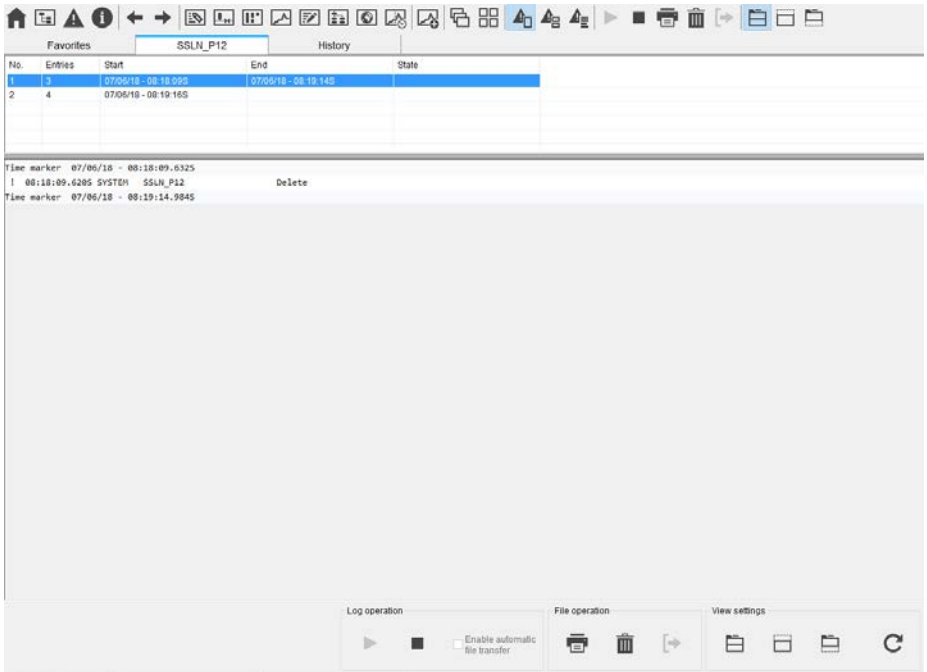
Message list Here you can select whether a set priority filter shall be used the next time a message list for a specific plant area is called up.

use last When calling up an area-related message page, the messages will be filtered according to the priority filters last used.

select all Messages of all priorities will be displayed when calling up an area-related message page.

Signal sequence log

Here you can configure the text and background colors for the signal sequence logs, so that you get alternating line colors which provide a better overview of the table, as shown in the example.

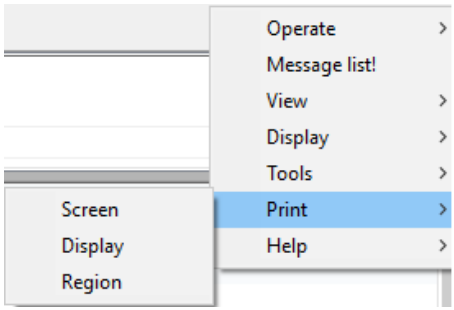


Signal Sequence log.png

Trend display Here you can select for trend displays whether the operating field shall be arranged above or below the curve.

SFC display If the Control Aspect/CBF Viewer is additionally installed, you can configure the system in such a way that this program opens on a double-click. With this setting, an automatically configured criteria window corresponding to the transition program will replace the criteria window to be configured.

Print



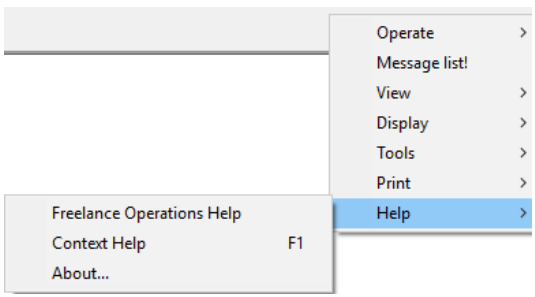
Print.png

Screen Outputs a copy of the entire screen currently displayed output to the printer.

Display Outputs only the display area of the screen to the printer, without the menu or dialog area.

Region Prints a selected section of the screen. To do so, you need to define the area to be printed. Press the left mouse button and move the focus to the appropriate section of the display. The selected section will be printed once you release the left mouse button.

Help



Help.png

Freelance Operations Help

Calls the Freelance Operations help system. This help system includes all important parts of the present manual.

Context Help	Helpful information on the current screen display.
About...	Provides information on the Freelance Operations software version.

Display selection

A good, straightforward system of display selection is particularly important for a control system. This ensures quick access to the area in question in order to take the necessary steps and control the process safely.

You can access all displays, tags and logs of this operator station. There are different access options.

Freelance Operations supports Multi Monitor functionality which makes it possible to customize the display types on up to four monitors. This can be done in Freelance Engineering. Display types which are enabled are presented as normal icon, disabled display types appear as grayed out icon and are inoperable.

Via the toolbar:

Left-click the symbol (e.g. graphic displays) > Double-click the appropriate graphic display in the Display Explorer

Via the menu

Display > **Graphic...** (e.g.) > Double-click the appropriate graphic display in the Display Explorer

Via a shortcut

CTRL + F5 to **CTRL + F9** > Select the appropriate display using the CURSOR KEYS > Enter

For further details on the display types, please refer to Process visualization, page 28.

In all cases the Display Explorer with the names of all available displays comes up. Double clicking the required display name selects the display.

In the Display Explorer, a quick selection is possible by entering the first letter of the tag or of the display name.

Via the context menu

The display selection via the context menu is a fast alternative for calling up displays. In addition to general displays, it is also possible to directly select the displays assigned to the tag.

Select tag > Call up context menu > Select the appropriate display.

For further details on the context menu, please refer to Operation using the context menu, page 25.

From the overview display

Alternatively you can select displays via the overview display.

To select a specific display, proceed as follows:

Left-click the appropriate symbol in the overview display
or
Select the appropriate symbol with the TAB key > ENTER

For further details on the overview display, please refer to Overview Display, page 83.

From a graphic display

In order to call up a display from a graphic display, a graphic object that features the **Show display** action configured with a display in Freelance Engineering must have been previously selected.

Left-click the appropriate graphic symbol
or
Select the appropriate graphic symbol with the TAB key > ENTER

Via the default display

A default display can be assigned to each tag when configuring the display assignment in Freelance Engineering, which provides quick access to plant status information during operation and monitoring in case of emergency, for instance. After selecting the tag, this display will be listed in top position of the context menu so that you can call it up with both the mouse and the keyboard:

Call up context menu >Left-click default display
or
F11

Only one default display can be configured per tag. The following types are available:

- graphic display,
- trend display,
- group display,
- SFC display,
- time scheduler display,
- WEB display,
- operation log,
- signal sequence log,
- disturbance course log,
- Excel report.

Window Tabs

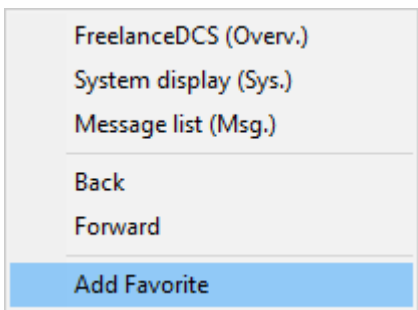
Favorites

Click the Favorite tab, and Favorite window is shown. Favorite window allows the operator to configure quick access to the favorite displays, trends, logs and so on, with which the operator can optimize personal usage with Freelance Operations software.

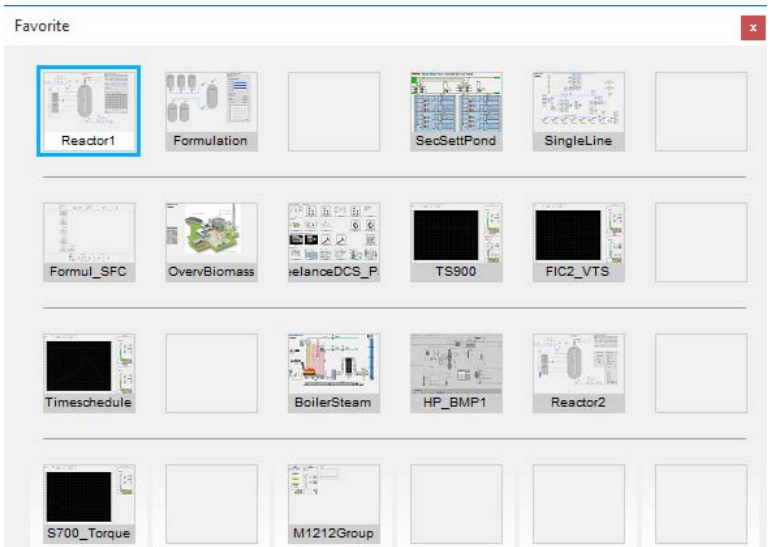
Favorite window contains 24 buttons (4 by 6). Each of the buttons can be configured to call up any display. In the following text, the term display is used as generic term for all displays that can be selected in Freelance Operations: graphic, group, WEB, and trend displays, logs as well as the overview or system display, the message list, all faceplates, the SFC displays and time scheduler displays.

For each button in the Favorite window it is also possible to assign any keystroke from the keyboard to each function. Therefore, the function keys F1 to F12 are available for configuration - as single keystroke as well as in combination with the CTRL, SHIFT or ALT key. Furthermore, the ASCII keys – with or without the SHIFT key - can be used in combination with the CTRL or ALT key. In the following text, all these keystroke combinations are called shortcuts.

Configuration of the Favorite window is performed in Freelance Operations. In a display interface, right click and choose the option “Add Favorite” in the context menu.



The Favorite window appears. Choose a position to place the display. Thus, a Favorite file is added successfully. Each Freelance user selects its own favorite display. Existing configurations can be imported and exported.



Favorite.png

Each display that is assigned to a button is represented by a thumbnail picture with the display name below it. The operator can move a display to another button by long-pressing the mouse and dragging the thumbnail picture to the target position. The operator can also change two displays position in this way.

Scope of the Favorite Window

The configuration of the Favorite window is according to the current logged-in user. If User Management has not been enabled, the user NOLOCK is used.

The Favorite window is not part of a special project, but rather belongs to an operator station. It is so there will be no modifications when loading a new project or a whole station from Freelance Engineering.

Saving the Configuration of the Favorite Window

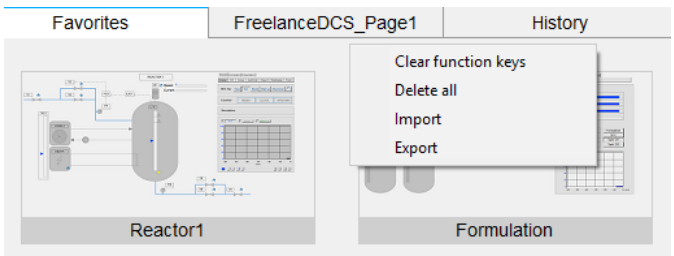
Every time the dialog box is closed, the Favorite window configuration is automatically saved in the file <user name>.qck. This file is stored in the default project directory:

<FreelanceData>\proj.

Functions of the Favorite Window

All functions described for the Favorite window can be called up from its context menu

Right click on a position between the displays (do not position mouse pointer on displays!).



Favorite Function.png

Clear function keys

All assignments of the function keys (shortcuts) will be deleted.

All functions of the soft buttons remain unchanged.

Delete all

All user-made assignments for the buttons and shortcuts will be deleted.

If the operator selects *Clear function keys* or *Delete all*, all standard keyboard assignments of the function keys, which had been pre-assigned for the use of the menu and the display, will then be available again.

Import

The file **'<username>.qck'** will be imported from **C:\<FreelanceData>\export\qselect**. If a configuration is already available on the operator station for the Quick Select window, a security dialog will ask if the operator really wants to delete the current configuration.

Export

To make the configuration available for other PCs, this menu item can be used to store configuration data as file:
C:\<FreelanceData>\export\qselect\<username>.qck.

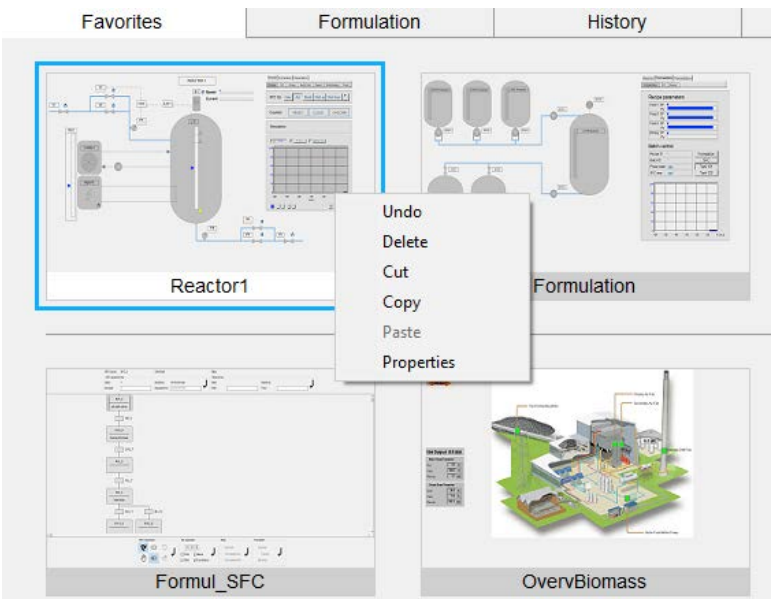
Functions of a Specific Button

Proceed as follows to open the context menu for a button:

Right click appropriate button

or

SHIFT + **F10**



Favorite-specific button.png

Undo

The last button configuration will be undone.

Delete

The assignment of the selected button is deleted. Pressing this button will no longer call up a display.

Cut

The configuration of the selected button is deleted and stored in the clipboard.

Copy

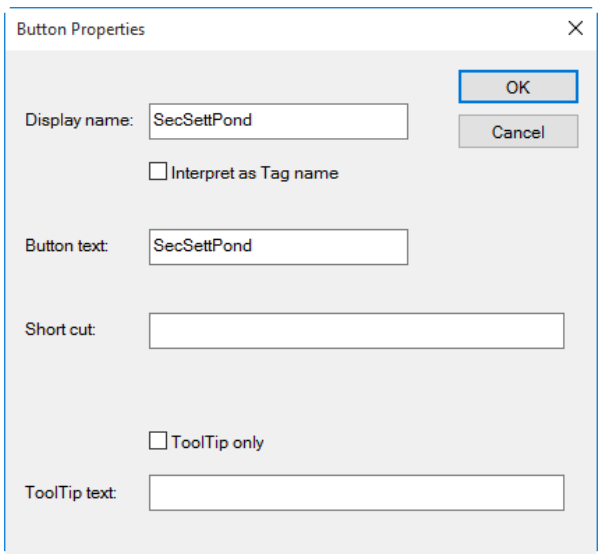
The configuration of the selected button is stored in the clipboard.

Paste

The content of the clipboard is assigned to the selected button.

Properties

A new dialog box with the characteristic data of a Favorite file, but one will be opened where the operator can specify additional properties.



Button Properties.png

Display name

Enter the name of the display or a tag in the edit field. With the Check box the operator must indicate whether the name should be interpreted as a display or a tag name.

Button text

Any text can be entered to be shown on the selected button.

Short cut

Instead of using the Favorite buttons, the linked display can also be called up via the keyboard. By pressing an appropriate combination of keys from the keyboard, this key combination is entered as the short cut of this button.

The operator can call up the assigned display at any time using this combined keystroke.

Caution!

For key assignment purposes it is also possible to define those combined keystrokes, which are normally pre-assigned to the system (F1 for Help, CTRL + F5 for Tag list), thus deleting the pre-assignments. There will be no system warning in such cases!

ToolTip text

The operator can enter any text in the edit field.

ToolTip only

☐ Tooltip text will be displayed as follows

<Display name>, <Shortcut> <Tooltip text>

e.g. <Reactor> <ALT + F8> <Plant display>

☑ only the entered tooltip text will be displayed.

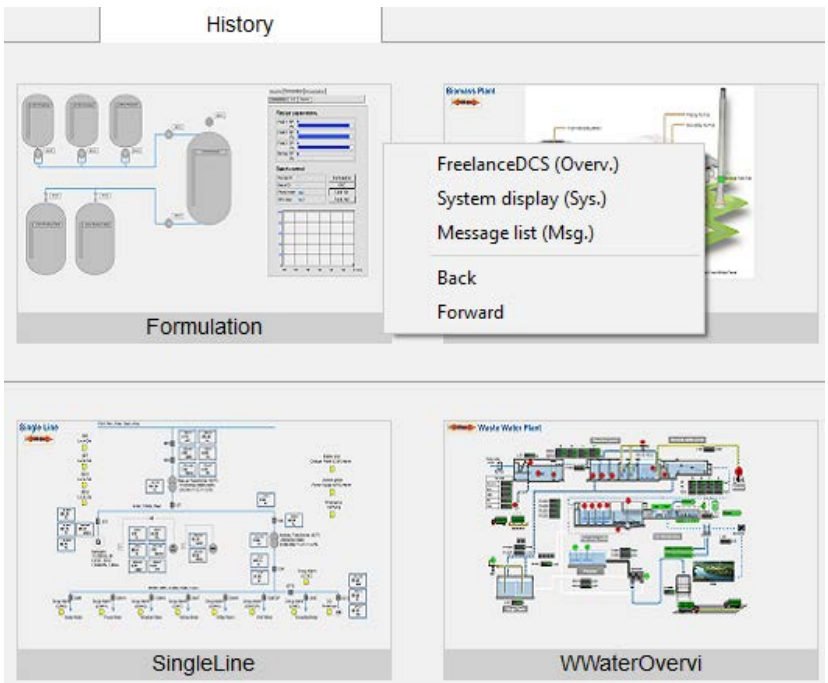
Active Window (middle tab)

The active window shows the current selected display.

History

The History window shows what the operator has accessed in Freelance Operations during present time operation. Any display the operator opened has been added in History window and would be displayed as one only with updated position.

From History window, with context menu, the user can access the Overview display, System display and Message list directly, as well as the displays opened recently with the **Back** and **Forward** option.



History overview.png

Scope of the History Window

The configuration of the **History** window is according to the current **logged-in** user. If User Management has not been enabled, the user **NOLOCK** is used.

The **History** window is not part of a special project, but rather belongs to an operator station. So there will be no modifications when loading a new project or a whole station from Freelance Engineering.

Section 3Messages and Hints

General description – Messages and hints

Errors and certain status deviations in the Freelance system are signaled by optical and acoustic messages.

The Freelance system provides the following message types: **system message**, **fault message**, **switch message**, **hint** and **hint message**. Depending on their process-relevant importance, these message types have different priority levels: namely one system level (subdivided into three groups S1–S3) and five user levels (1–5).

During configuration in Freelance Engineering, a specific **acknowledgement strategy** is assigned to each priority level. This acknowledgment strategy defines how the transmitted messages are to be acknowledged.

Messages and hints are displayed in the message line, message list, and hint list and can be acknowledged from the respective location. This does not apply to the plant view in the message line. In addition, the messages can be acknowledged via the context menu of the assigned faceplate and in a graphic display.

When Freelance Operations is restarted, the current project status is determined. For this purpose, active messages on all connected process stations are read-out together with the corresponding message time and displayed on the message page. This ensures that the actual time when the message was generated is indicated in Freelance Operations, even if the operator station was not active at that time.

Message types

In the Freelance system, messages are subdivided into the following **message types** according to their process-relevant importance:

System messages

System messages always have the **highest priority level** and are subdivided into the message groups S1 to S3. These messages cannot be configured or changed by the user. System messages are used to indicate a fault status of the system (hardware) itself.

Fault messages

Fault messages have the **priority levels 1 to 3**. Messages of this priority level are used to signal limit value violations, for instance.

Switch messages

Switch messages have the **priority level 4**. Messages of this priority level are used to indicate switching operations, e.g. *Valve Open/Closed*.

Hints

For each fault and switch message, a hint for the user can be configured in Freelance Engineering. A hint of this kind gives the operator the cause of the message, options for eliminating the process anomaly and, if necessary, further hints for operation. Hints appear only in the hint list.

Hint messages

Hint messages have the **priority level 5**. Hints are exclusively displayed in the hint list and serve for information purposes only.

Priority levels

Messages generated by the process stations can be of different importance for the smooth operation of the process. The Freelance system provides six different priority levels for messages. Four display colors are assigned to these priority levels:

Priority level	Message type	Display color
S1, S2, S3	System message	blue
1	Fault message	red
2	Fault message	orange
3	Fault message	yellow
4	Switch message	yellow
5	Hint message	white or yellow *)

*) A hint message is shown with a white background, if the hint does not belong to an alarm or if the accompanying alarm is **inactive**. A hint is shown with yellow background, if the accompanying alarm is **active**.

The same color is used to indicate the priority level of a message in the message line, message list and faceplates.

Message acknowledgement

Messages can be acknowledged in two different ways: by visual acknowledgment and by point acknowledgment.

Visual acknowledgment does not replace point acknowledgment; but provides an additional function.

Visual acknowledgment

With visual acknowledgment, the messages are marked as “viewed”. This type of acknowledgment has no effect on the current message status in the process station. It is available in the message line and the hint list.

By visual acknowledgment in the message line all listed entries are deleted. However, they are still present in the message list. Through the acknowledgment in the hint list the hint or hint message is marked as acknowledged. Acknowledging a hint does not affect the acknowledgement status of the associated message.

The visual acknowledgment is limited to the operator station on which it was performed.

Point acknowledgment

This type of acknowledgment is available in the message list, faceplates and graphic displays. If configured accordingly, it is also provided in the message line. It causes the message in the process station to be acknowledged. This changes the status of the message. The point acknowledgment has a system-wide effect as it is transmitted by the process station to all connected operator stations.

Acknowledgment level

There are three different acknowledgment levels (1-3) for acknowledging messages.

Acknowledgment level 1

This is the highest acknowledgment level. Messages with this acknowledgement level must be acknowledged for incoming and outgoing messages.

Acknowledgment level 2

Messages of this level must only be acknowledged if they are incoming.

Acknowledgment level 3

Messages of this level need not be acknowledged.

A message is qualified as **incoming** when the situation that caused this message has just occurred. The message is newly added to the message line and the message list.

Example:
A limit value violation is managed as incoming message until the monitored value reaches again the “normal range”.

A message is considered as **outgoing** when the situation that caused this message is no longer active. In some cases, acknowledgment must be used to remove these messages from the message line and the message list.

Example:
A limit value violation is qualified as outgoing message if it is no longer active and the relevant value has reached again the “normal range”.

Acknowledgment in the message line and message list

Depending on the configuration, **visual or point acknowledgment** are available in the message line. The active acknowledgement type can be recognized by the following symbols:

Visual acknowledgement of message or

Point acknowledgment of message.

Only point acknowledgment is available in the message list. The appropriate buttons can be found in the operation line.

This type of acknowledgment affects the message status. Possible combinations are:

Acknow-ledgment level	**Incoming message not acknow-ledged**	**Incoming message acknow-ledged once**	**Outgoing message not acknow-ledged**	**Outgoing message acknow-ledged once**	**Outgoing message acknow-ledged twice**
1	Full symbol flashing	Full symbol static	Empty symbol flashing	Empty symbol static	Not visible
2	Full symbol flashing	Full symbol static	Empty symbol flashing	Not visible	Not visible
3	Full symbol flashing	Not visible	Not visible	Not visible	Not visible

An **incoming** message is **active** on the process station.

An **outgoing** message is **no longer active** on the process station.

The **full symbol** is displayed at the left side of the message list. It is displayed as white or black text on a colored background. The background color depends on the priority.

The **empty symbol** is also displayed at the left side in the message list. It is displayed as colored text on a gray background. The text color (number and sign) depends on the priority.

Acknowledgment in the Hint List

The hint list only features visual acknowledgment. Visual acknowledgment does not affect the appearance of the messages or their acknowledgment level in the message list. The display of hints depends on the visual acknowledgment and the message status.

Message incoming and not acknowledged	**Message incoming** and **acknowledged**	**Message outgoing and not acknowledged**	**Message outgoing** and **acknowledged**
Black text on yellow background	White text on black background	Black text on white background	Not visible

Message with sound files

Several sound files can be configured for individual process messages and for message priorities in general. As these sound files are played successively without any interruption, they are referred to as the “sound file” in the following text.

The sound files for a message priority can be played during a status change from inactive to active and vice versa. The sound file for a specific process message is triggered when the message status changes from inactive to active.

There are three different options for processing sound files in the operator station:

- priority-controlled, oldest message,
- priority-controlled, newest message,
- chronological order.

One of these options is selected during configuration in Freelance Engineering.

The following section provides more detailed information on the processing of sound files:

Priority-controlled, oldest or newest message

In addition to the entry in the message list, all incoming messages at the operator station are stored in a cache while the sound file of a message is being played. When the playback of the sound file is completed, all newly received messages are checked and the next sound file to be played as per configuration is determined. If the cache does not feature a “more important” message with sound file, the last sound file is played again. Once the sound file has been played, the message entry is deleted from the cache and the sound file for the following message is played.

The current sound file is replaced by a newly received message in the operator station if the latter is “more important” according to the following criteria:

a. Incoming message status
   An incoming message (status transition from inactive to active) is more important than an outgoing message (change from active to inactive).

b. Higher message priority
   The ascending order of message priority is as follows: 5, 4, 3, 2, 1, S3, S2, S1.

c. Customized sound file
   An individually configured sound file is more important than sound files configured for the priority.

d. Time
   newest message: a new message is more important than the former message;
   oldest message: in the case of equal importance according to criteria a to c, the sound file of the oldest message is played again.

Using the **HORN off** button or **F12 key**, the current sound file can be stopped and the sound cache can be cleared.

Chronological order

In addition to being added to the message list, all incoming messages (message status changed from inactive to active) are stored in a cache in the correct chronological order. Outgoing messages are not processed.

The configured sound file of a message from the cache is played once. Once the sound file has been played, the message entry is deleted from the cache and the sound file for the following message is played.

This sound file sequence determined by the system can be interrupted by the operator. You can select a message in the message list and start the configured sound file. After the current sound file has finished playing, this user-selected file is played without any effect on the sound cache. Once this sound file has been played, the next file to be played is determined according to the configured algorithm.

If the sound file to be played is not available, a system message (priority S1) will be triggered and an entry will be created in the Windows event log. If the sound file for a priority S1 message is not found, this will only trigger the creation of an entry in the Windows event log without an additional S1 message.

The configured message filter is applied to the playing of sound files.

Sound files are not loaded by Freelance Engineering. These files must be copied into the following directory of the operator station PC:

<FreelanceData>\wave

Message line

The message line indicates faults in the process in the form of a message.

The message line is at the top of the screen. This display area cannot be overlaid by other windows and, thus, is always visible.

Structure

The messages occurring can be displayed in three different view types. The view can be changed using the toolbar or the *View* menu. The number of available views can be limited by the configuration in Freelance Engineering. The toolbar provides the following icons:

Standard view

Indicates each message in a separate field.

Plant view

Displays the associated number of messages for each plant area.

List view

Shows the four most important messages of the message list.

The following overview shows all possible components of the message line, depending on the selected view:

Hint field

The ABB symbol is active and marked with an i if messages arrive for which hints have been configured. The hint list can then be displayed.

If there are no hints there is no I in the ABB field.

Message fields

These fields include the following information:

- Standard view: Incoming messages
- Plant view: Plant areas with the number of messages
- List view: List with the four most important messages

If the number of active messages cannot be displayed on the screen, this field is shown with yellow background. This field is not available in the plant view.

The number indicated is the number of all active messages in this operator station. This field is not shown in the plant view.

Visual acknowledgment or normal acknowledgment, depending on the configuration. This button is not available in the plant view.

The control room or field horn is shown in color, when it is in operation. It can be switched off using this button.

The next sections provide more information about the different views.

Standard view

Standard view.png

Each message is indicated in a separate field. The tooltip for this field contains the same information as the message list. The number of fields depends on the screen resolution.

The message field display provides two lines: the first line includes the tag name and the second the message text configured for this tag.

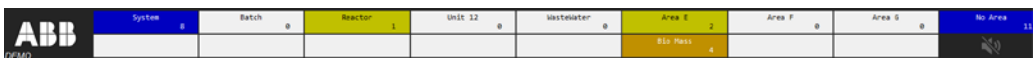
In addition, the message line contains the field for the display of the message line overflow, the field with the number of all messages included in the message list, the button for acknowledging the displayed messages (i.e. the button for visual acknowledgment or the button for point acknowledgment, depending on the configuration), and the button to switch off the signal horn.

Via the ABB button you can switch to the hint list. The hint list gives information on the issued messages, provided these have been configured in Freelance Engineering and hint messages are available.

It is recommended to select visual acknowledgment for this view. This allows you to empty the message line upon a quick check of the alarm priority and to recognize newly incoming alarms immediately.

If you use point acknowledgment for the message line, make sure to select the type of configuration with the latest alarm appearing in the top left corner. All newly incoming alarms are thus immediately visible.

Area view



Area view.png

Each plant area is displayed in a separate field. In addition to that, a plant area called *No Area* is displayed. All tag messages that are not assigned to a specific plant area, are displayed in this field. There is also a field called *System*, where all system alarms can be found.

Information on the most important message for the relevant plant area is provided in the form of a tooltip. This message defines the color and the flashing status of the button.

When you click a plant area, the display area shows the messages for this plant area. Via the ABB button you can switch to the hint list.

List view

List view.png

This view shows a list of the four most important alarm messages. The information about the messages corresponds to the information in the message list.

Moreover, the message line contains the field for the display of the message line overflow, the field with the number of all messages in the message list, the button for acknowledging the displayed messages, and the button to switch off the signal horn. Via the ABB button you can switch to the hint list.

Operating the message line

Message selection

Left-click message

Calling up a faceplate

Double-click message (only possible in the standard view)
or
Select message> **ENTER** (only possible in the standard view)
or
Call up context menu of message > Left-click associated faceplate

Calling up assigned displays

Right-click message > Left-click the appropriate display

Point acknowledging or visual acknowledging of messages


Selecting the button **Point-acknowledge message** or **Visually acknowledge message** in the standard view point-acknowledges or visually acknowledges all messages currently visible in the message line. There are two options in the list view: if a message has been selected, only this message will be acknowledged. If no message has been selected, all visible messages are acknowledged. If the overflow field is displayed with a yellow background, the subsequent messages are displayed when the operating button is pressed.

Left-click **Point-acknowledge message** or **Visually acknowledge message**
or

Set focus to message line with ALT + CURSOR KEY > **A key** or **ALT + A**

The visual acknowledgment will not acknowledge messages in the message list!

Switching off the horn

Whether or not the field horn is turned off with the control room horn or by a separately configured binary signal is defined during configuration. Furthermore, it is defined in the configuration of each control station if acknowledgement of the field horn causes the control room horn to be turned off.

Left-click **Horn off** button
or
menu **Operate** > **Horn off**
or
Set focus to message line with ALT + CURSOR KEYS > **O key** or **ALT + O** or **F12**

Opening the hint list

The hint list shows hints about the issued messages.

The button is only active when current hints or hint messages are available in this operator station.

Left-click the button **ABB**
or
Set focus to message line with ALT + CURSOR KEYS > **H key** or **ALT + H**

Message list

The message list contains all system messages (priority S1 to S3) and all process messages of priority levels 1 to 4. Depending on the messaging configuration in

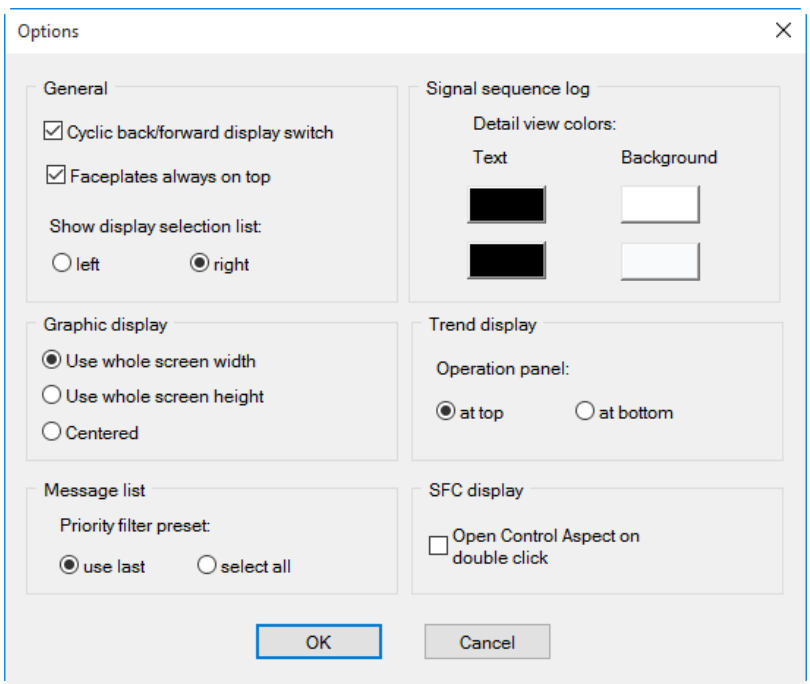
Freelance Engineering, the oldest message can be shown either at the top or the bottom of the list. In addition, it is defined in Freelance Engineering whether the display of messages from certain process stations or plant areas or of messages of a specific priority is suppressed.

The maximum number of messages in the message list is determined by the configuration of the operator station; it ranges between 10 and 4000 messages.

To call up different message lists (for the various plant areas), the default setting of the priority filters can be changed. Once you have changed the priority filter settings in a message list, you can select if this new setting is used again when you call up the message list the next time or if you want the settings to be reset.

> Tools > Options
or
ALT > T > P

In the following dialog you determine which priority filter presetting is valid. You can choose between the settings *use last* and *select all*.



Options.png

Calling up the message list

Left-click the symbol
or
> **Display** > **Message list**
or
Call up context menu > **Messages**

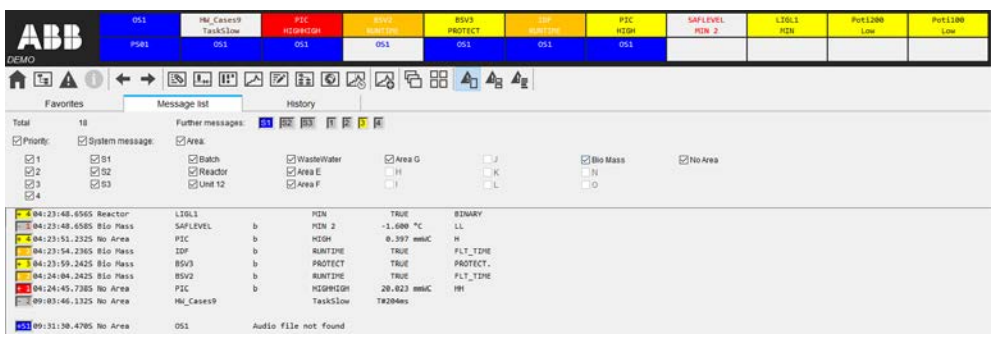
Clicking this symbol always calls up the entire message list containing all messages of all plant areas.

In addition, it is possible to call up the area-specific message lists that can be accessed from the message line in the respective area view only. Here, the plant area filters are set such as to ensure that only the messages of the selected plant area are displayed.

For calling up different message lists, the priority setting is evaluated.

Structure of the message list

The message list consists of a header, the list with the actual messages and the operating element area for message acknowledgment, operation of sound files and changing the display of the messages.



Message list overview.png

Header

The header line contains information about the message list. The total number of messages is indicated on the left hand side. On the right hand side colored boxes indicate if any messages exist outside the currently displayed page. If a box is highlighted with its priority color, messages of that priority are not visible on the screen.

Several checkboxes are available to filter the messages. When you tick a checkbox, the associated messages are shown. By a left-click on the non-indented checkboxes on top of a list, all indented checkboxes arranged below are ticked/unticked.

The following options are available:

Priority Apart from selecting all messages, messages assigned to a certain priority level can be hidden.

System message Apart from selecting all messages, messages assigned to certain system messages can be faded out.

Plant area Apart from selecting all messages, messages assigned to a certain plant area can be faded out.

The messages are filtered as follows:

Left-click appropriate option
or
> **Operate** > Select filter > Select level
or
ALT > **O** > Use CURSOR KEYS to select filter > **ENTER** > Use CURSOR KEYS or appropriate number keys to select level
or
Focus in display area > Use TAB KEY to select checkbox > Use SPACE BAR to change checkbox

If there are more messages than can be displayed in the display area, this is indicated by a scroll bar on the right edge of the area. The assigned priorities or assigned system messages of the messages in the non visible display area are

indicated by a color code under *Further messages*. The color corresponds to the priority level.

List with messages

The display of process messages can be changed in the operating element area. The **Value**, **Long text** and **Long text / Message type** formats are available for this purpose. The formats differ in the type of information presented to the operator. For system messages only a fixed display format is available.

The following overview shows the explanations of the individual formats. The terms used are explained below the overview table.

Value	Sound	Prio	Time	Area	Tag	S text	ST text	Measured value, Dim.	Type	Date
Long text	Sound	Prio	Time	Area	Tag	S text	L text	ST Text		Date
Long text/ M.type	Sound	Prio	Time	Area	Tag	S text	L text	Type		Date
System message	Sound	Grp	Time	Area	Tag	Fault text				

Sound Field specifying whether the message is associated with a configured sound file. Only messages for which a sound file has been configured during configuration are marked with the sound symbol. General sound configurations for all messages of identical priority in the local message configuration are not visualized here.

Prio Priority of the message with (+) prefix for incoming or (-) prefix for outgoing. Indicates the priority level by appropriate digit and associated color.

Grp System message group defined by the system (S1–S3).

Time Time of occurrence of the message; 1/1000 s resolution.

Area Plant area to which the tag is assigned.

Tag Designation of the tag that released this message.

S text Short text of the tag.

L text Long text of the tag.

ST text Status text of the message.

Measured value Measured value recorded when the message was generated (e.g. limit value).

Dim Dimension of the measured value.

Type A message type is assigned to each message. For limit values, the message type corresponds to the configured limit value type (e.g. HH for the second high limit value).

Date Only shown with the first message and after a date change. A date change is indicated by a horizontal red line.

Operate menu

The *Operate* menu for the message list contains the following menu items:

- Priority filter
- System alarm filter
- Plant area filter
- Acknowledge block
- Acknowledge page
- Play sound file
- Stop sound file
- Horn off
- Format: Value
- Format: Long text
- Format: Long text/message type

Operating panel

The operating element area contains the followings buttons:

Acknowledge page
Point acknowledgment of all messages shown in the display area.

 *Acknowledge block*
Point acknowledgment of all messages previously selected in the display area.


Play Audio
Plays the audio file configured for the message.

The *Play audio file* button can only be activated when an audio file has been configured for the selected message. Once the button has been pressed, the selected audio file is played on a cyclic basis.


Stop Audio
Stops playing the audio file

Format: Value, **Format: Long text, format: Long text/message type**
These check boxes allow the display of the process messages to be changed. See also List with messages, page 73.

When the format is toggled, any empty lines in the list are deleted.

Messages with configured audio files

Messages with configured audio files are identified in the message list by the bell symbol.

The assigned audio file can also be started manually.

Display of different priority levels

The different priority levels are displayed at the beginning of each list entry. The following symbols are used:

The priority levels differ in background color and the appropriate digit.

Display of incoming and outgoing messages

The priority level of a message is indicated with a sign. The sign indicates the incoming (+) or outgoing (–) status of the message. Incoming messages can also be recognized by their colored background. Outgoing messages are marked by colored text on a gray background. The symbol of unacknowledged messages is shown in color and is flashing.

Operation of the message list

Calling up Faceplates

After selecting the message of a tag, the associated faceplate can be called up.

Double-click message
or
Call up context menu of message > Left-click associated faceplate
or
Set focus to message list with ALT + CURSOR KEYS > Use CURSOR KEYS to select message > Use SPACE BAR to select message > ENTER

Calling up assigned displays

After selecting the message of a tag via the context menu, the displays assigned to this tag can be called up.

Call up context menu of message > Left-click appropriate display
or
Use CURSOR KEYS to select message > Use SPACE BAR to select message > **SHIFT + F10** > Select display

Acknowledging messages by page

All messages shown on the current page will be point acknowledged.

In operating element area: click *Acknowledge by page*
or
Operate > **Acknowledge page**
or
Alt, O, C

Acknowledging messages by block

All previously selected messages are point acknowledged.

Select messages > In operating element area: click *Acknowledge by block*
or
Select messages > **Operate** > **Acknowledge block**
or
Select messages > **Alt, O, B**

To provide a better overview, the gaps of the outgoing or deleted message in the display area are only filled when the message list is scrolled.

Hint List

Each operator station has a hint list. The hint list provides information on messages that may occur, provided these have been configured in Freelance Engineering.

When configuring the hint list, the configurator defines in Freelance Engineering whether only the hints for process messages of priority 1 to 4 or also the hints with message priority 5 are displayed. The hint list can be configured to show the latest hints either at the top or the bottom of the list.

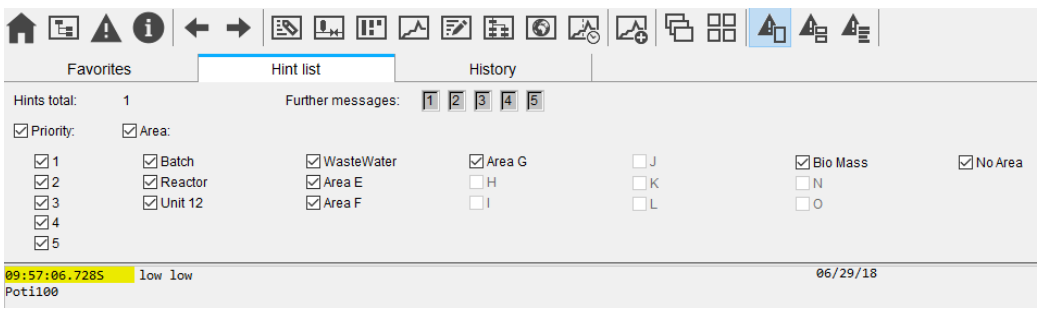
Calling up hint list

The button for the hint list in the toolbar is only active if one or more hints or hint messages are active.

Left-click toolbar icon
or
> **Display > Hint list**
or
In the message line: Left-click the ABB logo
or
Set focus to message page with the CURSOR KEYS > H key and/or ALT+H

Structure of the hint list

The hint list consists of a header, the list with the actual hints, and the operating element area with three buttons.



Hint list.png

Header

The header line contains information about the hint list. The total number of hints is indicated on the left. On the right, priority boxes show whether hints overflow the current page. If a box is highlighted with its priority color, messages of that priority are not visible on the screen.

Several checkboxes are available to filter the hints. When you tick a checkbox, the associated hints are shown.

The following filters are available:

Priority

Apart from selecting all hints, hints assigned to a certain priority level can be faded in or out.

Plant

Apart from selecting all hints, hints assigned to a certain plant area can be faded in or out.

The messages are filtered as follows:

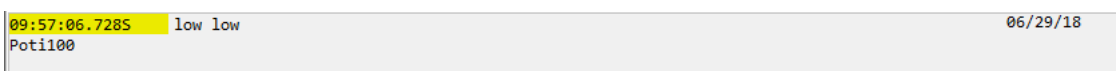
Left-click appropriate option
or
Operate > Select filter > Select level
or
Focus in display area > Use TAB KEY to select checkbox > Use SPACE BAR to change checkbox

If there are more hints than can be displayed in the display area, this is indicated by a scroll bar on the right edge of the area. The priority assigned to the hints in the non visible display area is shown by a color code under *Further messages*. The color corresponds to the priority level.

List with hints

All hints in the hint list are displayed in a uniform three line format.

Example:



List with hints.png

The following information is available:

Line 1: Time Text

Line 2:	Tag	Text
Line 3:	Display name	Text

The time field can be highlighted in yellow. Then the message has incoming status. If it is on a white background, it has outgoing status.

The terms used are explained as follows:

Time	Time stamp of occurrence of the message. 1 ms resolution.
Tag	Designation of the tag that released this message.
Text	Configured hint text of up to three lines.
Display name	The display assigned to the hint; can be called up via the button  in the operating area.

Operating the menu

The *Operate* menu for the hint list contains the following menu items:

- Priority filter
- Plant area filter
- Acknowledge block
- Acknowledge page
- Display

Operating panel

The operating element area contains the followings buttons:

Visually acknowledge page: Visual acknowledgment of all hints shown in the display area.

Visually acknowledge b**lock**: Visual acknowledgment of all hints selected in the display area.

Display: Calls up the display configured for a hint.

The **Display** button is only active if a display was configured for a hint in Freelance Engineering.

Operating the hint list

Calling up faceplates

After selecting the hint of a tag, the associated faceplate can be called up.

Double-click appropriate hint
or
Call up context menu > Left-click tag name
or
Set focus to hint list with ALT + CURSOR KEYS > Use CURSOR KEYS to select hint > Use SPACE BAR to select hint > ENTER

Calling up Assigned Displays

After selecting the hint of a tag via the context menu, the displays assigned to this tag can be called up.

Call up context menu of hint > Left-click appropriate display
or
Use CURSOR KEYS to select hint > Use SPACE BAR to select hint > SHIFT + **F10** > Select display

Acknowledge Hints by Page

The acknowledgment of hints in the hint list is a visual acknowledgment only. It does not affect the display of messages in the message list.

In operating element area: Left-click 
or
Operate > **Acknowledge page**

or
ALT > O > C

Acknowledge hints by block

All selected hints are acknowledged.

Select hint > In operating element area: Left-click 
or
Select hint > **Operate** > **Acknowledge block**
or
ALT > O > B

Section 4 Overview Display

General description – Overview display

The process information for the entire plant can be presented in concentrated form in an overview display.

In the Freelance system, one overview display can be configured for each operator station. When configuring the operator station, you can specify whether the default display or a user-configured display is to be used as the overview display.

In the standard overview display the following display types can be selected: group display, trend display, graphic display, time scheduler display, SFC display and WEB-display. Logs can also be called up directly from the overview display. An overview display comprises 16 lines of 6 columns; therefore up to 96 entries can be configured.

Calling up an overview display

Via the toolbar:

vh_e0013_us.png

Left-click the toolbar icon

Via the Display menu item

Display > **Overview display**
or
ALT + I > V

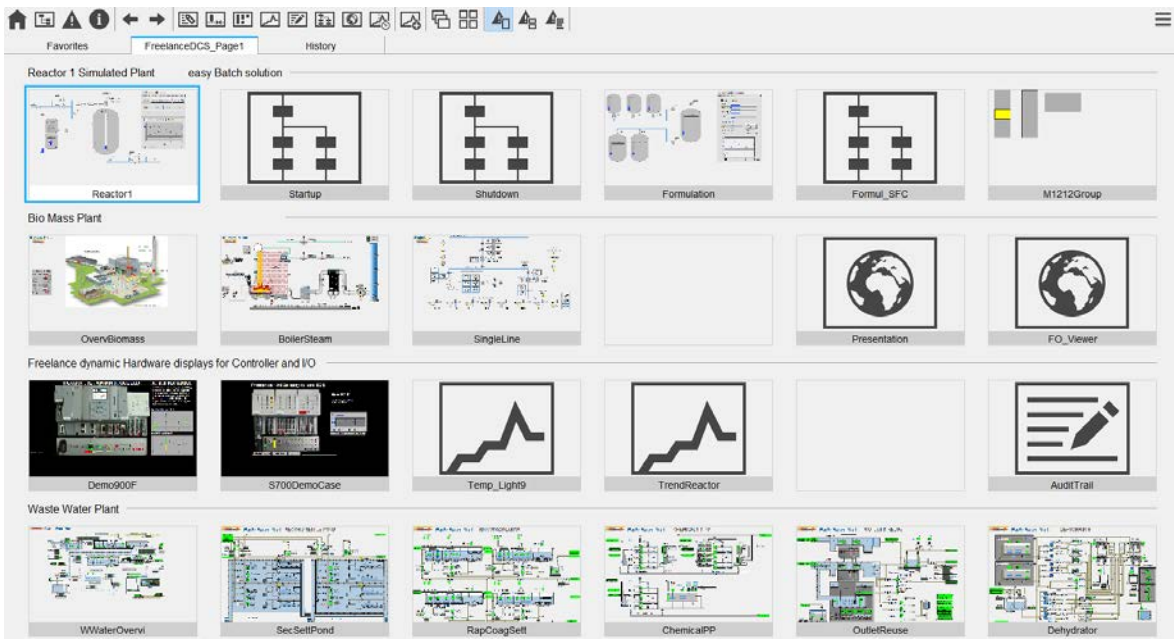
Via the context menu

Call up context menu > Select overview display

From a graphic display

Left-click graphic object with appropriate configuration
or
Use TAB KEY to select appropriate graphic object > ENTER

Operation in the overview display



Overview Display.png

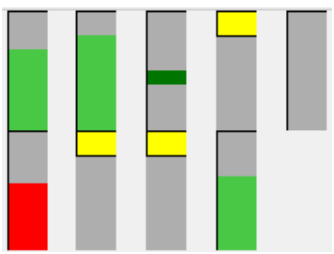
If available, additional overview displays can be called up on additional pages (tabs).

Display selection from the overview display

Left-click a display type symbol (group display, trend display, etc.)
or
Use CURSOR KEYS to select a display type symbol > ENTER

Display type symbols

Group display



grp.png

Graphic Display

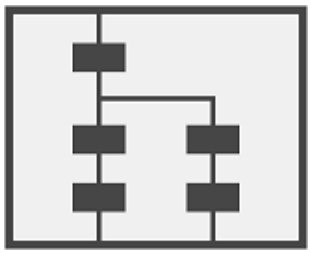
(the configured graphic is shown in miniature)

Graphic.png

Trend display

Trend.png

SFC display



sfc.png

Logs

Log.png

Excel reports

Excel.png

Time Scheduler Display

Time Scheduler.PNG

WEB display

Web.PNG

Dynamics in the group display symbol

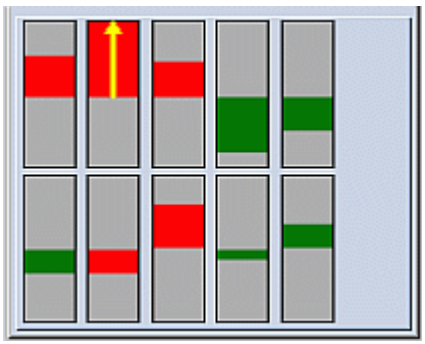
The group display symbol is the only dynamic symbol in the overview display. Even in the overview display, this symbol makes it possible to gain rough information on the types and statuses of the tags in the subsidiary group display.

General

Displays in red indicate that there is a message for the corresponding tag. If a counter overflow occurs or measured values have passed out of their measuring range, a yellow arrow is displayed for the tag in question.

Controller

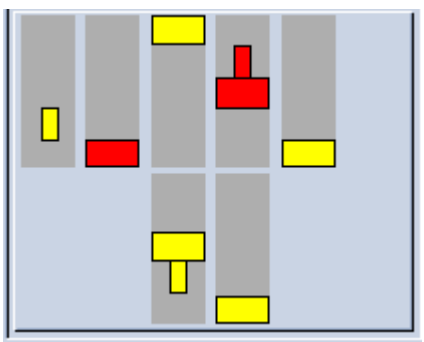
A bargraph depicts the control deviation in both positive and negative directions. The bar graph display normally appears in green. If there is a message, it is shown in red and in case of a deviation of more than 25% between setpoint and actual value, a yellow overflow arrow is shown pointing up or down.



vh_e0118.png

IDF

The small rectangle at the top, bottom or in the middle indicates the status of the final control element (Off, Stop or On). The even smaller rectangle above and below the center is always shown in color if a run arrow is displayed in the subsidiary faceplate.

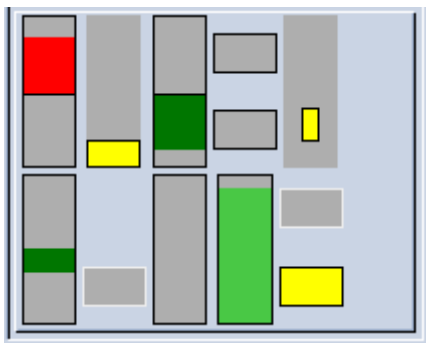


vh_e0117.png

Mixed

Constants and user-defined function blocks

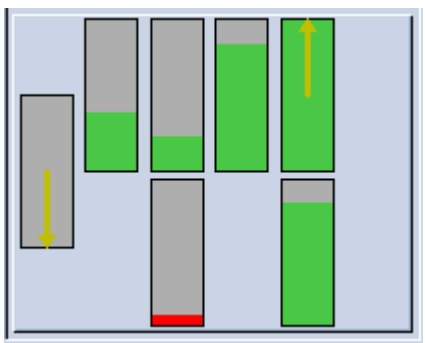
There are no dynamics for these function block types. A gray rectangle is displayed to mark the used area in the group display.



vh_e0115.png

Counter and analog monitoring

A bargraph indicates the current counter position or analog value. An overflow or undershoot is indicated by a yellow arrow in the bargraph.



vh_e0116.png

FPX and PLI

The Freelance PhaseX (FPX) and Phase Logic Interface (PLI) function blocks are interfaces between the 800xA Batch recipe package and the Freelance process stations. The current state is indicated by colored rectangles and their position. For more detailed information, please refer to Batch control function blocks, page 180.

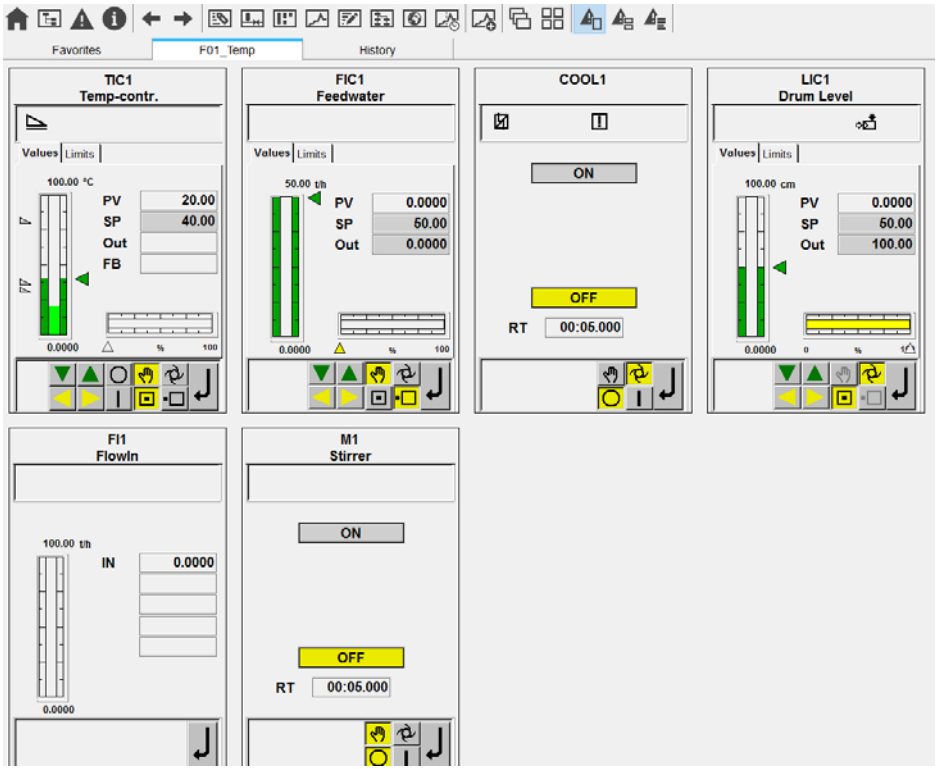
vh_e0119.png

Section 5 Group Display

General description – Group display

A group display is a combination of several faceplates. It offers the user the opportunity of displaying related functions in one display. After selecting one of the displayed faceplates the corresponding function is operable. The composition of the group display is defined during configuration in Freelance Engineering.

In the group display, the faceplates are arranged in a grid. If it is not possible to show all faceplates completely in the display area, scrollbars are provided.



Group display.png

Calling up the group display

Via the toolbar

vh_f0003_us.PNG

Left-click toolbar icon > Double-click the appropriate group display in the display explorer

Via the Display menu item

Display > **Group displays** > Double-click the appropriate group display in the display explorer
or
CTRL + F7 > Use CURSOR KEYS to select the appropriate group display > ENTER
or
CTRL + F6 > Enter first letters of the display name > ENTER

Via the context menu

In order to call up a group display via the context menu, you must first select a tag to which a group display has been assigned in Freelance Engineering using the *Display access* function.

Select tag > Call up context menu > Select the appropriate group display

From the overview display

Left-click appropriate group display symbol
or
Use CURSOR or TAB keys to select appropriate group display symbol > ENTER

From a graphic display

In order to call up a group display from a graphic display, a graphic object that features the *Show display* action configured with a group display in Freelance Engineering must have been previously selected.

Left-click graphic object with appropriate configuration
or
Use TAB KEY to select appropriate graphic object > ENTER

Operating procedures in the Group display

You can directly operate the tags shown in the group display by clicking the appropriate faceplate. All user actions can be performed as required, provided that this has been enabled.

In addition, all tags of the group display are listed in the *Operate* menu. They can be operated in the faceplate via the keyboard using the **Alt + O** key combination and the CURSOR KEYS.

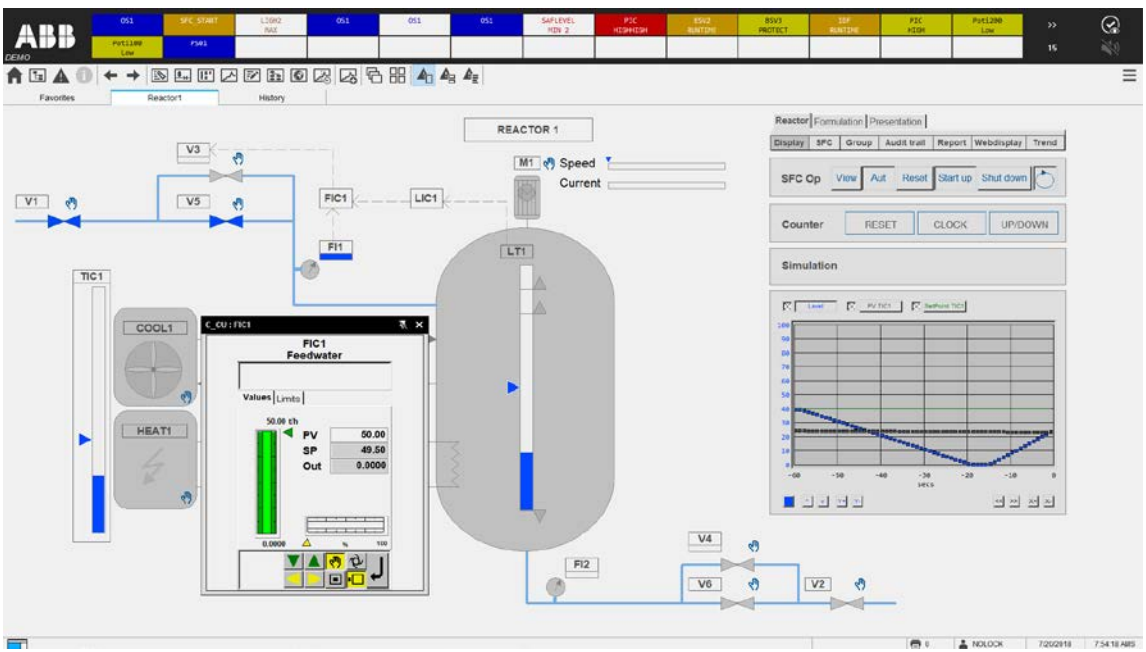
For more detailed information on operation in the faceplates, please refer to Faceplates, page 133.

Section 6 Graphic Display

General description – Graphic display

In addition to standard displays such as overview display, group display or trend display, it is possible to create plant-specific graphic displays. These graphic displays can comprise a combination of static and dynamic elements and are designed according to the requirements of the user.

The static part can be, for example, the schematic structure of the plant as background display.



Graphic display.png

Current process data and process state information can be presented in digital or analog form (e.g. bar graph, fill level or trend) in the required position as a dynamic foreground display.

Depending on the process status the graphic symbols can be alternated, the colors or positions in the display can be changed or colors can flash.

With configurable display selection buttons and areas, a selection hierarchy for operation can be created within the free graphic displays.

The shown graphic display together with an additionally called up faceplate contains some options of displaying current process data in plant-specific form in the Freelance system.

Calling up a graphic display

Via the toolbar

vh_f0003_us.PNG

Left-click toolbar icon > Double-click the appropriate graphic display in the display explorer

Via the Display menu item

Display > **Graphic displays** > Click the appropriate graphic display in the display explorer
or
CTRL + F6 > Use CURSOR KEYS to select the appropriate group display > ENTER
or
CTRL + F6 > Enter first letters of the display name > ENTER

Via the context menu

In order to call up a graphic display via the context menu, you must first select a tag to which a graphic display has been assigned in Freelance Engineering using the *Display access* function.

Select tag > Call up context menu > Select the appropriate graphic display

From the overview display

Left-click the appropriate graphic display
or
Use CURSOR or TAB keys to select appropriate graphic symbol > ENTER

From a graphic display

In order to call up a graphic display from another graphic display, a graphic object that features the *Show display* action configured with a graphic display in Freelance Engineering must have been previously selected.

Left-click graphic object with appropriate configuration
or
Use TAB KEY to select appropriate graphic object > ENTER

Displaying a graphic display

The display of a graphic can be configured according to the monitor screen resolution. The area available to display of a graphic varies due to different heights of the menu and status bars, for example. A configured graphic display designed for another resolution is scaled for display, keeping the aspect ratio unchanged. Thus, either the full height or the full width of the available area can be utilized.

These settings can be made under *Tools* in the *Options* dialog box in the *Graphic display group*.

Show display over full screen width

Tools > **Options** > **full screen width**

The graphic display is shown over the entire width in the available graphic area with the aspect ratio remaining unchanged. Depending on the display size and the used monitor, the lower or right screen area may not be used or a part of the display is clipped and can only be reached by using the scrollbar.

Show display over full screen height

Tools > **Options** > **full screen height**

The graphic display is shown over the entire height in the available graphic area with the aspect ratio remaining unchanged. Depending on the display size and the used monitor, the right screen area may not be used or a part of the display is clipped and can only be reached by using the scrollbar.

Show display centered

Tools > **Options** > **Centered**

The graphic display is centered on the screen.

Operating procedures in the Graphic display

Additional to the visualization of process data each dynamic graphic object can be configured with an action. This action is performed by a single click.

Four types of action are available for each dynamic graphic object alternatively:

- Display or log selection
- Faceplate selection

- Writing of process variables
- Message acknowledgement

Selecting a display via a graphic display

It is possible to jump to other graphic displays using a configured dynamic graphic object. This display change is initiated by left-clicking the graphic object.

Selecting a faceplate

It is possible to call up any faceplate using a configured dynamic graphic object. This faceplate is called up by double clicking the graphic object.

Writing of Process Variables

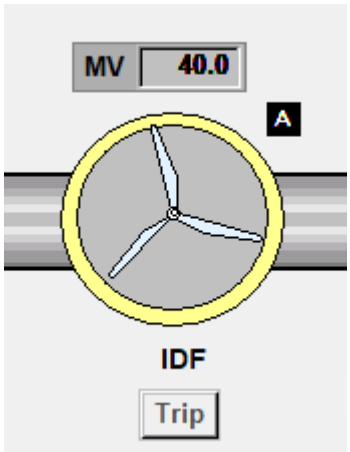
Using a dynamic graphic object, the analog and binary process variables can be changed. There are different options to manipulate process variables:

- You can write a new process variable in an edit field. Confirm the writing action with OK or ENTER. You can cancel the writing action at any time with ESC.
- You can continuously manipulate process variables by permanently clicking graphic elements (e. g. arrow keys).
- You can manipulate process variables within a certain range by shifting a graphic element (e. g. a cursor in a bargraph).

Acknowledging messages

Depending on the configuration, a single left mouse click will acknowledge one or several messages.

Dynamic display elements



Dynamic.png

Displaying analog values

Analog values can be displayed using bar graphs, fill levels, graphic symbol positioning and, of course, alphanumeric displays.

Bargraph

Display of analog values by filling a rectangular form, with the rectangle being filled horizontally or vertically.

Fill level

Similar to a bar graph, but the area to be filled may be of any shape.

Symbol position

Symbols can be moved continuously based on an analog value.

Alphanumeric display

Display of analog values in numerical form in different sizes and colors.

Changing analog values

Left-click the adjustable numerical value > Change value > 

or

Controllable values can also be changed by scrolling the appropriate cursor.

Subsequently confirm with 

or

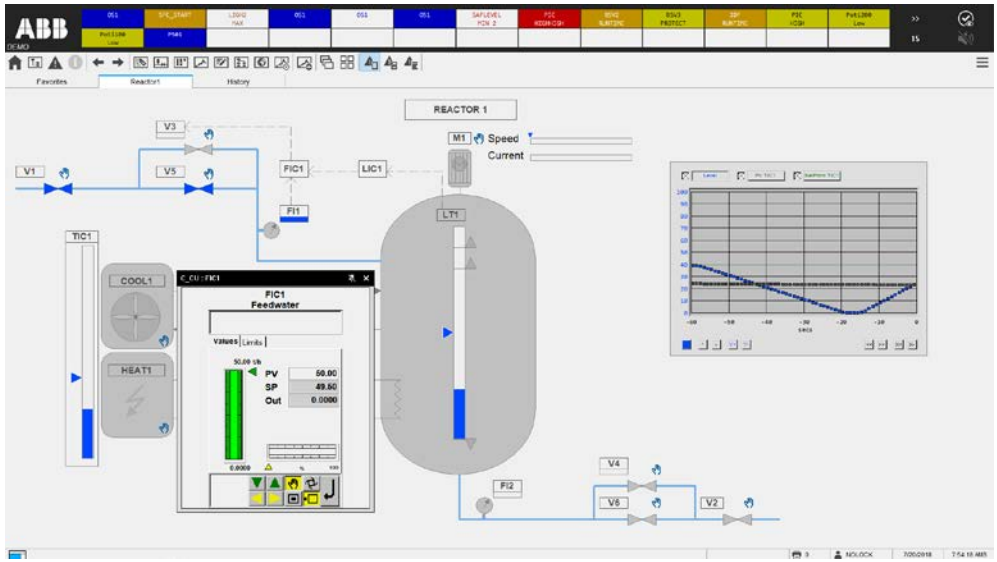
Use the TAB key to select appropriate numerical value > ENTER > Change value > ENTER

Displaying binary signals

If configured, the color of graphic objects will change depending on the values of binary signals; depending on binary states, graphic objects may also be displayed in different positions.

Trend window in the graphic display

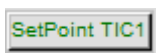
The temporal progression of up to six measurement values can be followed in a trend window. Unlike the trend display, the trend window in the graphic display does not include a history. This means that the trend window does not start displaying curves until the graphic display is called up.



Trend window in graphic.png

Operations in the trend window can always be performed via the **context menu**, and in some cases via the toolbar icons – however the toolbar icons are only visible if configured accordingly in Freelance Engineering. Below you can see the toolbar icons, next to the menu items.

Selecting tracks

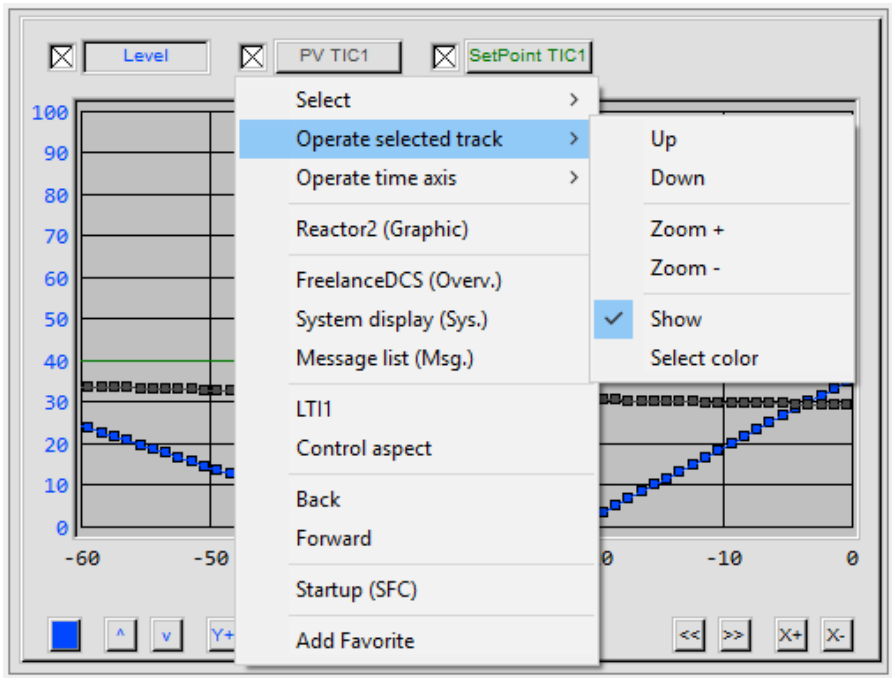


By pressing the button with the variable name, the respective track is selected and can be operated in the *Operate selected track* menu.

Operating tracks

Call up context menu > **Operate selected track**

Here you will find all operating options for a track. The associated five buttons (bottom left corner in the trend window) change color depending on the track selected in the upper left section of the trend window.



Operate track.png

Up Shifts the selected trend upwards.

Down Shifts the selected trend downwards.

Zoom + Reduces the displayed measuring range for the selected trend by half (curve increase)

Zoom Doubles the displayed measuring range for the selected trend (curve decreases)

SetPoint TIC1 **Show**

The track selected in the context window or marked in the symbol is displayed in the trend window - in the example track LI704.

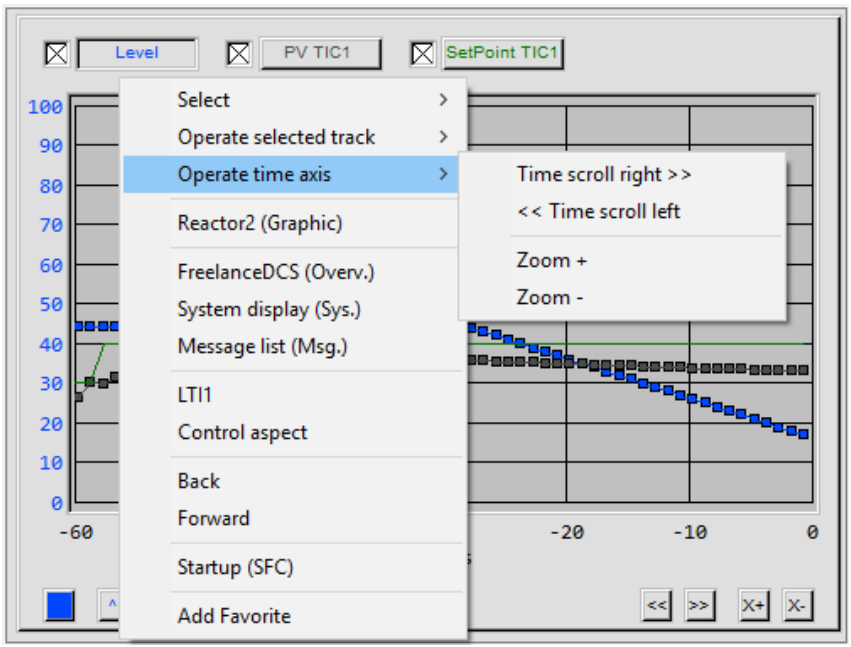
Select color

Here you can modify the trend color.

Time axis

Call up context menu > **Operate time axis**

Here you can find all operating features of the time axis.



Operate time axis.png

These buttons (bottom right corner in the trend window) always remain the same.

Time scroll right>>
Scrolls the selected trend to the right (towards the present).

<< Time scroll left
Scrolls the selected trend to the left (toward the past).

Zoom + Reduces the displayed time range by half (stretches the curve in horizontal direction).

Zoom – Doubles the displayed time range (compresses the curve in horizontal direction).

The trend window in the graphics display does **not save the settings** specified in the operating dialog. Each time it is called up the display commences with the originally configured settings.

Section 7 Trend Display

General description – Trend display

A trend display is the visual representation of a trend recorder. It shows the chronological progression of analog and binary process variables as trend curves in an X-Y coordinate system, where **up to six process variables** can be graphically represented in a display. Trend displays can be configured in Freelance Engineering and defined by an operator station user. In order for a trend display to be defined by an operator, a trend server must have been configured in the project. In a trend display, the operator can zoom in and out, show and hide, and scroll the display of the measured values.

There a two types of trend acquisition: the **Trend server** is used for the acquisition of any variable – even for a trend from different process stations. This trend server makes all the variables in the project available to the trend displays in the operator stations. The minimum acquisition time for this is 1 second. The trend server does not store any historical values, but provides instantaneous values only. The archives are created and saved on the operator station.

The trend acquisition block allows process values with extremely fast data changes to be acquired directly in the process stations. Thus, the acquisition time is the same as the task cycle time. Two types of archives are available: a short-term and a long-term archive:

Short-term archive with trend acquisition block

When selecting a trend display associated with a trend acquisition block, the short-term history of the individual trends is displayed. In this moment, 200 process values per trend are read from the process station. Then - per second - the 30 current process variables are written into the short-term archive.

Short-term archive with trend server

Upon selection of a trend display associated with a trend server, no historical data are available. One value per track is read in the data acquisition cycle. If the trend display remains switched off, it will increase continuously due to newly acquired values. The short-term history can be stored for a short time only. After this period, older values are cleared from the memory when new values are received. When the short-term archive with trend server is closed, all historical data are lost.

Long-term archive

The long-term archive saves data for display of historical information that go beyond the short-term archive time, regardless of whether or not the associated trend display has been called. With a long-term archive associated with a trend acquisition block, the data are recorded in a trend acquisition block of the process station. A maximum of 200 process values with time stamp are transferred from the process station to the long-term archive in each archiving cycle. The data for the long-term history are stored in the form of archives on the operator station's hard disk. This archive can also be copied by FTP (File Transfer Protocol) to an FTP server. The target can also be a disk drive of an operator station. Using the **Archive Browser** add-on program, these files can subsequently be displayed and converted into CSV format for further processing.

For data acquisition with a trend server, the process data is read in the configured cycle time of the trend server and saved in the operator station. Long-term archiving corresponds to the long-term archiving of trends from an acquisition block, with the exception that only one value per track is archived in each archiving cycle.

Although the number of trend server based long-term trends is not limited by the configuration, it depends on the PC’s performance. Missing track parts or slow reactions of Freelance Operations – up to inoperability of the system – may indicate that the system is overloaded. In this case, it is recommended to reduce the number of long-term archives or to extend the archiving cycle (acquisition cycle).

Start-up characteristics

After changes have been made in Freelance Engineering and downloaded to the operator station, the trend display appears with the configured values. Previous changes of the display characteristics made by the operator after the last download are lost and replaced by the configured values. Operator-made changes of the visualization are stored in Freelance Operations. The next time it is called up, the trend display appears again with these settings until the next download to the same trend.

If the system time is set back by a time that is longer than the trend acquisition cycle (task cycle time * scan-down factor), the current trend archive file is closed and a new trend archive file is created.

Operating the menu

The *Operate* menu for the trend display contains the following menu items:

- Select
  - <List of process variables>
- Operate selected track
  - Up
  - Down
  - Zoom +
  - Zoom -
  - Show
  - Select color
  - Select marker
- Time axis
  - Time scroll right >>
  - Time scroll right >
  - < Time scroll left
  - << Time scroll left
  - Zoom +
  - Zoom -
  - Cursor >
  - < Cursor
- Options...

- Reset
- File transfer

Calling up a trend display

Via the toolbar:

Call up trend.png

Left-click toolbar icon > Double-click appropriate trend display in display explorer

Via the Display menu item

Display > **Trend displays** > Double-click appropriate trend display in display explorer
or
CTRL + F8 > Use CURSOR KEYS to select the appropriate trend display > ENTER
or
CTRL + F8 > Enter first letters of the display name > ENTER

Via the context menu

In order to call up a trend display via the context menu, you must first select a tag to which a trend display has been assigned in Freelance Engineering using the *Display access* function.

Select tag > Call up context menu > Select the appropriate trend display

From the overview display

Left-click appropriate trend display symbol
or
Use CURSOR or TAB keys to select appropriate trend display symbol > ENTER

From a graphic display

In order to call up a trend display from a graphic display, a graphic object that features the *Show display* action configured in Freelance Engineering must have been previously selected.

Left-click graphic object with appropriate configuration
or
Use TAB KEY to select appropriate graphic object > ENTER

Defining the trend display

In Freelance Operations, the operator can define up to 20 own trend displays. Each display can comprise up to six user-defined project variables. For this purpose, a trend server must have been configured and installed in Freelance Engineering. User-defined trend displays are intended for short-term records / analyses related to a specific situation or for optimization purposes. If you need a trend for a longer period of time, please contact your configuration engineer to have the trend configured in Freelance Engineering.

User-defined trend displays can be changed, exported, or deleted at any time. A trend display that was previously exported can be imported again as new display. All these operations are carried out in the operation dialog for user-defined trend displays. In this dialog, all existing user-defined trends are displayed.

When loading data from Freelance Engineering into an operator station, the user-configured trend displays may be deleted. For this reason, it is recommended to export user-defined displays and then re-import them, if required.

Opening the operation dialog for user-defined trend displays

Call up UDT.png

Left-click toolbar icon
or
Tools > Define trend displays

The operation dialog is opened. The list of the existing user-defined trend displays and all operating options are displayed.

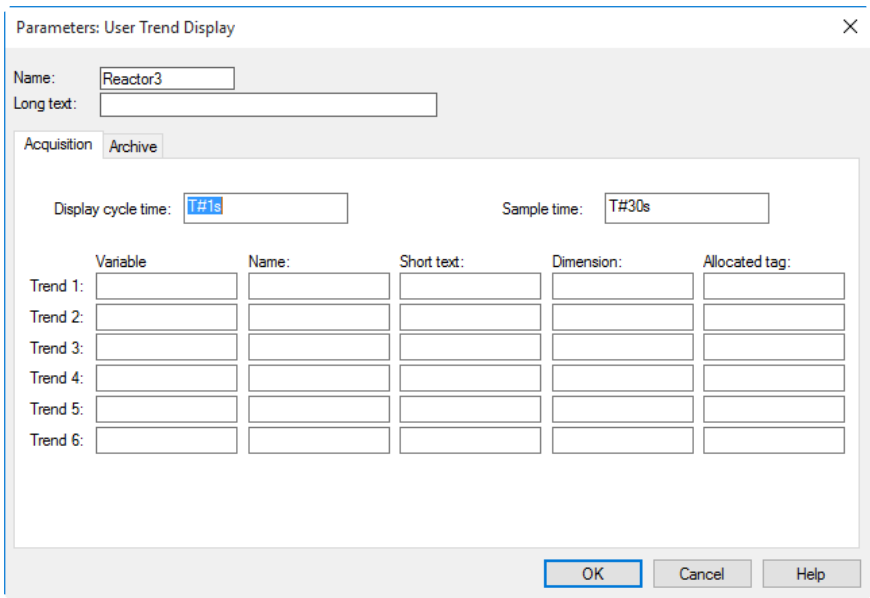
User defined trend.png

Create new trend display

Open the operation dialog for user-defined trend displays.

Tools > **Define trend displays** > INSERT > Enter name > OK

The new trend display is defined in the subsequent dialogs:



Define trend display.png

Name Max. 12 characters (without spaces)

Long text Max. 30 characters for free-form text

Acquisition tab

Display cycle time

This cycle time is used for refreshing the trend display.

Sample time Cycle time for the acquisition of new trend values.

Variable Name of the variable whose values are acquired in the trend. Pressing function key F2 displays the list of variables known in the system for selection.

Name, Short text, Dimension

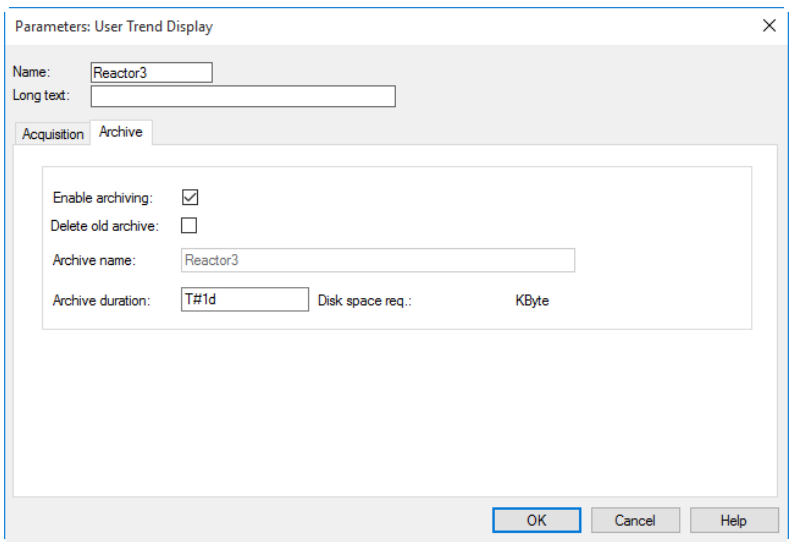
These texts are displayed with the trend curve in the display. After a variable is selected from the list, the variable name is used as

name and the first 12 characters of the variable comment as short text. The text can be modified freely.

Allocated tag A tag can be assigned to each trend curve. Using the F2 function key the available tags are displayed in a list for selection.

Archive tab

On this tab you define whether and how trend data is to be archived.



Archive Trend.png

Enable archiving

Tick this check box to archive trend data. Please also refer to archive name and archive duration.
If this check box is not ticked, no archive file will be created; the trend data are acquired and displayed as long as the trend display is shown.

Delete old archive

Tick this check box to delete the old archive when the operator station is rebooted (restart of Freelance Operations).

Archive name The name of the trend is automatically entered as the archive name. This name cannot be changed.

Archive duration

Enter the archive duration according to IEC 61131-3 time format. The period can be entered in days, hours, minutes and seconds. Minimum value 1 s, maximum value: 1d = 1 day.
Examples: **T#1d** or **T#20h31m23s**

The archiving duration defines the size of the archive file. This size cannot be exceeded as the data are stored in a ring buffer. This means that once the archival period has been reached the current data always overwrites the oldest data.

User-defined trend displays are intended for short-term records / analyses related to a specific situation or for optimization purposes. If you need a trend for a longer period of time, please contact your configuration engineer to have the trend configured in Freelance Engineering.

Disk space req.

The space required for the archive is automatically displayed in kilobytes next to the edit field for the archive duration.

Saving trend display

After all dialogs are edited, the definitions are saved with OK. The data that has been entered is checked and tested for plausibility. If any errors are encountered, these will be displayed.

When loading data from Freelance Engineering into an operator station, the user-configured trend displays may be deleted. For this reason, it is recommended to export user-defined displays and then re-import them, if required.

Edit trend display

Open the operation dialog for user-defined trend displays.

Select appropriate trend display > EDIT

The same dialogs as for creating a trend display are shown. All entries can be changed.

Save the changes with OK.

Deleting a trend display

Open the operation dialog for user-defined trend displays.

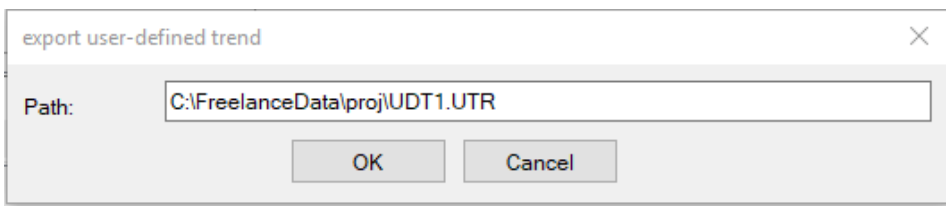
Select appropriate trend display > DELETE

The selected trend display is deleted without security dialog.

Exporting a trend display

Open the operation dialog for user-defined trend displays.

Select appropriate trend display > EXPORT



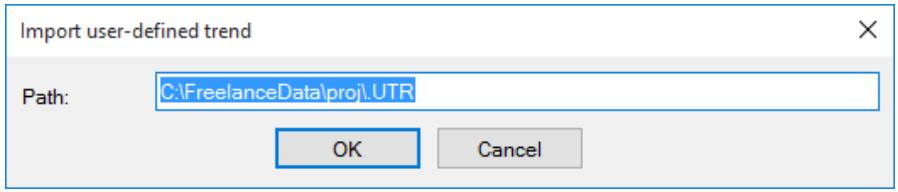
Export a trend.png

You can change the displayed directory and file name. The definition of the selected trend display is stored in a *.UTR file.

Importing a trend display

Open the operation dialog for user-defined trend displays.

> IMPORT

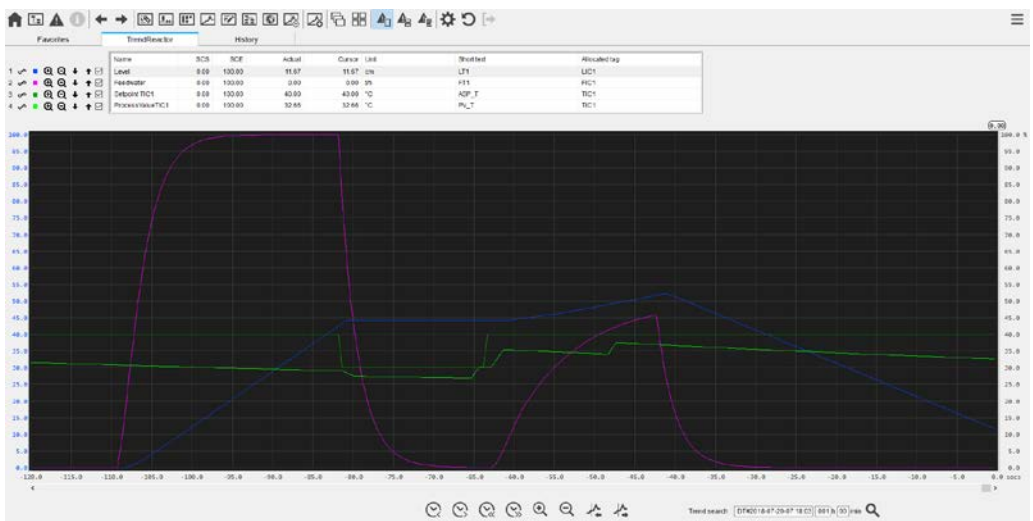


Import a trend.png

In the displayed path, enter the name of the file to be imported and click OK.

The system checks whether a trend display with the same name as the import file already exists on the Freelance Operations station. If a trend display exists you can decide whether to overwrite the existing trend with the imported data or whether to create a new trend display with a new name.

Operations in the trend display

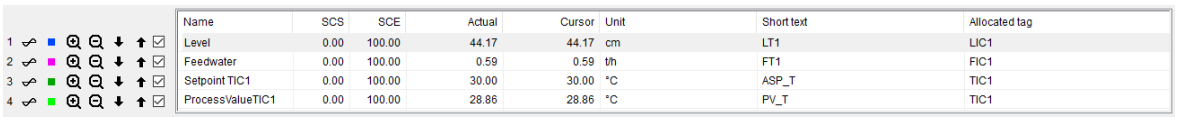


Trend display.png

After having accessed the trend display, three new icons are shown on the right side of the toolbar.

In the *Tools / Options* menu of Freelance Operations you can define whether the value and dialog area is shown above or below the curve.

Value area and dialog area



	Name	SCS	SCE	Actual	Cursor	Unit	Short text	Allocated tag
1	Level	0.00	100.00	44.17	44.17	cm	LT1	LIC1
2	Feedwater	0.00	100.00	0.59	0.59	t/h	FT1	FIC1
3	Setpoint TIC1	0.00	100.00	30.00	30.00	°C	ASP_T	TIC1
4	ProcessValueTIC1	0.00	100.00	28.86	28.86	°C	PV_T	TIC1

Value area.png

The value area lists all variables with trends in this display and the associated information:

Name	Name of the variable
SCS	Scale start for this trend on the Y axis
SCE	Scale end for this trend on the Y axis
Actual	The current value of the process variables
Cursor	The present value of the process variable at the position of the cursor
Unit	Unit of the process variable
Short text	Configured short text for this trend
Allocated tag	Name of the assigned tag

The operation buttons are located on the left in the dialog area:


Switch cursor on/off


Color selection for the trend curve


Zooms in trend curve (value range)


Zooms out trend curve (value range)


Scroll trend curve downward


Scroll trend curve upward

☑ Show/hide trend curve

Selecting a trend in the value area

Left-click the appropriate trend in the value area
or
Use TAB KEY to go to value area list > Use CURSOR KEYS to select appropriate trend

When the trend is selected in the trend area, the scaling configured for the trend is displayed on the left of the X-Y coordinate system. The scaling is shown with the same color as the trend curve.

Switching the cursor on and off

In the dialog area left-click 
or
Use TAB KEY  to select > Toggle with SPACE BAR

Setting the color of the trend curve

In the dialog area, left-click color symbol
or
Use TAB KEY to select color symbol > Toggle with SPACE BAR

The color selection dialog is opened.

This dialog window shows all available colors in a list. The colors are sorted by usage groups that can be shown/hidden.

The individual color groups can be selected by a left-click on the switches STATIC, MESSAGE, SIGNAL, MEDIA and FREE (keyboard: TAB key and ENTER).

To reduce the number of colors displayed in the list, mark only the color groups to be shown.

Left-click appropriate color in color selection list > OK
or
Use CURSOR KEYS to select appropriate color > ENTER

Zooming the trend curve in/out

The zoom function affects the scaling of the Y axis.

In dialog area, left-click  or 

This will produce the same effect as the change of the band start % and band end %.See also Trend curve settings, page 128.

Scrolling the trend curve vertically

In dialog area, left-click  or 

The zero point of the trend is moved upward or downward along the Y axis. This will produce the same effect as a simultaneous increase or decrease of the band start % and band end %. See also Trend curve settings, page 128.

Showing/hiding the trend curve

In dialog area, left-click ☑ or ☐

The trend curve is shown or hidden.

Calling up assigned displays

If the appropriate tags are assigned, a trend can be selected in the value area and the displays associated with is tag can be called up via the context menu.

Select appropriate trend in value area > Call up context menu > Select appropriate display

To open the faceplate of the assigned tag:

Double-click selected trend in value area
or
Select appropriate trend in value area > Call up context menu > Select tag

Trend area

The individual trends are displayed as curves in an X-Y coordinate system. There are two scale settings for the Y axis: on the right hand side it is always a scaling in %. On the left hand side it is scaling of a selected trend in physical units. The scaling is displayed in the same color as the trend curve.

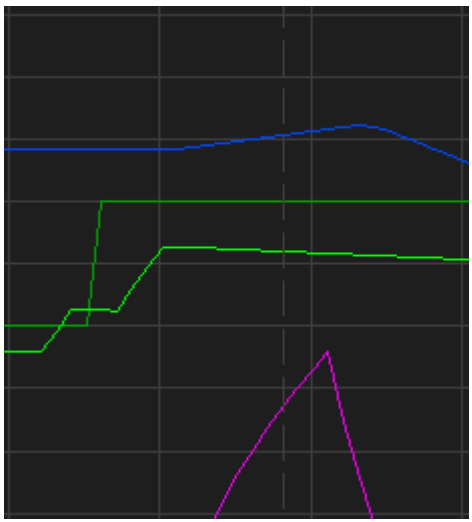
The X axis represents the time line. Depending on configuration or operation, the time display can be relative or absolute.

Below the coordinate system is a horizontal scroll bar, to adjust the visible time window backward in time to analyze the trends.

By using an adjustable cursor, past behavior of trends can be evaluated and compared.

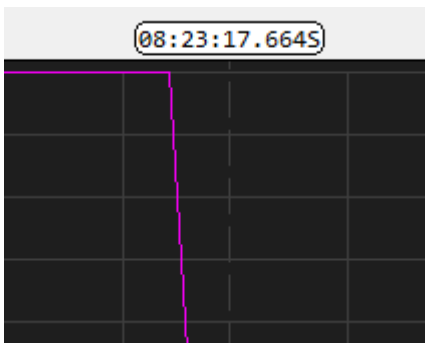
The trend values are always acquired with the system time. The displayed time axis is
labeled with the current time. Times during daylight saving time period are marked with an S. This ensures that no time gaps or double curves in the trend display result from the changeover from
normal time to daylight saving time or vice versa.

Time gaps within a trend curve are displayed by vertical red lines at the beginning and end. The size of a gap can be configured in the parameter definition mask of the trend display (see **Engineering Manual, Operator Station, Standard Display, Trend Display**). If **no time gap detection**, is configured, the threefold cycle time is displayed as a gap. Example: With a cycle time of 10 seconds, a data gap of 30 seconds is shown as a gap in the trend, even if no gap detection has been configured.



Trend area.png

Cursor adjustment



Cursor adjustment.png

After calling up a trend display the cursor appears at the top of the right side Y axis. The time-of-day or the deviation to local time is shown in the cursor area.

In trend area, left-click the X-Y coordinate system at the height of appropriate time
or

Repeat left-click switch  or  until cursor is positioned at appropriate

time
or
Repeat pressing ALT + < or ALT + > until cursor is positioned at appropriate time

Scrolling the displayed time range in the trend display

The time window for the trend display can be scrolled by the horizontal scroll bars or switches below the X-Y coordinate system. When the trend display is opened, the zero point (current time) is always located at the right edge of the time line.

The time window can also be scrolled with the buttons below the X-Y coordinate system:

ALT + **Z**; Scroll time window in small steps to the left (step width one scale unit)

ALT + **T**; Scroll time window in small steps to the right (step width one scale unit)

ALT + **C**; Scroll time window in large steps to the left (step width one screen width)

ALT + **S**; Scroll time window in large steps to the right (step width one screen width)

When the time window is scrolled to the left, the time display on the X axis changes automatically from relative to absolute.

Scaling the displayed time range in the trend display

To facilitate the analysis, the X axis (time axis) can be expanded or compressed. This alters the resolution of the time axis.

ALT + **+**; Expands the time axis (each click doubles the display width, which means that the time segment is cut in half)

ALT + **–** ; Compresses the time axis (each click cuts the display width in half, which means that the time segment is doubled)

Trend Display Options

In the *Trend display options* operation dialog, the displayed trend can be set. These settings refer to the general layout of the trend display as well as to the adjustment of individual trend curves.

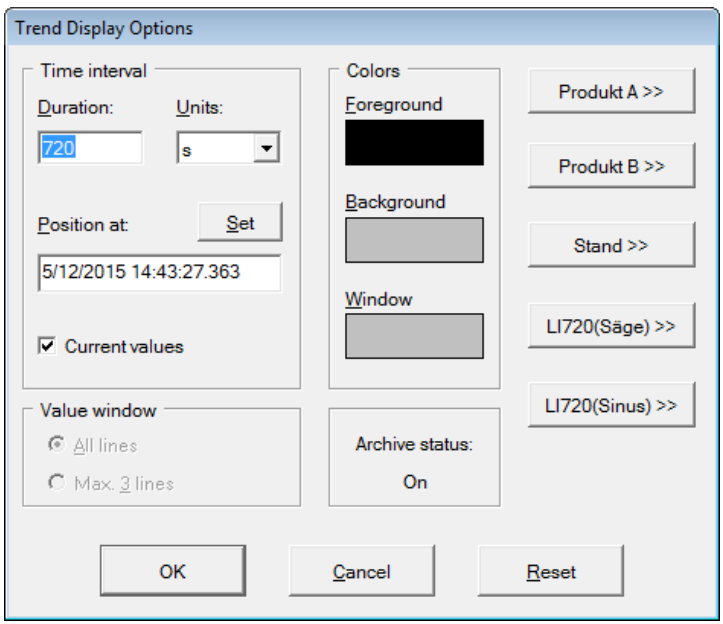
Opening the options operation dialog

After having accessed the trend display, three new icons are shown on the right of the toolbar.

Operation in trend.png

Left-click the toolbar icon
or
Operate > **Options**
or
ALT + **O** > **O**

Setting and changing options



Operation in trend.png

Trend display settings

Time interval

Duration Range of the time window on the X axis for the trend display.

Position at: Enter point in time (for positioning window at a specified time on the trend curve).

SET Set the window to the specified position.

Current values Current process values are shown on the right border of the X axis. The x axis shows relative time values.

Colors

You can adjust the colors for Foreground, Background and Window of the trend display.

A click on the appropriate color field opens the color selection list.

A click on **Reset** restores the default colors.

Archive status Archive status display

On Archive is running

Idle Archive status is controlled by the SEN function block input of the assigned trend data acquisition unit

Emergency stop
Internal emergency stop; the archive was stopped due to an internal fault.

Off No archive

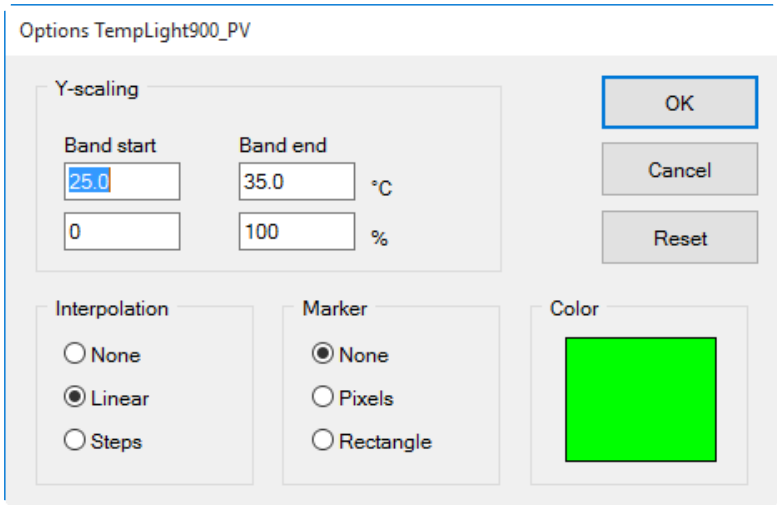
OK All inputs are accepted and checked for plausibility.

Cancel All inputs are rejected; the dialog window is closed.

Reset All settings are reset to the configured values:
Trend display colors,
trend curve colors,
value window settings,
start of band, end of band,
start %, end %,
time range (jump to present = current time).

Trend curve settings

Product <A> >>
This button label is an example for the variable, here “product <A>”. The number of buttons corresponds to the number of trends configured for this trend display. These buttons are used to open the respective operation dialog for the trend specific settings:



Trend curve settings.png

Y-scaling

The options Band start and Band end define the scaling of the Y axis for this trend. The position on the Y axis of the band start and band end can be set between 0% and 100% using band start % and band end %.

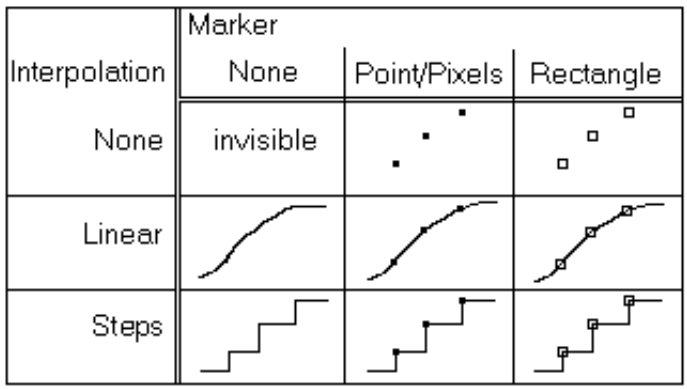
The band start setting must always be less than the band end. This also applies to the band start % and band end %. The percentage values can be less than 0% and more than 100%. In this case, the part of the trend outside the range between 0% and 100% will be displayed as a line above 100% or below 0%.

Band start and band end must be entered as real values. The value range is between 0.0 and ±999999999.9. The percentage values for band start and band end must be entered as integer values. The value range is between -5000 and +5000%.

Interpolation Select *None*, *Linear* and *Steps*.

Marker Select *None*, *Pixel* or *Rectangle* for the display of the cursors.

If you select both for Interpolation and Marker the option *None*, the trend curve is not visible!



di0559us.png

Trend color Define the color of the trend curve display. See also Setting the color of the trend curve, page 121.

RESET This button resets all settings for this trend curve to the default values including the Y-scaling, the markers, the interpolation, and the
color.

Resetting all settings

The changed settings of all trends can be reset to the default values.

Call up reset.png

Left-click the toolbar icon
or
Operate > **Options** > **Reset**

Saving the trend file

A copy of the trend archive file can be saved on the configured disk drive.

This is only possible for trend displays that have been configured accordingly in Freelance Engineering.

File transfer.png

Left-click the toolbar icon
or
Operate > **File transfer**

Section 8 Faceplates

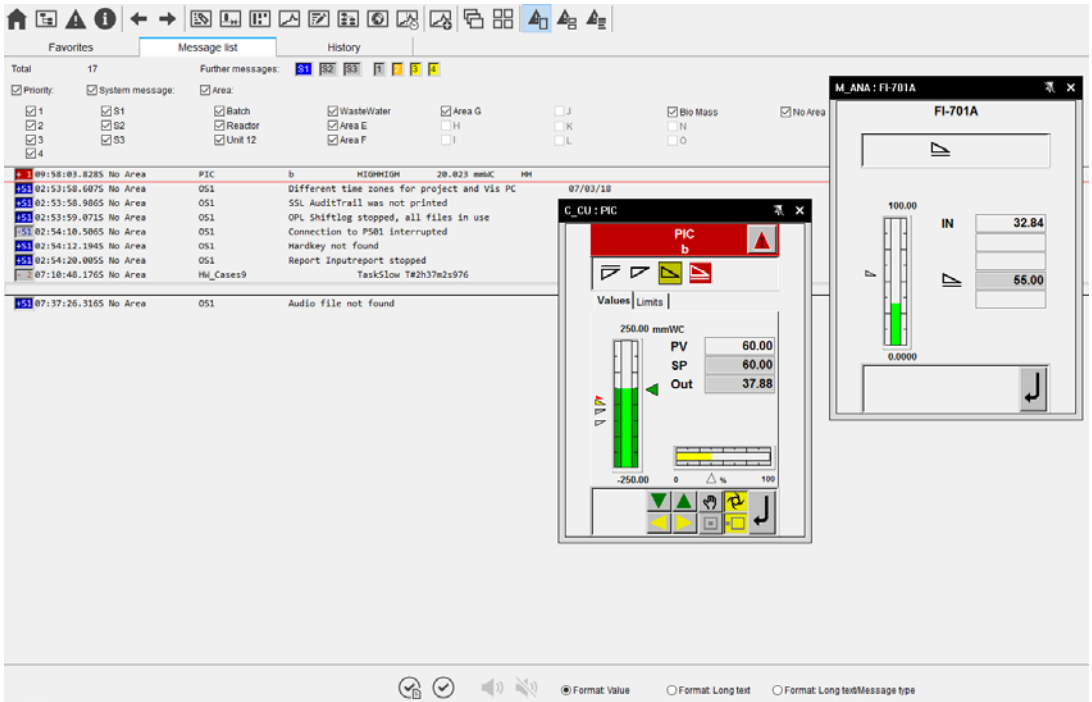
General description – Faceplates

In a faceplate you can observe and operate the associated tag. The information shown in the faceplate is cyclically polled and updated. This means, the faceplates always indicate the current state of the connected process.

Faceplates provide both overview and detail information on tags. They can appear on the screen combined with either pre-configured or freely configurable displays.

The time scheduler and the SFC have their own pre-configured full-screen operation displays. Each other operable function has a preconfigured faceplate. In addition, some non-operable functions also have preconfigured faceplates to support the observation of the current process state.

Programming, configuration or display access are not required, as the faceplate becomes available immediately after the function block is defined.



faceplate.png

A faceplate can be moved freely around the display area of the screen. For safety reasons, the faceplate cannot overlap the message line. In dual monitor mode, it cannot be shifted from one screen to the other either. In this case, the cursor must be moved to the second monitor in order to call up the appropriate faceplate on this monitor. A displayed faceplate stays on the screen until it is closed or replaced by another faceplate. A faceplate will thus remain on screen even when the display in the background is changed, such as during a change from an overview display to the message list.

A maximum of 5 faceplates can be displayed simultaneously on the screen. If you open an additional faceplate, the system simultaneously closes the faceplate which had not been activated for the longest period.

For further general information on the handling of faceplates, please refer to Operating Philosophy, page 19.

For more detailed information on function blocks of the Freelance system, please refer to the **Engineering Reference Manual, Functions and Function Blocks**.

Calling up a faceplate

A faceplate can be displayed by several methods. When the appropriate tag is selectable on the screen (e. g. in a graphic display), the associated faceplate can be called up directly via the context menu. A tag in the tag list of the graphic display explorer can be selected and displayed with the associated faceplate in any operating situation, please also refer to Operating Philosophy, page 19.

Via the toolbar:

Call up faceplate.png

Left-click toolbar icon > In display explorer double-click the appropriate tag

Via the Display menu item

Display > **Via tag list** > In display explorer double-click the appropriate tag
or
CTRL + F5 > Use CURSOR KEYS to select the appropriate tag > ENTER
or
CTRL + F5 > Enter first letters of the tag > ENTER

Via the context menu

To call up a faceplate via the context menu, a tag must be selected first.

Right-click the tag or an area in the current display to which a tag has been assigned > Left-click tag name in the context menu

From a group display

The group display is a configured collection of several faceplates (see Group Display, page 93.

Double-click the appropriate faceplate
or
ALT + O > Use CURSOR KEYS to select the appropriate faceplate > ENTER

From a graphic display

In order to call up a faceplate from a graphic display, a graphic object that features the *Open faceplate* action configured in Freelance Engineering must have been previously selected.

Double-click graphic object with appropriate configuration
or
Use TAB KEY to select appropriate graphic object > ENTER

From the message list

Double-click appropriate message
or
Use CURSOR KEYS to select the appropriate message > ENTER

Structure and operation of faceplates

Basic structure and operation of faceplates

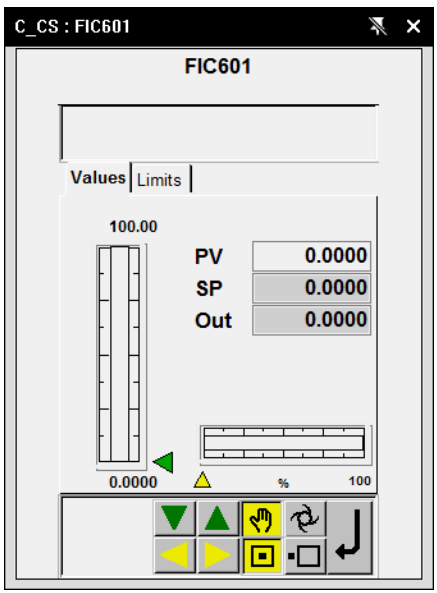
All faceplates have an identical basic structure. This provides important information about the displayed tags which can be instantly recognized.

The faceplates feature an identical width; there are two types that differ in height: the normal height faceplates occupy half the height of the display area, for function blocks with minor information content, there are small faceplates that only require

1/2 of this height. Thus, two small faceplates can be placed in the group display in the space required by one normal faceplate.

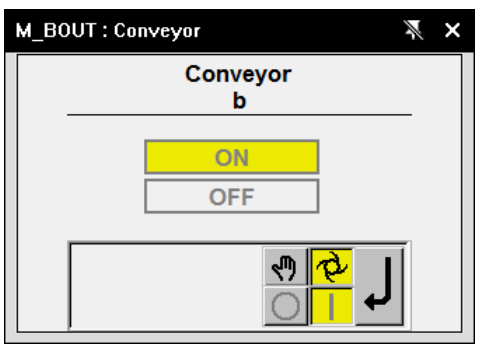
User-defined faceplates, especially those taken over from older program versions, can deviate from this scheme.

All normal-height faceplates are built up as follows:



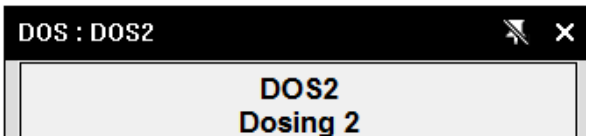
vh_i0009_us.png

The **small** faceplates only consist of title line, faceplate header, and display of actual value, combined with an operating element area, if necessary.



vh_i0009a_us.png

Title line and faceplate header



Faceplate header.png

The title line of the faceplate contains the abbreviation of the corresponding block type (e.g. DOS) and the tag name. On the right edge, the pin button to fixate the display and the close button are located. When a faceplate is selected, the title line and the entire frame around the faceplate have a dark blue background.

While the tag name is displayed in the faceplate header, the short text of the respective function block is shown below. Further information can include a tooltip with the configured long text.

For messages the faceplate header is displayed with a colored background according to the configured priority and a caution icon. Similar to the message line, this colored background flashes as long as the message has not been acknowledged (see Messages and Hints, page 57).

In each faceplate you can acknowledge all present messages of a tag by left-clicking the caution icon.

Message area

Faceplate message.png

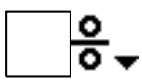
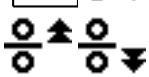
In the message area all configured messages of the tag, for which a message priority has been assigned, are displayed as icons. In the event of a message, the color changes or the icons flash depending on the priority. There is a tooltip for each icon that shows the **configured message text**.

In addition to the messages, the tag status like the track mode can be visualized in the message area.

The messages for the tag are always shown in the faceplate, even if these messages are not visible in the message line and message page because of the filters that been configured for the station.

Icons in the message area of faceplates

The following table lists all icons available in the message area of faceplates. The designations of the limit value types are shown in the message list.

Icon	Limit type; Meaning
	**HL**; Process value is greater/smaller than configured limit value
	**HH** or **LL**; Process value is greater/smaller than configured limit value / high priority
	**H_XD** or **L_XD**; Monitoring of maximum/minimum control difference
	**HH_XD** or **LL_XD**; Monitoring of maximum/minimum control difference / high priority
	**LH_XD**; Monitoring of the size of control difference
	**DHs, DHm, DHh** or **DLs, DLm, DLh**; Monitoring a maximum/minimum change
	**DHHs, DHHm, DHHh** or **DLLs, DLLm, DLLh**; Monitoring a maximum/minimum change rate / high priority
	**H_V** or **L_V**; Monitoring of a ratio limit value
	**HH_V** or **LL_V**; Monitoring of a ratio limit value / high priority
	**BREAK**; Cable break

TEMP; Overtemperature

ERROR; Error (only function block types IDF_1, IDF_2, IDF_A)

FLT_TIME; Runtime error (only function block types IDF_1, IDF_2, IDF_A)

END_POS; End position error (only function block types IDF_1, IDF_2, IDF_A)

PROTECT; Safety intervention (only function block types IDF_1, IDF_2, IDF_A)

LOC_OP; Local intervention (only function block types IDF_1, IDF_2, IDF_A)

TORQUE; Torque (only function block type IDF_A)

BINARY; Monitoring a binary state

TIME; Monitoring a time overflow or underflow

LV; Monitoring a limit value

US; User-defined alarm message (only function block type M_GEN)

TIME_OV; Time overflow (only function block type TUNE)

NOISE; Noise level (only function block type TUNE)

MOVE; Excessive movement (only function block type TUNE)

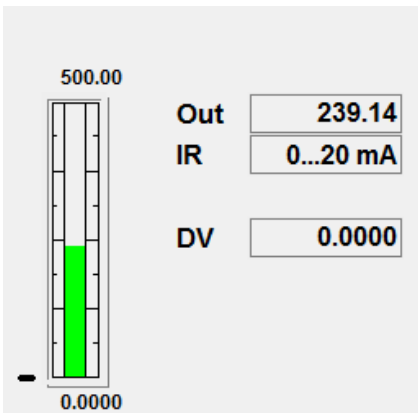
STAT; Not enough movement (only function block type TUNE)

Y_LIMIT; Internal or external limit of the correcting variable (only function block type TUNE)

TRACK; Tag is working in track mode

Graphic field

Overview



vh_i0103_us.png

The graphic field of a faceplate displays the current values and states of the function block in the form of an overview.

The most important analog variables in a block are displayed along with their associated limit, basic or overflow values as **scaled bargraphs** with corresponding markers. They may also feature the corresponding engineering units. Two **related values**, e. g. set point and actual value or current and previous counter value are indicated through two **nested bargraphs**; the changing actual value is generally framed within the usually static set point. If the operator can change the external value, a green rectangle is shown to the right of the bargraph. You can shift this triangle along the bargraph as required using the mouse to set the displayed process variable to a new value.

Faceplates for functions monitoring the limit values of an analog value show these limit values as small **triangular markers** on the left side of the actual value column. The limit value marks always relate to the analog value displayed in the actual value column.

For blocks with discrete current statuses, texts for identifying the current status are displayed in the graphic field instead of the bargraphs. A **current status** is highlighted in yellow.

Depending on the function block, the displayed process variables can be arranged in the graphic field on up to three tabs labeled *Values* and *Limits* or *Absolute*, *Ratio* and *Limits*.

Display and operation in the graphic field

All numerical values that can be changed or set by the operator (operator-controllable values) are denoted by gray highlighting.

Selecting tabs

Left-click appropriate tab (Values, Limits, etc.)
or
Use TAB KEY to select current tab > Use CURSOR KEY to select appropriate tab

Changing values in the graphic field

Left-click adjustable numerical value> Change value > OK
or
Use TAB KEY to select appropriate numerical value > ENTER > Change value > ENTER
or
Move appropriate marker of the adjustable value using the mouse > confirm new value with 

If the entry confirmation button is not actuated within 5 seconds, the input field is closed automatically and the previous value is restored.

For further operations, please refer to Operating element area, page 144.

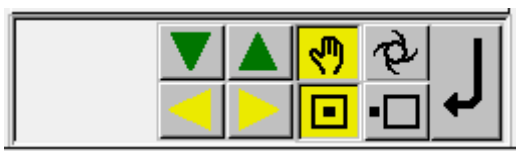
Symbols and Abbreviations in the Graphic Field

The display of the actual value in the graphic field uses the same symbols as the message area (see Message area, page 138). The used abbreviations and their meaning are listed in the following table.

Abbreviation	Description
A	Function block output
B	Bias
BA	Batch ID
BV	Basic value
CA	Counter actual value
CD	Derivative gain
CID	Campaign ID
Constant	Function block output
CP	Counter last period
Cyc	Number of program cycles
DH	Configured default value High
Dim	Engineering unit (dimension)
DL	Configured default value Low
DT	Delay time, Switch-on time
DV	Default value
EM	Execution mode
F	Failure register
FB	Feedback
IN	Function block input
LO	Lot ID
MV	Manual value
Off	Time scheduler offset
OR	Output range (signal range)
Out	Output variable
PC	Proportional coefficient
PD	Pulse duration
PS	Pre-threshold value
PV	Process value
R	Ratio
RP	Recipe ID

RQ	Request command
RT	Runtime
RV	Resetting value
S	Shut-off value
Scale end	High scale limit
Scale start	Low scale limit
Sec	Time scheduler sections
SI	Step index
SP	Set point
ST	Status register
T	Runtime since start resp. configured time in time scheduler
TC	Time, current value
Type	Configured timer type

Operating element area



vh_i0104.png

The current operating modes of the function block are displayed in the operating element area and can be toggled. The counter blocks can be reset by pressing a button.

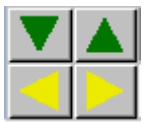
All operable buttons are marked with black icons, those that cannot be operated with gray icons. Current states are denoted by yellow buttons.

Terminating operation

Operations in the faceplate must generally be terminated by the ENTER key or by the  button in the operating element area, to ensure that value changes are effective in the process station.

Continuous change of controller correcting variable and set point

The controller function blocks enable continuous adjustment of set point and correcting variable. For this purpose, the buttons feature colored triangles, the color of which corresponds to the associated bargraph: green for the set point and yellow for the correcting variable.



arrow_yelllowgreen.png

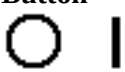
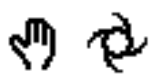
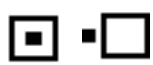
Left-click appropriate controller button > Keep left mouse button pressed or repeat clicking until the appropriate value is reached.

The current value is shown as tooltip.

A value change made with these buttons is directly written into the process station. No confirmation (with ENTER) is required.

While the button is pressed and held, changes are written into the operation log on a cyclic basis.

Buttons in the operating element area of faceplates

Button	Description
	Status toggle: 0/1 or operating mode Off/On for time scheduler function block
	Status toggle, stop or operating mode stop for time scheduler function block
	Toggle permanent/cyclic
	Toggle manual/automatic
	Toggle internal/external

Toggle run/stop

Reset actual counter value to basic value or 0 or reset running time to 0

Triggering scan pulse

Toggle internal/external ratio

Toggle ratio/fixed value

(yellow); Decrease/increase correcting variable

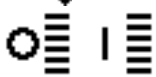
(green); Decrease/increase set point

Coarse dosing/fine dosing/close valve

TUNE function block: Use PID parameter set of TUNE function block or user parameters

TUNE function block uses internal or user program

Stationarity



Scheduling off/on

Definition of controller dynamics: high, medium, low

Abort mode for batch function blocks FPX and PLI

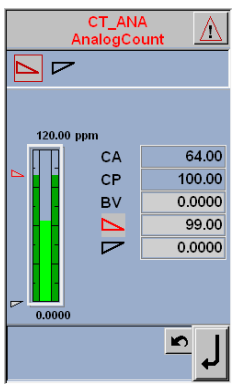
Hold/Restart mode for batch function blocks FPX and PLI

Pause/Resume mode for batch function blocks FPX and PLI

Skip/Scroll mode for the time scheduler block

Analog function blocks

Counter with analog input, CT_ANA

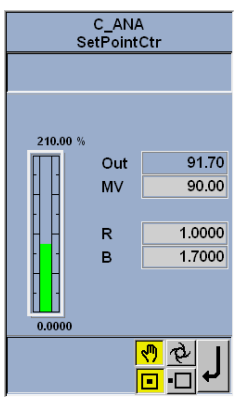


CT_ANA_us.png

Display: Message area
Icons for the configured high and low limit values, if they are configured as messages.
Display: Numerical values
CA Counter actual value
CP Counter last period
BV Basic value
2 Limit values with icons for the configured limit value types
Display: Graphical display
CA actual counter value as actual value bargraph
CP last counter period as set point bargraph
The scale range and engineering unit are valid for both bargraphs. Limit values as marks on counter position bargraph

Operator interventions
Changing basic value and limit values.
Resetting counter.
Acknowledging of messages.

Set point controller, C_ANA



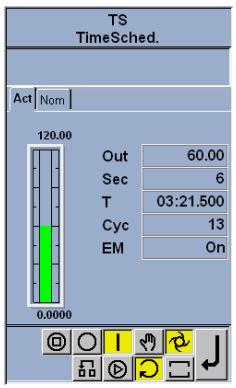
C_ANA_us.png

Display: Numerical values
Out Output value
MV Manual value
R Ratio
B Bias

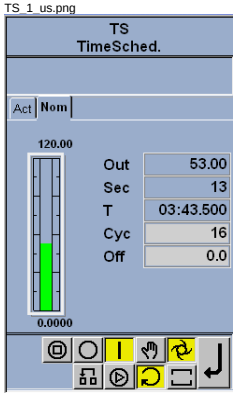
Display: Graphical display
Output value as actual value bargraph with scale range and engineering units

Operator interventions
Operating mode for input or manual value: toggle manual/automatic
Operating mode for ratio and bias: toggle internal/external
Changing manual value MV (only in manual mode)
Changing internal values of ratio R and bias B

Time scheduler, TS



TS_1_us.png



TS_2_us.png

Display: Numerical values
Tab Act show the current values:

Out	Current output value
Sec	Current section
T	Runtime since start
Cyc	Number of program cycles
EM	Execution mode (Off, Stop, On, Skip, Scroll)

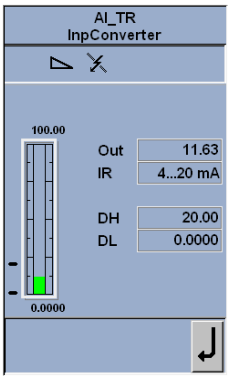
Tab Nom shows the nominal values:

Out	Current output value
Sec	Number of configured sections
T	Runtime in time scheduler, time marker on set trend
Cyc	Number of configured program cycles
OFF	Offset set point

Display: Graphical display
Current output value Out as bargraph with scale range

Operator interventions
Changing the number of set cycles and offset values
Operating mode for output value: toggle manual/automatic
Toggling between **permanent/cyclic** mode
Changing execution mode Off/On/Stop/Skip/Scroll
For further details on operation, please refer to SFC Display, page 185

Analog input transformation, AI_TR



AI_TR_us.png

Display: Message area
Icons for overflow and underflow, if they are configured as messages.
Icon for cable break message

Display: Numerical values

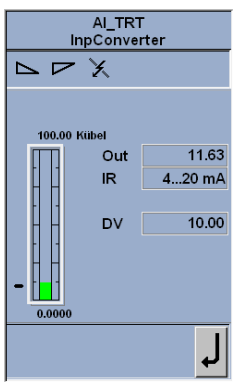
Out	Converted analog value
OR	Output range (0...20 mA or 4...20 mA)
DH	Default value
DL	Default value

If a default value is effective, the analog value
A will be displayed in red.

Display: Graphical display
Analog value A as bargraph with scale range
DH and DL default values as horizontal cursors at the left side of the bargraph

Operator interventions
None

Analog input transformation, transient AI_TRT



AI_TRT_us.png

Display: Message area
Icons for measuring range violation (Low) and transient violation (High), if they are configured as a message.
Icon for cable break message

Display: Numerical values

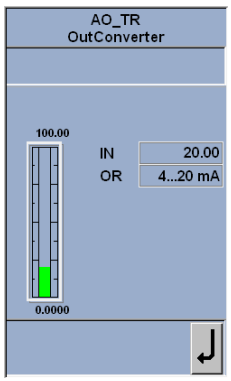
Out	Converted analog value
OR	Output range (0...20 mA or 4...20 mA)
DH	Default value
DL	Default value

If a default value is effective, the analog value
A will be displayed in red.

Display: Graphical display
Converted analog value A as bargraph with scale range and engineering unit, DV default value as horizontal cursor on the left side of the bargraph

Operator interventions
None

Analog output transformation, AO_TR



AO_TR_us.png

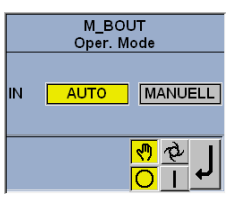
Display: Numerical values
Out Converted analog value
OR Output range (0...20 mA or 4...20 mA)

Display: Graphical display
Analog value IN as bargraph with scale range

Operator interventions
None

Binary Function Blocks

Binary output, M_BOUT

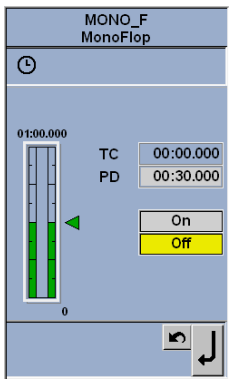


MBOUT_us.png

Display: Display
Current status with configured status texts

Operator interventions
Operating mode for function block output: toggle manual/automatic
Toggling output between state 0 and 1 (only in Manual mode)

Monoflop, MONO_F



MONO_F_us.pngg

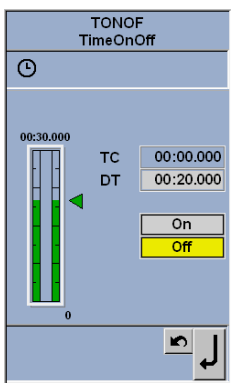
Display: Message area
Icon for time message, if a message has been configured for the set output.

Display: Numerical values
TC Time, current value
PD Pulse duration

Display: Graphical display
Pulse duration and elapsed time as bargraphs with scale range
Status of the output ON (logic-1 signal)/OFF (logic-0 signal).

Operator interventions
Change PD pulse duration within the valid scale range
Premature abort by reset (output Out is set to logic-0 signal)

Timer, switch-on/off delay, TONOF



TONOF_us.png

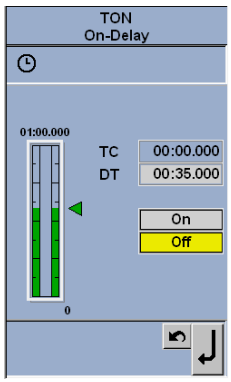
Display: Message area
Icon for time message, if a message has been configured for the set output.

Display: Numerical values
TC Time, current value
DT Switch-on time

Display: Graphical display
Pulse duration and elapsed time as bargraphs with scale range
Status of the output ON (logic-1 signal)/OFF (logic-0 signal).

Operator interventions
Change DT switch-on time within valid scale range
Premature abort by reset (output Out is set to logic-0 signal)

Timer, switch-on delay, TON



TON_us.png

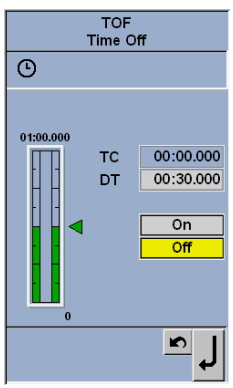
Display: Message area
Icon for time message, if a message has been configured for the set output.

Display: Numerical values
TC Time, current value
DT Delay time

Display: Graphical display
Pulse duration and elapsed time as bargraphs with scale range
Status of the output On (logic-1 signal)/Off (logic-0 signal).

Operator interventions
Change DT delay time within valid scale range
Premature abort by reset (output Out is set to logic-0 signal)

Timer, switch-off delay, TOF



TOF_us.png

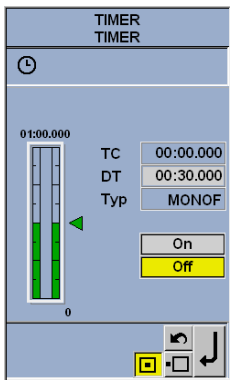
Display: Message area
Icon for time message, if a message has been configured for the set output.

Display: Numerical values
TC Time, current value
DT Delay time

Display: Graphical display
Pulse duration and elapsed time as bargraphs with scale range
Status of the output On (logic-1 signal)/Off (logic-0 signal).

Operator interventions
Change DT delay time within valid scale range
Premature abort by reset (output Out is set to logic-0 signal)

Timer with external time input, TIMER



TIMER_us.png

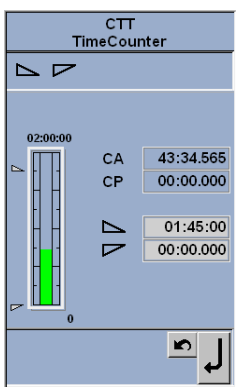
Display: Message area
Icon for time message, if a message has been configured for the set output.

Display: Numerical values
TC Time, current value
DT Switch-on resp. delay time
Type Indication of timer behavior MONOF, TON, TOF, or TONOF

Display: Graphical display
Switch-on or delay time and elapsed time as bargraphs with scale range
Status of the output On (logic-1 signal)/Off (logic-0 signal).

Operator interventions
Changing switch-on resp. delay time DT
Premature abort by Resetting
Toggling between internal/external
mode for the switch-on or delay time

Timer counter, CTT



CTT_us.png

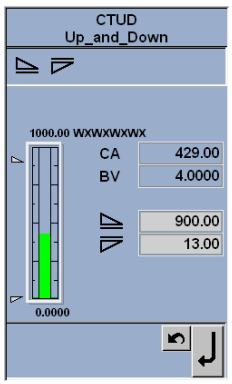
Display: Message area
Icons for the configured high and low limit values, if they are configured as messages.

Display: Numerical values
CA Counter actual value
CP Counter last period
2 limit values with icons for the configured
limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

Display: Graphical display
Current counter value as bargraph with scale range
Counter value of the last period as bargraph with scale range
Scale range limit values as marks on position bargraph

Operator interventions
Changing limit values
Resetting time value output to

Up/Down counter, CTUD



CTUD_us.png

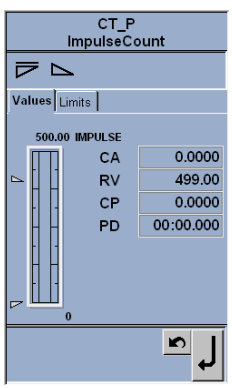
Display: Message area
Icons for the configured limit values, if configured as messages.

Display: Numerical values
CA Counter actual value
BV Basic value
2 limit values with icons for the configured limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

Display: Graphical display
Counter actual value as bargraph
Basic value as bargraph
Scale range and engineering units
Limit values as marks on bargraph

Operator interventions
Changing limit values
Resetting counter

Pulse counter, CT_P

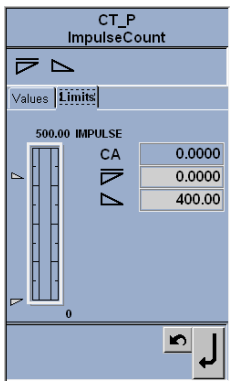


CT_P_1_us.png

Display: Message area
Icons for the configured high and low limit values, if they are configured as messages.

Display: Numerical values
Values tab
CA Counter actual value
RV Resetting value
CP Counter last period
PD Period length
Limits tab
CA Counter actual value
2 limit values with icons for the configured limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

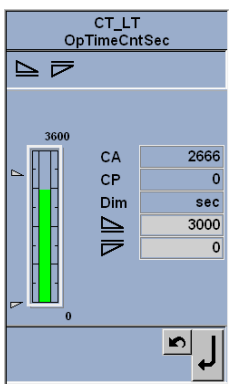
Display: Graphical display
Counter actual value as bargraph
Counter last period as bargraph
Scale range and engineering units
Limit values as marks on bargraph



CT_P_2_us.png

Operator interventions
Changing limit values
Resetting counter

Operating time counter, CT_LT



CTLT_us.png

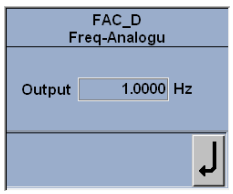
Display: Message area
Icons for the configured limit values, if configured as messages.

Display: Numerical values
CA Counter actual value
CP Counter last period
Dim Engineering unit; seconds (sec), minutes (min), hours (hour), 2 limit values with icons for the configured limit value types Icons in the message area of faceplates, page 139)

Display: Graphical display
Counter actual value as bargraph
Counter last period as bargraph
Scale range
Limit values as marks on bargraph

Operator interventions
Changing limit values
Resetting counter

Frequency/analog converter, FAC_D

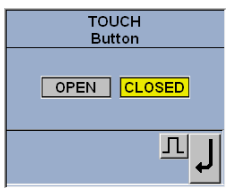


FAC_D_us.png

Display: Display
Analog output signal as numerical value with engineering units.

Operator interventions
None

TOUCH button



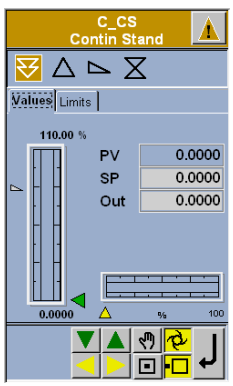
TOUCH_us.png

Display: Display
Current button state with configured status texts.

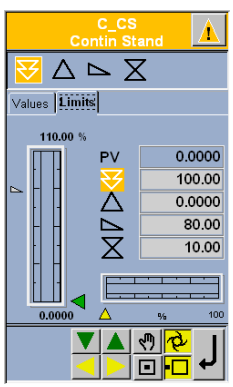
Operator interventions
Trigger scan pulse

Controller function blocks

Continuous standard controller, C_CS



C_CS_1_us.png



C_CS_2_us.png

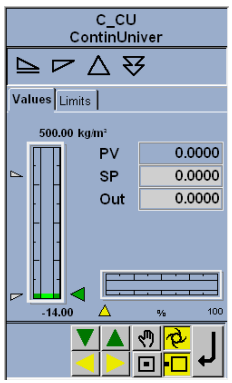
Display: Message area
Icons for the configured limit values, if configured as messages.

Display: Numerical values
Values tab
PV Process value
SP Set point
Out Output variable
Limits tab
PV Process value
4 limit values with icons for the configured
limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

Display: Graphical display
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Output variable as horizontal bargraph
Limit values as marks on bargraph

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing output variable Out (in manual mode, only)
Changing limit values

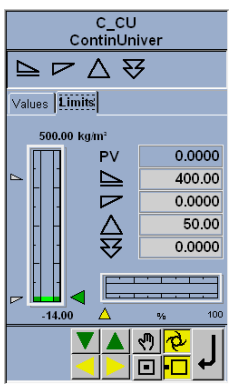
Continuous universal controller, C_CU



C_CU_1_us.png

Display: Message area
Icons for the configured limit values, if configured as messages.
Icon for operating mode Track, if this mode is active.

Display: Numerical values
Values tab
PV Process value
SP Set point
Out Output variable
Limits tab
PV Process value
4 limit values with icons for the configured
limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

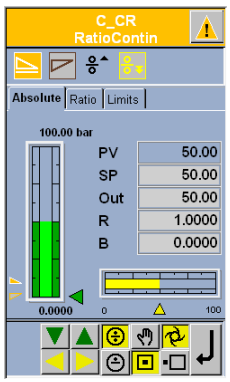


C_CU_2_us.png

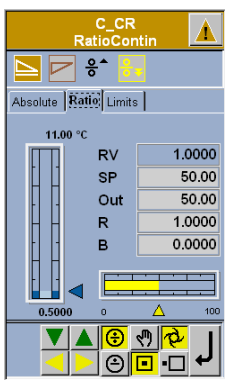
Display: Graphical display
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Output variable as horizontal bargraph
Limit values as marks on bargraph

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing output variable Out (in manual mode, only)
Changing limit values

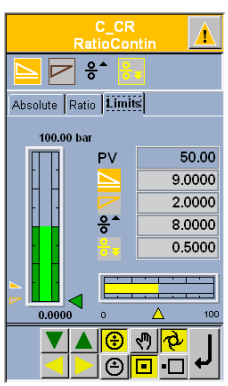
Continuous ratio controller, C_CR



C_CR_1_us.png



C_CR_2_us.png



C_CR_3_us.png

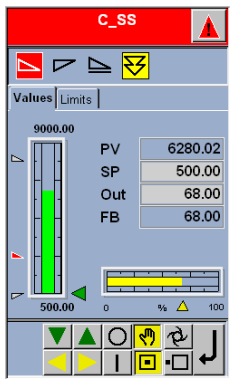
Display: Message area
Icons for the configured limit values, if configured as messages.
Icon for operating mode Track, if this mode is active.

Display: Numerical values
Absolute tab
PV Process value
SP Set point
Out Output variable
R Ratio
B Bias
Ratio tab
RV Current ratio value
SP Set point
Out Output variable
R Ratio
B Bias
Limits tab
PV Process value
4 limit values with icons for the configured
limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

Display: Graphical display
Absolute and *Limits* tabs
Actual value and set point as bargraph
Scale range and engineering units
Output variable as horizontal bargraph
Limit values as marks on bargraph
Ratio tab
Current ratio value and set ratio as bargraph with ratio scale range and engineering units
Ratio limit values as marks on bargraph

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing output variable Out (in manual mode, only)
Toggling between ratio control and fixed value
control
Changing ratio and bias
Changing limit values

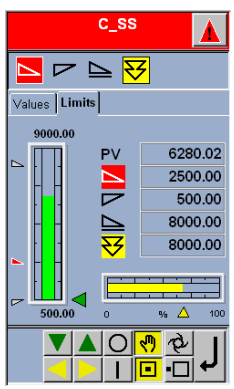
Standard step controller C_SS



C_SS_1_us.png

Display: Message area
Icons for the configured limit values, if configured as messages.

Display: Numerical values
Values tab
PV Process value
SP Set point
Out Output variable
FB Feedback*
Limits tab
PV Process value
4 limit values with icons for the configured
limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)



C_SS_2_us.png

Display: Graphical display
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Limit values as marks on bargraph
Feedback as horizontal bargraph*
The current direction of action of the output variable is indicated by arrows above the horizontal bargraph.
Right arrow: positive step output is active
Left arrow: negative step output is active

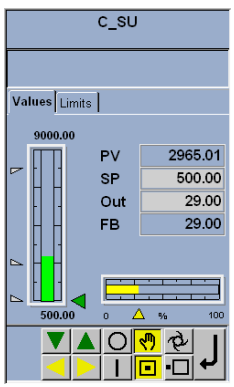
Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing output variable Out (in manual mode only)
Changing limit values

*With activated feedback, the FB position feedback appears as a bargraph and as a numerical value. If feedback is interrupted, i.e. if the FBF signal is 1, an empty field appears instead of the numerical value. The FB column than also disappears.

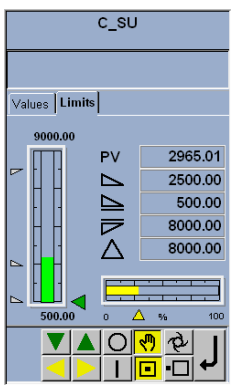
** If external position feedback has been configured and is active, you can change the output value by entering a value in the number field or moving the slider. Without effective external feedback (external feedback in Freelance Engineering is disabled or FBF signal is set to logical 1), the output variable can be changed only incrementally using the yellow triangle buttons. The **Open** and **Close** buttons are end position commands that cause the

actuator to move in the respective direction for the motor positioning time plus the max. runtime factor. This movement can be stopped by briefly pressing one of the yellow triangle buttons.

Universal step controller C_SU



C_SU_1_us.png



C_SU_2_us.png

Display: Message area
Icons for the configured limit values, if configured as messages.
Icon for operating mode Track, if this mode is active.

Display: Numerical values
Values tab
PV Process value
SP Set point
Out Output variable
FB Feedback*
Limits tab
PV Process value
4 limit values with icons for the configured limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

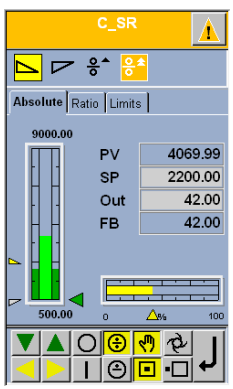
Display: Graphical display
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Limit values as marks on bargraph
Feedback as horizontal bargraph*
The current direction of action of the output variable is indicated by arrows above the horizontal bargraph.
Right arrow: positive step output is active
Left arrow: negative step output is active

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing output variable Out (in manual mode only)
Changing limit values

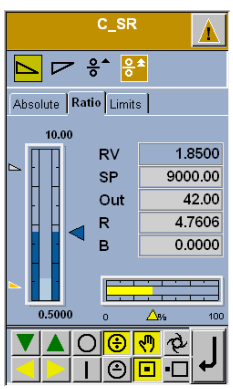
*With feedback switched on, the position feedback FB appears as a bargraph and as a numerical value. If feedback is interrupted, i.e. if the FBF signal is 1, an empty field appears instead of the numerical value. The FB column than also disappears.

** If external position feedback has been configured and is active, you can change the output value by entering a value in the number field or moving the slider. Without effective external feedback (external feedback in Freelance Engineering is disabled or FBF signal is set to logical 1), the output variable can be changed only incrementally using the yellow triangle buttons. The Open and Close buttons are end position commands that cause the actuator to move in the respective direction for the motor positioning time plus the max. runtime factor. This movement can be stopped by briefly pressing one of the yellow triangle buttons.

Ratio step controller C_SR



C_SR_1_us.png

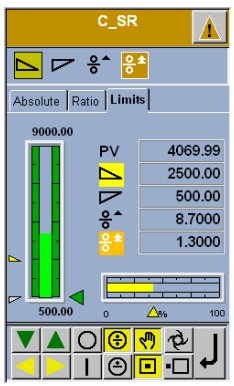


C_SR_2_us.png

Display: Message area
Icons for the configured limit values, if configured as messages.
Icon for operating mode Track, if this mode is active.

Display: Numerical values
Absolute tab
PV Process value
SP Set point
Out Output variable
FB Feedback*
Ratio tab
RV Ratio value
SP Set point
Out Output variable
R Ratio
B Bias
Limits tab
PV Process value
4 limit values with icons for the configured
limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

Display: Graphical display
Absolute and *Limits* tabs
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Limit values as marks on bargraph
Feedback as horizontal bargraph*
The current direction of action of the output variable is indicated by arrows above the horizontal bargraph.
Right arrow: positive step output is active
Left arrow: negative step output is active



C_SR_3_us.png

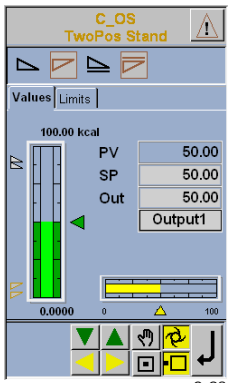
Ratio tab
Current ratio value and set ratio as bargraph with ratio scale range and engineering units
Ratio limit values as marks with bargraph

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing output variable Out (in manual mode only)
Toggling between ratio control and fixed value control
Changing ratio and bias
Changing limit values

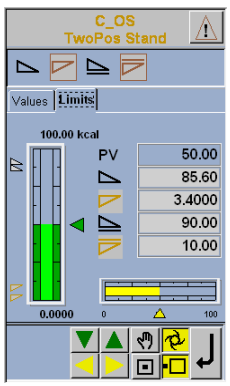
*With feedback switched on, the position feedback FB appears as a bargraph and as a numerical value. If feedback is interrupted, i.e. if the FBF signal is 1, an empty field appears instead of the numerical value. The FB column than also disappears.

** If external position feedback has been configured and is active, you can change the output value by entering a value in the number field or moving the slider. Without effective external feedback (external feedback in Freelance Engineering is disabled or FBF signal is set to logical 1), the output variable can be changed only incrementally using the yellow triangle buttons. The Open and Close buttons are end position commands that cause the actuator to move in the respective direction for the motor positioning time plus the max. runtime factor. This movement can be stopped by briefly pressing one of the yellow triangle buttons.

Standard two position controller C_OS



C_OS_1_us.png



C_OS_2_us.png

Display: Message area
Icons for the configured limit values, if configured as messages.

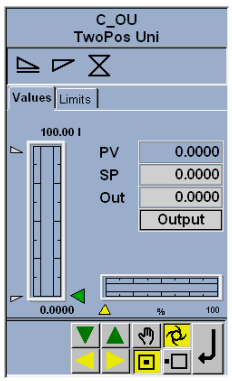
Display: Numerical values
Values tab
PV Process value
SP Set point
Out Output variable
Current status of output variable OB Gray background: output is passive, yellow background output is active (activated).

Limits tab
PV Process value
4 limit values with icons for the configured
limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

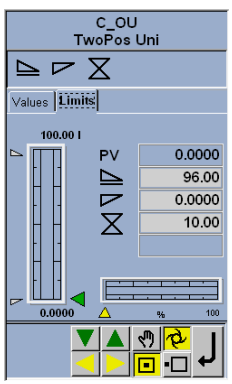
Display: Graphical display
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Limit values as marks on bargraph
Output variable as horizontal bargraph*
Limit values as marks on bargraph

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing correcting variable OUT and, thus, changing binary output OB according to the configured pulse-width modulation (manual mode only)
Changing limit values

Universal Two Position Controller, C_OU



C_OU_1_us.png



C_OU_2_us.png

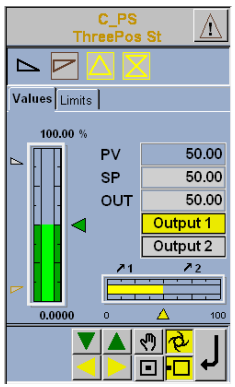
Display: Message area
Icons for the configured limit values, if configured as messages.
Icon for operating mode Track, if this mode is active.

Display: Numerical values
Values tab
PV Process value
SP Set point
Out Output variable
Current status of output variable OBGray background: output is passive, yellow background output is active (activated).
Limits tab
PV Process value
4 limit values with icons for the configured limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

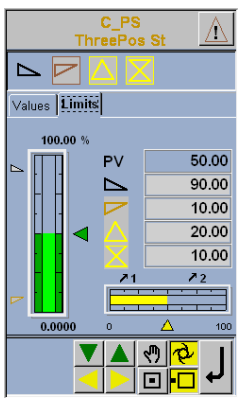
Display: Graphical display
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Output variable as horizontal bargraph
Limit values as marks on bargraph

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing correcting variable OUT and, thus, changing binary output OB according to the configured pulse-width modulation (manual mode only)
Changing limit values

Standard controller, three position C_PS



C_PS_1_us.png



C_PS_2_us.png

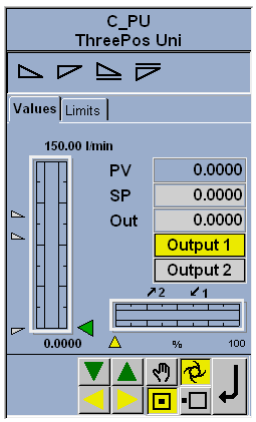
Display: Message area
Icons for the configured limit values, if configured as messages.

Display: Numerical values
Values tab
PV Process value
SP Set point
Out Output variable
Current activation status of binary outputs **OB1**, **OB2** with the **Output 1** and **Output 2** text fields.
Gray background: output is passive, yellow background output is active (activated).
Limits tab
PV Process value
4 limit values with icons for the configured limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

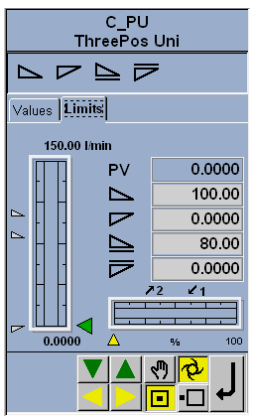
Display: Graphical display
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Output variable as horizontal bargraph
Limit values as marks on bargraph
Parameterized split points as arrows at the control value bargraph (Their displayed height corresponds approximately to the Y1, Y2 characteristic line split points and indicate the relationship and pitch of the characteristic line.)

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing the output variable Out and with it the binary outputs Output1 and Output2 in accordance with the configured split-range characteristic and pulse-width modulation (in manual mode, only)
Changing limit values

Universal controller, three position C_PU



C_PU_1_us.png



C_PU_2_us.png

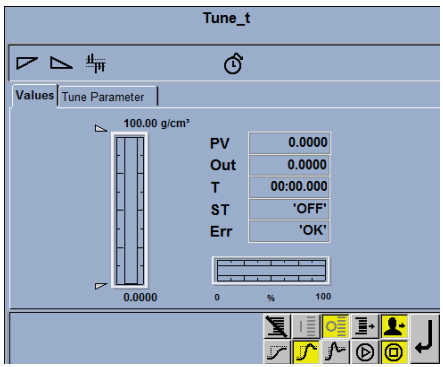
Display: Message area
Icons for the configured limit values, if configured as messages.
Icon for operating mode Track, if this mode is active.

Display: Numerical values
Values tab
PV Process value
SP Set point
Out Output variable
Current activation status of binary outputs **OB1**, **OB2** with the **Output 1** and **Output 2** text fields.
Gray background: output is passive, yellow background output is active (activated).
Limits tab
PV Process value
4 limit values with icons for the configured limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

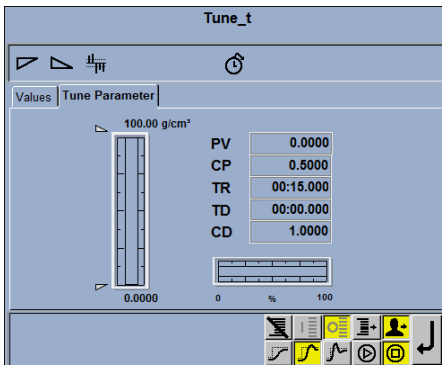
Display: Graphical display
Process value as bargraph
Set point as bargraph
Scale range and engineering units
Output variable as horizontal bargraph
Limit values as marks on bargraph
Parameterized split points as arrows at the control value bargraph (Their displayed height corresponds approximately to the Y1, Y2 characteristic line split points and indicate relationship and pitch of the characteristic line.)

Operator interventions
Operating mode for output variable: toggle manual/automatic
Operating mode for set point: toggle internal/external
Changing set point SP
Changing the output variable Out and with it the binary outputs Output1 and Output2 in accordance with the configured split-range characteristic and pulse-width modulation (in manual mode, only)
Changing limit values

Controller selftune TUNE



TUNE_1_us.png



TUNE_2_us.png

Display: Message area
Limit value icons: Low, High, NOISE, STAT, MOVE, OUT_LIMIT, TIME_OV Icon for operating mode Track, if this mode is active.

Display: Numerical values
Values tab
PV Process value, currently controlled variable
Out Current control value
T Current test step duration
ST Current selftune status (see page 170)
Err Error code (see page 170)
Tune Parameter tab:
PV Process value, currently controlled variable
CP Proportional coefficient CP
TR Reset time
TD Rate time
CD Derivative gain

Display: Graphical display
Actual value as bargraph
Scale range and engineering units
Output variable as horizontal bargraph
Limit values as marks on bargraph

Operator interventions
Starting and stopping parameter selftune
Toggling PID parameter set between selftune and user-defined parameters
Defining controller dynamics
Defining stationarity
Toggling parameter scheduling

Current selftune status ST:

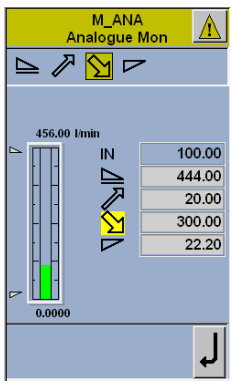
Text	Description
OFF	Selftune Off, no controller parameters have yet been determined
NOISE	Noise level measurement; noise level is determined
STEP1_S	Wait for movement after first test step
STEP1_M	Wait for stationarity after first test step
BREAK	Stop test step, wait for stationarity
STEP2_S	Wait for movement after second test step
STEP2_M	Wait for stationarity after second test step
CANCEL	Selftune canceled due to error, error cause indicated by error code
READY	Selftune complete, controller parameters have been determined

Errors ERR occurred during selftuning:

Text	Description
TIME_OV	Time overflow
NOISE	Noise level
STAT	Too much movement
MOVE	Not enough movement
LIMIT_Y	Output limited
WSTART	Break for warm start
OK	No error

Monitoring function blocks

Analog monitoring, M_ANA



M_ANA_us.png

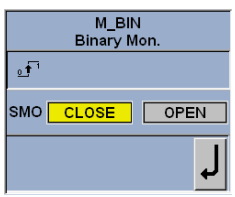
Display: Message area
Icons for the configured limit values, if configured as messages.

Display: Numerical values
IN Input signal
4 limit values with icons for the configured limit value types (for the meaning of the symbols, please refer to Icons in the message area of faceplates, page 139)

Display: Graphical display
Input signal as a bargraph with scale range and engineering units
Limit values as marks on bargraph

Operator interventions
Changing limit values

Binary monitoring, M_BIN



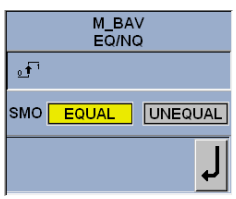
M_BIN_us.png

Display: Message area
Icon of binary message, if a message has been configured.

Display: Display
Message status with configured messages

Operator interventions
None

Binary monitoring of antivalence, M_BAV



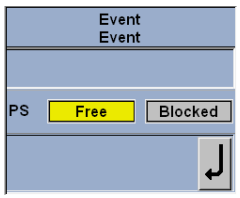
M_BAV_us.png

Display: Message area
Icon of binary message, if a message has been configured.

Display: Display
Message status with configured messages

Operator interventions
None

Event message, EVENT

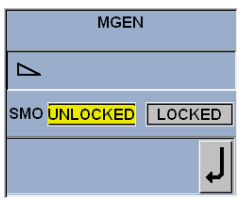


EVENT_us.png

Display: Display
Message status with configured messages

Operator interventions
None

General message block, M_GEN



M_GEN_us.png

Display: Message area
Icon for configured limit value, if configured as message

Display: Display
Message status with configured messages

Operator interventions
None

Open loop control function blocks

Messages of control function blocks

Error e.g. from motor control unit via binary input

Runtime Caused by exceeding the configured runtime; the defined time from control
command to achieving the end position was exceeded.

End position error
Caused by leaving the end position without a control command; a static arrow in the graphical area indicates the last command.

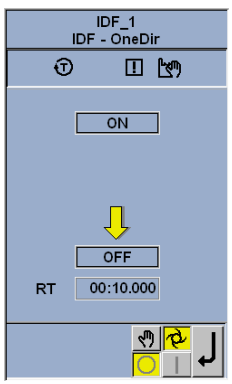
Safety intervention
Caused by an external signal, selected statuses are locked for safety reasons.

Local intervention

An external binary signal is sent to the individual drive function when the actuator is locally operated. An operation from the operator station is then inhibited.

Torque Caused by torque monitoring signal (for IDF_A only).

Individual drive function for unidirectional units, IDF_1



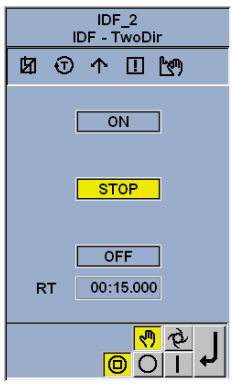
IDF_1_us.png

Display: Message area
Icons for disturbance, runtime, end position, protection and local control, if configured as messages.
A past safety intervention is indicated by a black icon on white background. This display will be reset in automatic or after an operation intervention.

Display: Graphical display
Status fields with configured command texts indicate the switch status.
Arrow: current direction of motion of the final control element. The direction-of-motion arrow flashes when the final control element is "moving". In the event of an end-position error or a run-time error, the end position to be attained is indicated by a static direction-of-motion arrow in the faceplate.
RT Configured runtime

Operator interventions
Operating mode for output variable: toggle manual/automatic
Change control command 1/0 (in manual mode only)

Individual drive function for bi-directional units, IDF_2



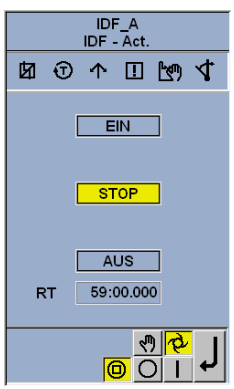
IDF_2_us.png

Display: Message area
Icons for disturbance, runtime, end position, protection and local control, if configured as messages. A past safety intervention is indicated by a black icon on white background. This display will be reset in automatic or after an operation intervention.

Display: Graphical display
Status fields with configured command texts indicate the switch status;
Arrow: current direction of motion of the final control element. The direction-of-motion arrow flashes when the final control element is “moving”. In the event of an end-position error or a run-time error, the end position to be attained is indicated by a static direction-of-motion arrow in the faceplate. In direction of movement STOP the status field for STOP flashes.
RT Configured runtime

Operator interventions
Operating mode for output variable: Toggle manual/automatic
Change control command 1/stop/0 (in manual mode, only)

Individual drive function for actuators, IDF_A



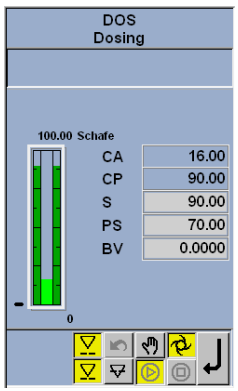
IDF_A_us.png

Display: Message area
Icons for disturbance, runtime, end position, protection, local control and torque blockage, if configured as messages.
A past safety intervention is indicated by a black icon on white background. This display will be reset in automatic or after an operation intervention.

Display: Graphical display
Status fields with configured command texts indicate the switch status.
Arrow: current direction of motion of the final control element. The direction-of-motion arrow flashes when the final control element is “moving”. In the event of an end-position error or a run-time error, the end position to be attained is indicated by a static direction-of-motion arrow in the faceplate. In direction of movement STOP the status field for STOP flashes.
RT Configured runtime

Operator interventions
Operating mode for output variable: toggle manual/automatic
Change control command 1/stop/0 (in manual mode only)

Dosing circuits, DOS, DOS_A, DOS_E



DOS_us.png

Display: Message area
For DOS_E, only, an alarm is indicated by an icon, if configured accordingly.

Display: Numerical display

CA	Actual counter position
CP	Counter last period
S	Shut-off value
PS	Pre-shut-off value
BV	Basic value

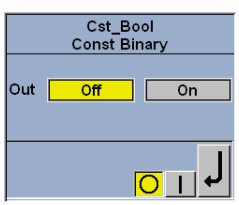
Display: Graphical display
Counter actual value CA as bargraph
Shut-off value S as bargraph
Basic value as marker to the left of the bargraph

Operator interventions
Change basic value, pre-shut-off value and/or shut-off value
Operating mode for output variable: toggle manual/automatic
Stopping and reactivating the dosing circuits (automatic mode only)
Reset: current counter is reset to its basic value
Adjust dosing: coarse dosing, fine dosing, and dosing OFF (in manual mode only)

Constant function blocks

Constant function blocks CSTBO … CSTWO

CSTBO - Binary value data type

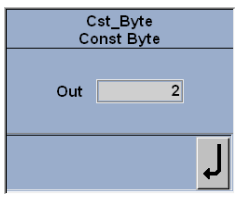


CST_BOOL_us.png

Display: Display
Status of the constant

Operator interventions
Toggling the binary value

CSTBY - Byte data type

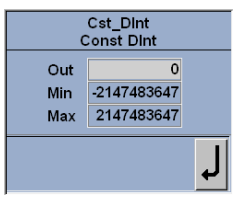


CST_BYTE_us.png

Display: Display
Numerical value of constant

Operator interventions
Changing constant value

CSTDI - Double integer word data type

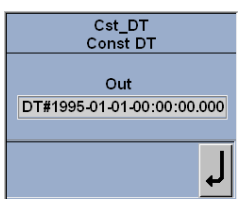


CST_DINT_us.png

Display: Display
Numerical value of constant and permissible value range

Operator interventions
Changing constant value

Date&Time data type

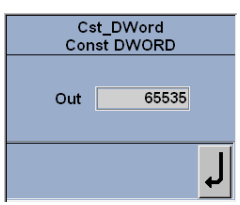


CST_DT_us.png

Display: Display
Numerical value of constant

Operator interventions
Changing constant value

CSTDW - Double word value data type

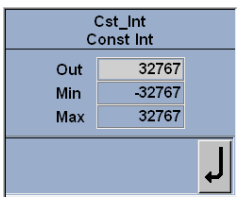


CST_DWORD_us.png

Display: Display
Numerical value of constant

Operator interventions
Changing constant value

CSTIN - Integer data type

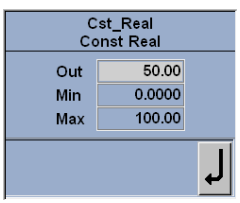


CST_INT_us.png

Display: Display
Numerical value of constant and permissible value range

Operator interventions
Changing constant value

CSTRE - Floating point value data type

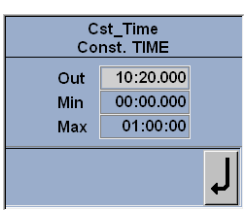


CST_REAL_us.png

Display: Display
Numerical value of constant and permissible value range

Operator interventions
Changing constant value

CSTTI - Time data type

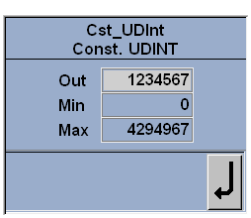


CST_TIME_us.png

Display: Display
Numerical value of constant and permissible value range

Operator interventions
Changing constant value

CSTUD - Double integer word without prefix data type

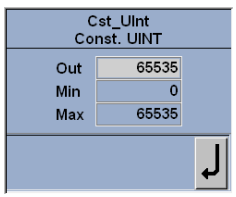


CST_UDINT_us.png

Display: Display
Numerical value of constant and permissible value range

Operator interventions
Changing constant value

CSTUI - Integer word without prefix data type

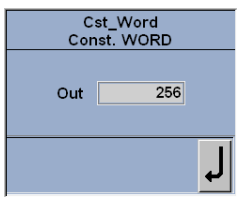


CST_UINT_us.png

Display: Display
Numerical value of constant and permissible value range

Operator interventions
Changing constant value

CSTWO - Word value data type



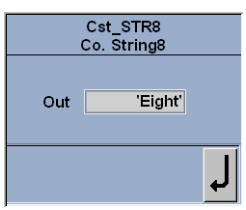
CST_WORD_us.png

Display: Display
Numerical value of constant

Operator interventions
Changing constant value

Function block constants CSTSTR8, ... , CSTSTR256

Data type STRING8

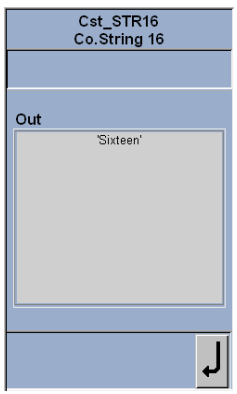


CST_STR8_us.png

Display: Display
Text of the constant

Operator interventions
Changing constant value

STRING16, STRING32, STRING64, STRING128 and STRING256



CST_STR16_us.png

Display: Display
Text of the constant

Operator interventions
Changing constant value

The following string constants are available:

Function block Data type; max. number of characters

CSTSTR8	STRING8, max. 8 characters
CSTSTR16	STRING8, max. 16 characters
CSTSTR32	STRING8, max. 32 characters
CSTSTR64	STRING8, max. 64 characters
CSTSTR128	STRING8, max.128 characters
CSTSTR256	STRING8, max. 256 characters

The IEC character set is supported. This includes all characters from the ISO646 Table 6461 "Basic Code Table", columns 3 to 7. Lowercase letters are also supported Non-printing characters such as e.g. line feed are marked by the dollar symbol $ and entered as hexadecimal characters.

Example:

$0D$0A	Corresponds to 2 characters, 0D = carriage return and 0A = line feed

Other examples of the non-printing characters acc. to IEC are:

$$	Dollar sign,

$'	Superscript,
$P or $p	Form feed,
$L or $l	Line feed or $0A
$R or $r	Carriage return or $0D,
$N or $n	New line, end current line and begin at start of next line,
$T or $t	Tab,with non-proportional script, advance to the column that can be divided by 8, and to the next 2 cm limit with proportional script.

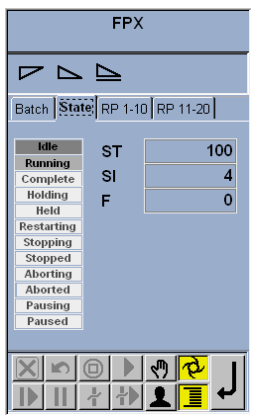
Characters marked by $ are not interpreted in the faceplates, but displayed in the form entered, e.g. $AB for «.

The characters known from IEC are abbreviated accordingly, e.g. $0A is displayed as $L.

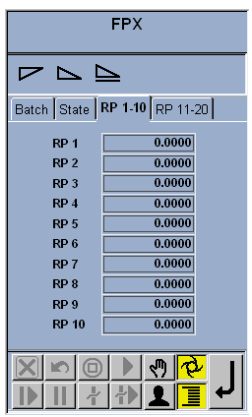
Batch control function blocks

Function block FPX

FPX_1_us.png



FPX_2_us.png



FPX_3_us.png

Display: Message area
Icons for the configured limit values, if configured as messages.

Display: Display

Batch tab
Status fields (see below)
ST Status display
BA Batch ID
RE Recipe ID
LO Lot ID
CA Campaign ID
State tab:
Status fields (see below)
ST Status display
SI Step index of current step
F Failure register
Tabs *RP 1-10* and *RP11-20*:
Recipe parameters 1 to 10 or 11 to 20 If parameter names have been configured in Freelance Engineering, these names will be displayed in the tool tip.

Operator interventions
Operating mode for output variable: toggle manual/automatic
Toggling the operating mode between operator/program
Starting run sequence
Starting restart sequence
Resetting after Idle
Pause
Continue after pause
Start stop sequence
Starting abort sequence
Start hold sequence

State fields in the FPX function block

The current state of the function block is indicated by the following text and colors: Impossible states are shown on a white background

State field	State	Background color / text color
Idle	Idle	Dark gray/black
Running	Running	Green/white
Complete	Complete	Light gray/light green
Holding	Stopping	Light blue, flashing/black

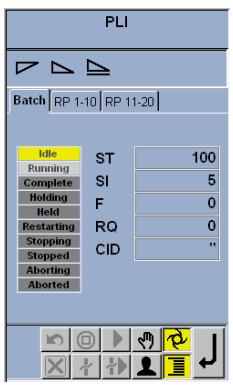
Held	Stopped	Light blue/black
Restarting	Restarting	Green, flashing/white
Stopping	Stopping	Blue, flashing/white
Stopped	Stopped	Blue/white
Aborting	Aborting	Orange, flashing/white
Aborted	Aborted	Orange/white
Pausing	Pausing	Light green, flashing/black
Paused	Pause	Light green/black

In the overview display the FPX function block's state is indicated by colored bars meaning the following:

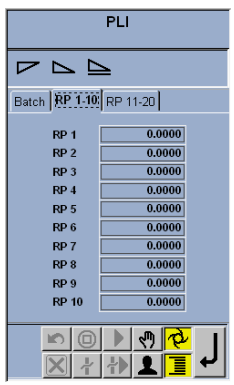
	Green Green, flashing	Running Restarting
	Light green Light green, flashing	Pause Pausing
	Light blue Light blue, flashing	Stopped Stopping
	Dark gray	Idle
	Blue Blue, flashing	Stopped Stopping

	Orange	Aborted
	Orange, flashing	Aborting
	Light gray	Complete

PLI function block



PLI_1_us.png



PLI_2_us.png

Display: Message area
Icons for the configured limit values, if configured as messages.

Display: Display
Batch tab
Status fields (yellow: current status; gray: possible statuses; dark gray: impossible statuses)
ST Status display
SI Step index of current step
F Failure register
RQ Request command
CID Campaign ID
Tabs *RP 1-10* and *RP11-20*:
Recipe parameters 1 to 10 or 11 to 20

Operator interventions
Operating mode for output variable: toggle manual/automatic
Toggling the operating mode between operator/program
Starting run sequence
Starting restart sequence
Resetting after Idle
Start stop sequence
Starting abort sequence
Start hold sequence

In the overview display the PLI function block's state is indicated by colored bars meaning the following:

	Yellow Yellow, flashing	Running Restarting
	Yellow Yellow, flashing	Stopped Stopping
	Dark gray	Idle
	Yellow Yellow, flashing	Stopped Stopping
	Yellow Yellow, flashing	Aborted Aborting
	Light gray	Complete

Section 9 SFC Display

General description – SFC display

The SFC (Sequential Function Chart) is a user-defined network of steps and transitions. The terms ‘step’ and ‘transition’ refer to action blocks and advancement conditions respectively. Steps and transitions are represented by graphical symbols. The display, type and color are dependent on the step and transition states.

Every SFC program begins with the initial step and ends with the end transition. During the initialization of the SFC program all steps are inactive. At the start of the SFC program the initial step is activated and all other steps are inactive. The SFC program starts when it is
enabled, i.e. when the start time, restart time or repeat time have been reached or have expired. The end transition terminates the SFC program run. Afterwards all steps will be in the inactive state.

The Freelance system provides the option of operating the SFC program in either automatic or manual mode.

In automatic mode the SFC program runs automatically. In manual mode you are able to influence the processing of steps and transitions.

Calling up the SFC display

Via the toolbar

Call up SFC.png

Left-click toolbar icon > In display explorer double-click appropriate SFC display

Via the display menu item

Display > **SFC displays** > In Display Explorer double-click SFC display
or
ALT + D > **C** > Use CURSOR KEYS to select SFC display > ENTER

Via the context menu

In order to call up an SFC display via the context menu, you must first select a tag to which an SFC display has been assigned in Freelance Engineering using the *Display access* function.

Select tag > Call up context menu > Select SFC display

From the overview display

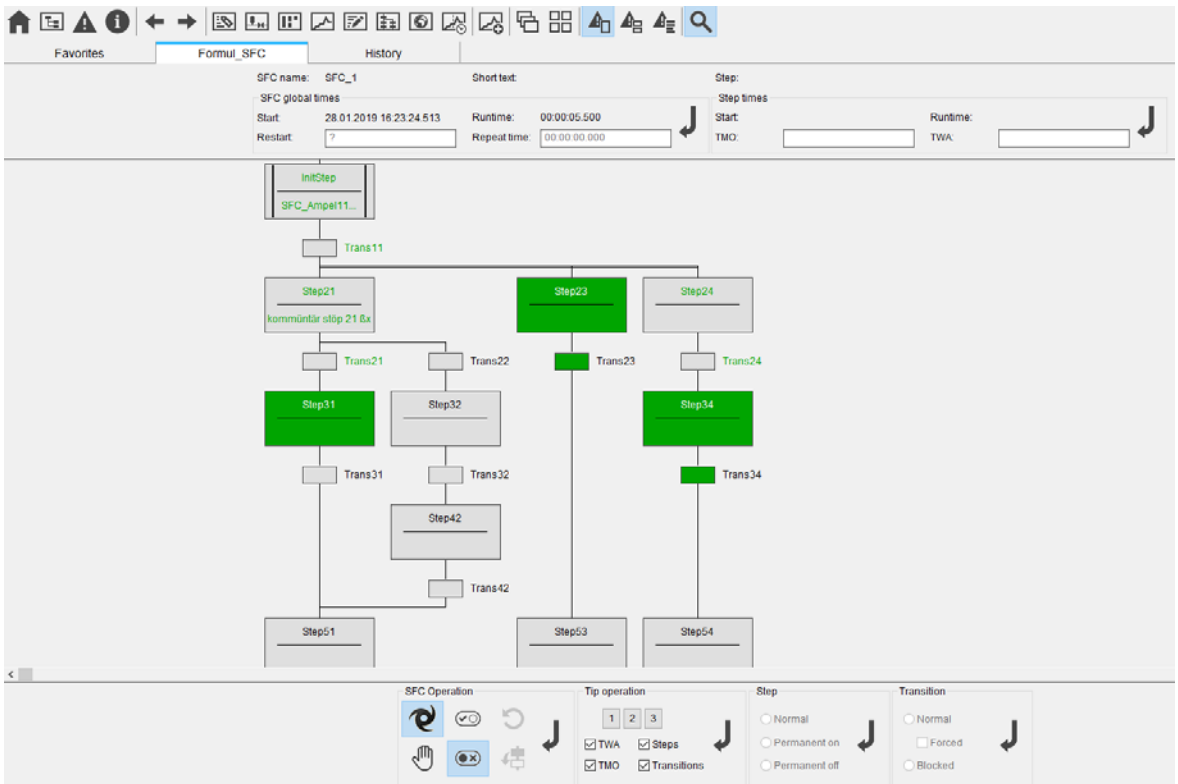
Left-click appropriate SFC display icon
or
Use CURSOR or TAB keys to select appropriate SFC display > ENTER

From a graphic display

In order to call up an SFC display from a graphic display, a graphic object that features the *Show display* action with an SFC display configured in Freelance Engineering must have been previously selected.

Left-click graphic object with appropriate configuration
or
Use TAB KEY to select appropriate graphic object > ENTER

Structure of the SFC display



SFC structure.png

Title line

The title line displays the name, the short text and the long text of the current SFC display.

Menu

Under the menu item Operation, the menu displays the actions available for the SFC display.

Upper operating element area

The upper operating element area displays the SFC times and the step times. The name of the SFC component and the currently marked step are also displayed.

Display area

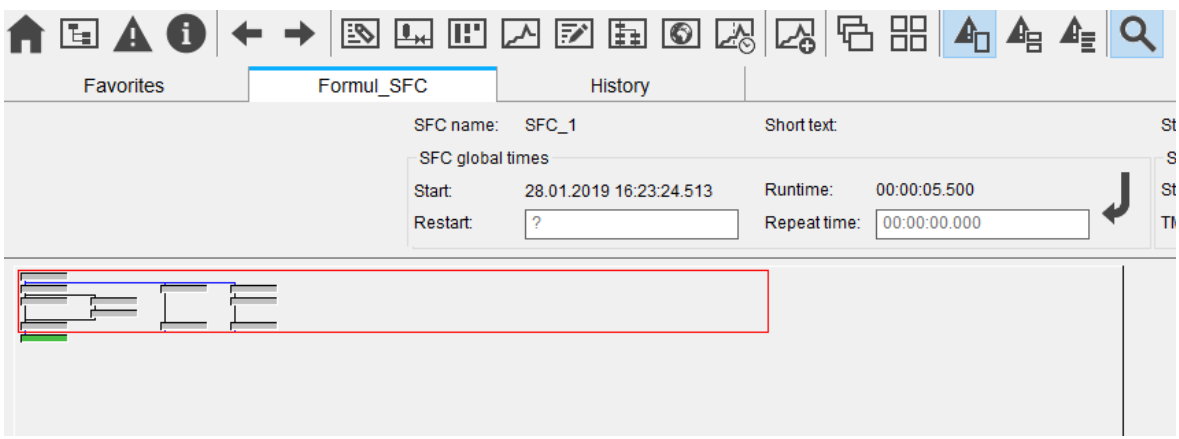
In the display area, the individual steps and transitions are displayed depending on their status and the mode of action execution. The SFC overview display is also shown here. You can scroll the display using the horizontal and vertical scroll bars.

The background color of the display section is dependent on the selected operating mode. In automatic mode, the background color is **light blue**, whereas it is **dark blue** in manual mode. The display of steps and transitions is identical in both operating modes.

Lower operating element area

The lower operating element area includes the SFC Operation, Tip operation, Step and Transition groups.

SFC overview display



SFC overview.png

The SFC overview display shows you the complete structure of the sequential function chart at a glance. The green marking shows you the currently active step or steps. Parallel branches are highlighted in blue.

The SFC overview display offers you a convenient way of viewing the required area in complex SFC structures.

Calling up the SFC overview display

In display area: Double-click next to a step or a transition
or
Operate > **Overview display**
or
ALT + O > **O**

Positioning the display area in the SFC overview display

Left-click in the appropriate display section > Double-click in the selected area
or
Use CURSOR KEYS to position the selection frame in the appropriate display section > ENTER

Operate menu

The Operate menu for the SFC display comprises the following menu items:

- Transitions...
- Steps...
- Active steps...
- Control Aspect
- Criteria window...
- Overview display

Steps and Transitions

Step statuses

Steps in the Freelance system can have the status **inactive, active, was active** and **interrupted.**

inactive — A step is **inactive** when it has not yet been performed in the current cycle. When a step is inactive, the programs assigned to it are not executed.

active — The step status changes to **active** as soon as all transition conditions of the preceding step have been fulfilled. When a step is active, the programs assigned to it are executed.

was active — When a step has been executed in the cycle, it is set to the **was active** status.

interrupted — The step monitoring time has been exceeded.

Executing steps

The **Freelance** system provides the **normal**, **permanently off** and **permanently on** modes for the execution of steps.

The action execution is independent of the step state.

normal — The actions assigned to a step are performed only on condition that the step is active.

permanently off — The actions assigned to the step are never executed.

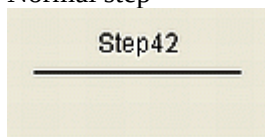
permanently on — The actions assigned to the step are always performed.

Display format of steps in the SFC display

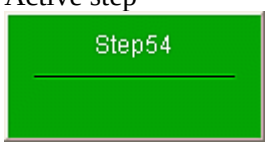
The display format of steps in the SFC display depends upon the step state and the mode of the action execution. The “permanently on” and “permanently off” action execution modes are indicated by a triangle in the top right corner of the step symbol. The triangle is dark blue for “permanently off”
and light green for “permanently on”.

Initial step

Normal step



Active step

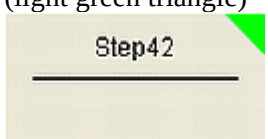


Interrupted step

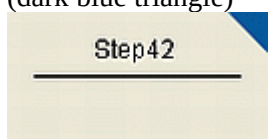
Inactive step

Step was active

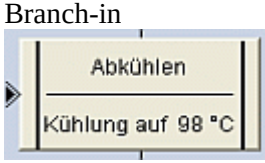
Permanently on step
(light green triangle)



Permanently off step
(dark blue triangle)



Branch-in



Branch-out

The following table provides information on the colors used for displaying steps depending on their state and the mode of action execution.

Step status	Symbol section	Action execution		
		normal	perm. off	perm. on
inactive	Background Text Triangle	Gray Black -	Gray Black Dark blue	Gray Black Light green
active	Background Text Triangle	Dark green White -	Dark green White Black	Light green Black Black
was active	Background Text Triangle	Gray Dark green -	Gray Dark green Dark blue	Gray Dark green Light green
interrupted	Background Text Triangle	Dark green Red -	Dark blue Red Black	Light green Red Black

Transition statuses

In the Freelance system, transitions can have the status **not processed**, **in progress**, **fulfilled** and **completed**.

not processed
Not all preceding steps have become active. The transition will not be evaluated.

in progress All preceding steps have become active. The transition will be evaluated.

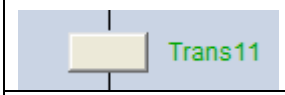
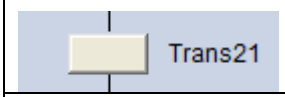
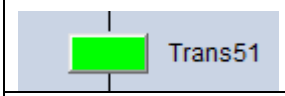
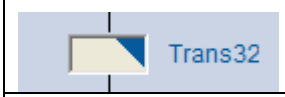
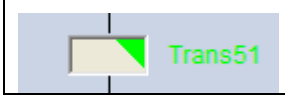
fulfilled The transition advancement condition is TRUE. All preceding steps will become inactive and all following steps will become active. The transition advances.

completed The end transition completes the SFC program run. Afterwards all steps will be in the inactive state.

Displaying transitions in the SFC display

Transitions are displayed in the SFC display depending on their status.

The table shows the status-dependent transition colors.

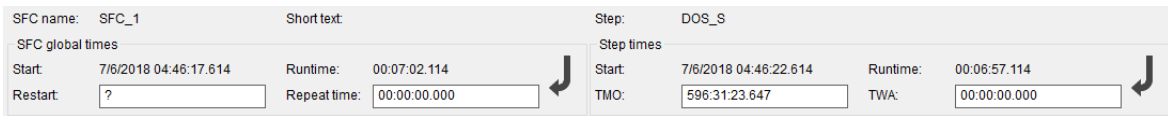
	**processed** or **fulfilled** (green text)
	**not processed** or **completed** (black text)
	**in progress**
	**execution blocked** (dark blue triangle)
	**execution forced** (light green triangle)

Transition status	Symbol section	Execution of the transition criteria		
		normal	blocked	forced
not processed or completed	Background Text Triangle	Gray Black -	Gray Black Dark blue	Gray Light green Light green
in progress	Background Text Triangle	Dark green White -	Dark blue White Black	Light green Black Black
fulfilled	Background Text Triangle	Gray Dark green -	Gray Dark blue Dark blue	Gray Dark green Black

SFC display operation

SFC times in the SFC display

The upper operating element area includes the SFC times and step times groups. The name of the SFC component and the currently marked step are also visible.



SFC Time.png

The SFC times refer to the complete sequential function control.

The start time and the runtime cannot be changed! The restart time and the repeat time can only be modified in manual mode.

During active daylight saving time period, all sequential function chart times are indicated on this basis. The times entered by the operator are also recorded as daylight saving time values in Freelance Operations and transferred accordingly to the controller.

Start The **start time** is the beginning of execution of the SFC program. At the start of each new run the current system time is recorded.

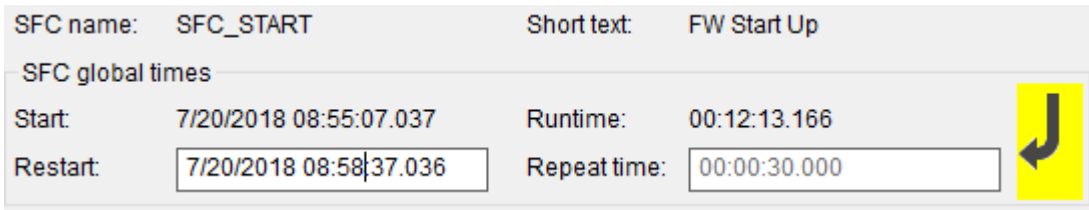
Runtime The **runtime** is the time that has elapsed since the start. The runtime is reset to 0 s when the SFC is started.

Restart The **restart** time is the time when the SFC program is started again. In contrast to the repeat time, the restart time represents a single point in time for starting the SFC program. In conjunction with repeat time, changing the restart time can influence the time point for cyclical processing of the SFC program.

Repeat time The **repeat time** is the minimum waiting time between two starts of the SFC program.
If the restart time is fixed, it will take precedence over the repeat

time. If the repeat time is less than or equal to the runtime of the SFC, then the SFC is started again immediately after ending.

Modifying the SFC times



SFC times.png

Modifying the restart time

Left-click edit field *Restart time* > Enter new value > ENTER

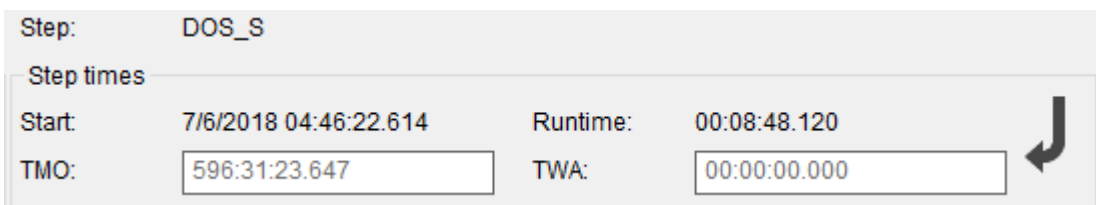
Modifying the repeat time

Left-click edit field *Repeat time* > Enter new value > ENTER

Step times in the SFC display

The times in this area only refer to the selected step.

The start time and the runtime cannot be changed! The monitoring time and the minimum waiting time can only be modified in manual mode of operation.



Step times.png

Start	The **start time** is the beginning of the execution of the selected step. Each time the step is executed the start time is updated.
Runtime	The **runtime** is the active time of the step. Each time the step is executed, the runtime is reset to 0 s.
TMO	**Monitoring time** for this step. The step should be completed prior to the expiry of the monitoring time. If this time is exceeded a message is generated.
TWA	**Minimum waiting time** for a step. The step remains active at least for the TWA duration.

Modifying the step times

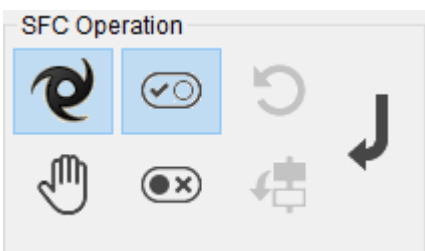
Modifying the monitoring time

Left-click edit field *TMO* > Enter new value > ENTER

Modifying the minimum waiting time

Left-click edit field *TWA* > Enter new value > ENTER

SFC display operation



SFC display operations.png

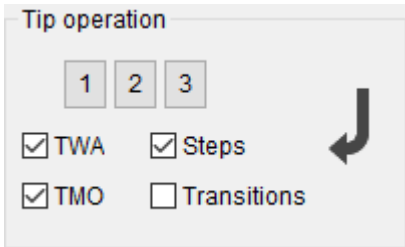
The SFC Operation group consists of six buttons and the ENTER button to confirm the selection. Operation is identical for all buttons.

Left-click appropriate button > ENTER

Automatic 	In automatic operating mode the transitions are stepped through by the program.
Manual 	In manual mode they can be stepped through by the operator.
Enable 	This refers to starting the SFC program. If in automatic operating mode Enable is switched on and either restart time or repeat time is reached, then the initial step in the SFC program will be carried out.
Disable 	The enable command for the SFC program is cancelled.
Reset 	The SFC program on the process station is reset.
Execute 	The program is continued depending on the selected tip options.

The SFC program can be enabled and disabled in manual and automatic mode. Resetting and execution are possible in manual mode only.

Tip operation



Tip operation.png

The *Tip operation* group consists of three buttons, four check boxes and the ENTER button to confirm a selection. Operation is identical for all buttons and check boxes.

Left-click appropriate button or appropriate check box > ENTER

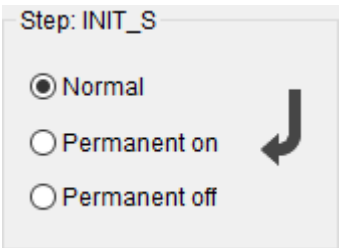
Tip operation

By activating one of these three buttons, a pre-defined profile for processing steps and transitions or for observing the *TWA* and *TMO* times can be set.

1	TWA, TMO, steps and transitions are not activated
2	Steps activated
3	Steps and transitions activated
TWA	If this field is selected, the minimum waiting time TWA is applied to all steps in the SFC display.
TMO	If this field is selected in manual mode, the corresponding TMO monitoring times will be applied to the active steps. In automatic mode, TMO will always be observed.
Steps	If this field is selected, the actions assigned to the active steps are performed.

Transitions If this field is selected, the programs assigned to the transitions are performed. The transition condition is checked.
If this field is not selected, the transition condition is always evaluated as TRUE.

Step operating element area



Step-sfc.png

In the *Step* group, the action execution of the selected step can be defined. The name of the selected step will be displayed.
The action execution of the step can only be changed in **Manual** mode; this is not possible in **Automatic** mode.

The selected action execution mode is kept even if you switch to automatic mode.

The action execution of a step can assume three different statuses:

Normal The step is processed normally.

Permanent off
The step is never processed.

Permanent on
The step is processed constantly.

The appropriate action can be selected via one of three radio buttons and the Enter button to confirm a selection.

In display area: Left-click a step > Select appropriate action > ENTER

Transition operating element area

Transition sfc.bmp

In the *Transitions* group, the type of advancement of the selected transition can be influenced. The name of the selected transition will be displayed.
The type of transition advancement can only be changed in **Manual** mode; this is not possible in **Automatic** mode.

The transition advancement mode can assume three states:

Normal The transition is advanced normally.

Blocked Transition advancement is blocked. This transition is not advanced even if the transition condition is TRUE.

Forced The transition is advanced immediately upon processing, regardless of the transition condition. The Forced status will be reset after one transition run has been completed.

The appropriate action can be selected via one of two radio buttons and the Enter button to confirm the selection. The Forced action can be operated via a check box.

In display area: Left-click a transition > Select appropriate action > ENTER

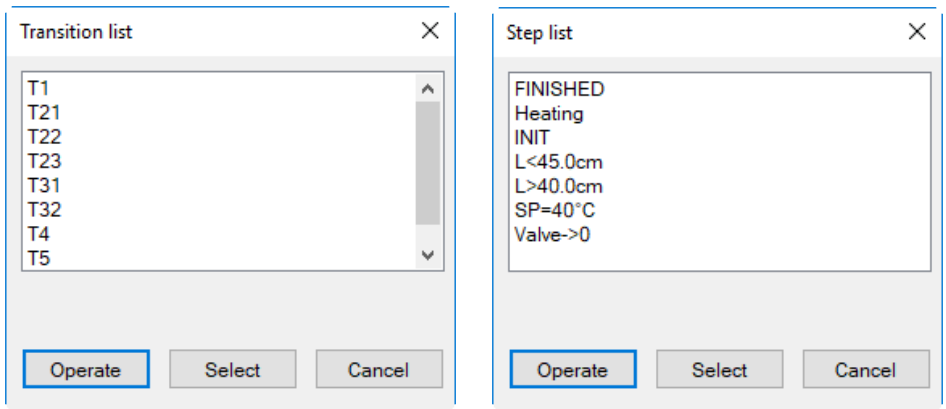
Selecting steps or transitions

You have the following options in order to select individual steps or transitions:

In display area: Left-click a step or transition
or

Operate > **Transitions…/Steps…/Active steps…** > Select from list
or
ALT + O > **T/S/C**

Displaying the transition list or step list



Transition/step list.png

Operate > **Transitions…/Steps…**

The following actions are available:

Operate	The highlighted step or transition respectively is selected for operation. The appropriate operating element area becomes active.
Select	The highlighted step or transition is selected.
Abort	The list is closed.

Displaying the list of active steps

Operate > **Active steps…**

This list is not updated automatically. This means that the steps included in the list were active at the time the list was called up but are not necessarily still active even a short time later.

The following actions are available:

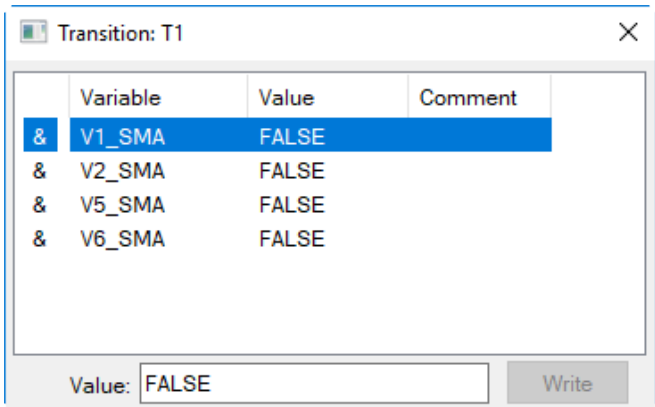
Update	The contents of the list are updated.
Operate	The highlighted step or transition respectively is selected for operation. The appropriate operating element area becomes active.
Select	The highlighted step or transition is selected.
Abort	The list is closed.

Operation in the display area

Criteria window

In the display area of the SFC display, you can call up a criteria window for each transition or step. The criteria windows provide further information about the selected transition or the selected step. In addition to the conventional criteria windows, which must have been configured explicitly in Freelance Engineering, the Control Aspect option also allows automatically created criteria windows to be called up. These windows show the program of the transition or step as configured in Freelance Engineering for the SFC. The display is based on online values similar to the Commissioning mode in Freelance Engineering. Online animation is limited to the display. Changes cannot be made.

Criteria window for transitions



Criteria window.png

The criteria window of a transition allows the advancement condition status to be monitored. The transition-relevant variables are indicated with their status, current value and a comment.

Variables marked with & are ANDed. Variables marked with >= are ORed. Variables without any marking serve for information purposes only and do not affect the transition condition.

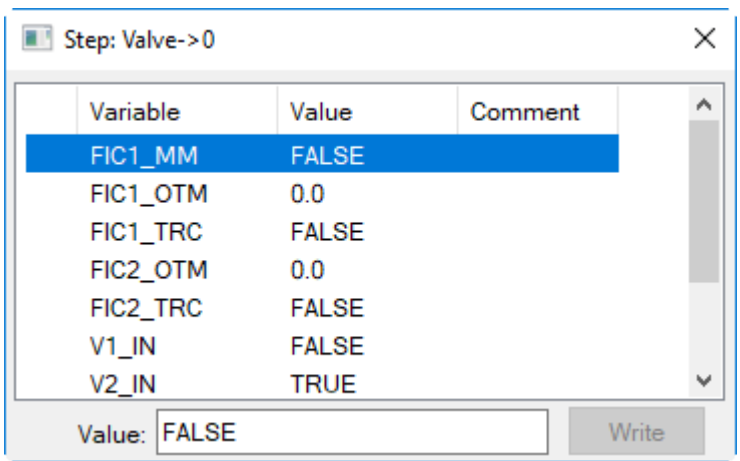
A transition (criterion for advancement) is considered as fulfilled when the conditions of all ANDed variables and at least one condition of the ORed variables are fulfilled. The text lines shown in green in the criteria window represent a fulfilled condition. All non-fulfilled conditions are indicated in black.

This type of display will only be used if configured accordingly in Freelance Engineering. During the configuration phase a tag can be assigned to each criterion. The associated faceplate can be called by double-clicking on the relevant line in the criteria window.

You can call up the criteria windows for transitions both from the display area of the SFC display and via the menu item Operation. This call-up is also possible via the context menu.

In display area: Double-click a transition
or
Select transition > **Operate** > **Criteria window**
or
Call up the context menu of a transition > **Criteria window**

Criteria window for steps



Criteria window for steps.png

The utilized variables with value and comment are displayed in the criteria windows for steps.

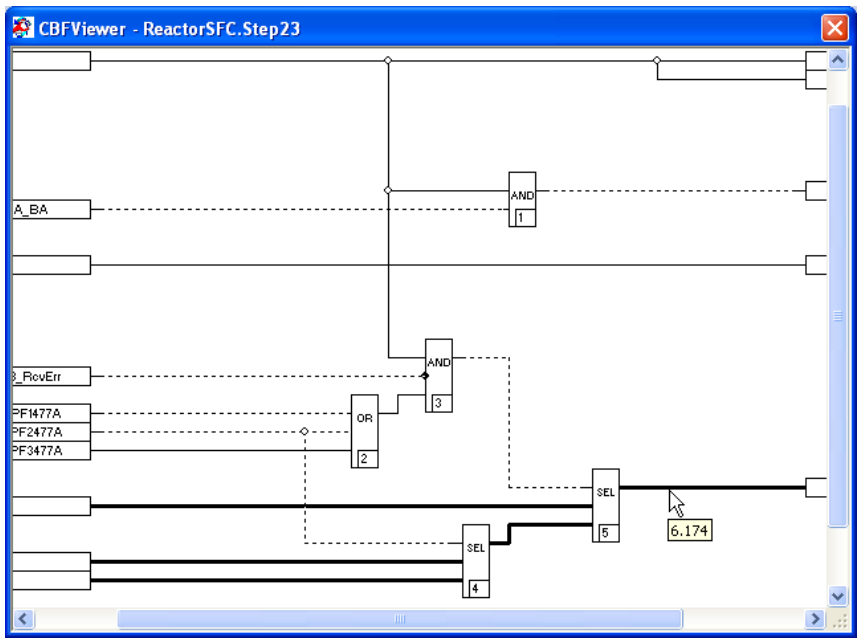
This type of display will only be used if configured accordingly in Freelance Engineering. During the configuration phase a tag can be assigned to each criterion. The associated faceplate can be called by double-clicking on the relevant line in the criteria window.

You can call up the criteria windows for steps both from the display area of the SFC display and via the menu item Operation. This call-up is also possible via the context menu.

In display area: Double-click a step
or
Select step> **Operate** > **Criteria window**

or
Call up the context menu of a step > **Criteria window**

Control Aspect



vh_j0036.png

The Control Aspect (CBF Viewer) add-on program must have been installed. For more detailed information, please refer to section Operating Philosophy, page 19 and to the "Getting started" manual, Installation.

If the Control Aspect (CBF Viewer) program is additionally installed on the Freelance Operations PC and the Control Aspect option is licensed and activated, the context menu of a step or a transition includes the **Control Aspect** item. The Control aspect is an animated display of the step or transition program, similar to the display of the program in the Commissioning mode in Freelance Engineering.

After selecting this entry, the associated configured program with all current values is displayed. If the contents of the Control Aspect window are displayed in red, there is either
no online connection or the step or transition is no longer active.

Operate > **Control Aspect**
or
Right-click a step or transition > **Control Aspect**
or
ALT + O > **C**

Under **Tools** > **Options** the setting can be changed to ensure that a double-click on a transition or a step calls up the Control Aspect feature instead of the conventional criteria window.

Calling up displays assigned to transitions and steps

The display allocation made during configuration in Freelance Engineering allows a group display, graphic display, trend display, time scheduler display, SFC display, WEB display as well as logs to be assigned to each step or transition.

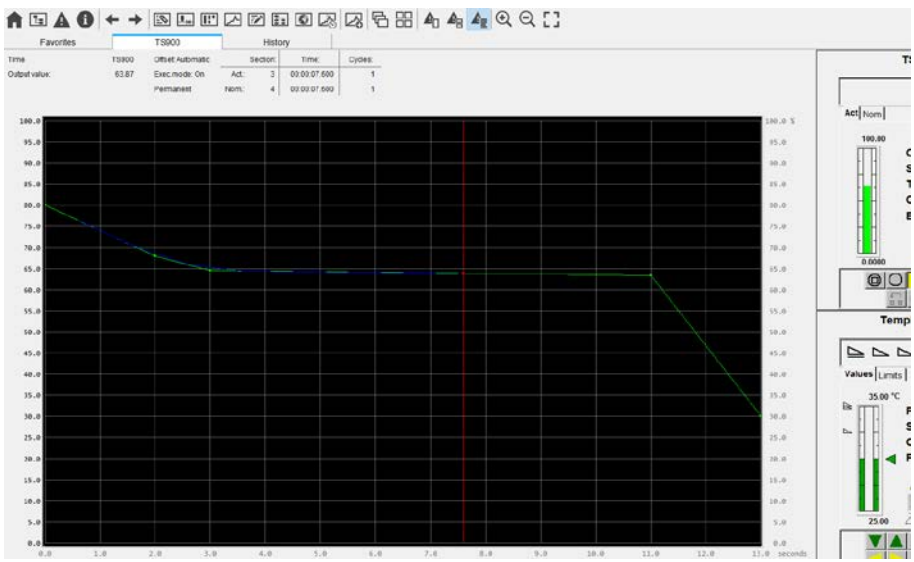
You can call up the assigned displays via the context menu.

Call up the context menu of a step or a transition > Select display

Section 10 Time Scheduler Display

General description – Time scheduler display

The time scheduler display in Freelance Operations is used to observe and operate the time scheduler. The time scheduler makes it possible to define analog variables chronologically by default, using a maximum of 32 different support values. These values are defined during configuration in Freelance Engineering. Each entry, of which there may be up to a maximum of 32, comprises a basic value and the associated runtime. The runtime defines the time at which the value is to be approached. The time scheduler display provides the possibility to influence the time scheduler output (analog signal), i.e. to deviate from the configured time schedule.



Time Schedule Display.png

The time trend is also displayed in a graphical format. Two different colors are used to distinguish between set trend and actual trend: green corresponds to the configured set trend and blue to the actual trend of the time scheduler output value. The latter does not necessarily match the set trend at all times. The current value is marked by a red rectangle.

Unlike the trend display there is no data archiving for the time scheduler display.

In addition to the trend curves, the time scheduler faceplate is shown. The actual output value is displayed as a bar graph and as numerical value. The *Act* and *Nom* tabs can be used to display and operate the actual values and nominal values in the value field.

A typical application of the time scheduler is to write a time-dependent variable value to a controller set point.

Below the faceplate of the time scheduler, any other faceplate can be displayed, e. g. the faceplate of the downstream controller.

Operate menu

The Operate menu for the time scheduler display comprises the following menu items:

- Scroll left
- Scroll right
- Zoom +
- Zoom -
- Zoom to window width

Calling up the Time Scheduler Display

Via the toolbar

Call up time schedule.png

Left-click toolbar icon > In the display explorer double-click appropriate time scheduler display

Via the Display menu item

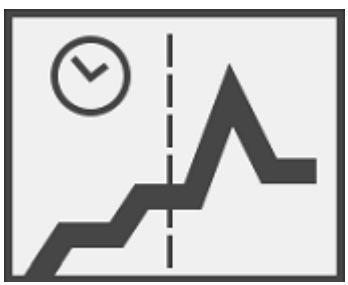
Display > **Time scheduler displays** > In Display Explorer double-click appropriate time scheduler display
or
ALT + **D** > **S** > Use CURSOR KEYS to select appropriate time scheduler display > ENTER

Via the context menu

In order to call up a time scheduler display via the context menu, you must first select a tag to which a time scheduler display has been assigned in Freelance Engineering using the *Display access* function.

Select tag > Call up context menu > Select appropriate time scheduler display

From the overview display



Time scheduler.PNG

Left-click appropriate time scheduler display icon
or
Use CURSOR or TAB keys to select appropriate time scheduler display > ENTER

From a graphic display

In order to call up a time scheduler display from a graphic display, a graphic object that features the *Show display* action with a time scheduler display configured in Freelance Engineering must have been previously selected.

Left-click graphic object with appropriate configuration
or

Use TAB KEY to select appropriate graphic object > ENTER

Operating the Time Scheduler Display

Manipulating the Graphic Area

Within a certain time, all defined ancillary values in the time scheduler display are reached. This time is the total time the horizontal axis of this time scheduler display comprises in its default status.

To observe a certain range more closely, you can scroll the display section or change the time range.

When you change the display section you can observe the trend area in the time scheduler display in more detail.

The change is carried out via the Operate menu or via the zoom levels in the toolbar. For this purpose the following three toolbar icons are available:

	**Zoom +**; Enlarges the displayed time range
	**Zoom –**; Reduces the displayed time range
	**Zoom to window width** Resets the displayed time range to the original size

Scrolling the display

The graphic area of the time scheduler display can be scrolled via the horizontal scroll bar positioned below the curve.

Left-click and hold position indicators in the scroll bar > Move position indicator
or
Operate > **Scroll left** or **Scroll right**
or
ALT + O > **L** or **ALT + O** > **R** to scroll left or right

Change display section

Left-click appropriate toolbar icon
or
Operate > Select zoom level: **Zoom+**, **Zoom-**, **Zoom to window width**
or
ALT + O > Use CURSOR KEYS to select zoom level > ENTER

Setting Parameters

Among the two possible faceplates the upper faceplate is assigned to the time scheduler display. This faceplate is used to change the different parameters if this option was configured in Freelance Engineering. For this purpose the following parameters are available:

Offset Designates the offset between set trend and actual trend of the time scheduler output value. Either positive or negative values can be entered. The offset value can only be changed in manual mode.

Entering an offset value in automatic mode is not accepted!

Cycles Indicates the number of runs for the section of the set trend to be repeated. If the time scheduler is not operating in permanent mode but in **Cycle mode** and the time scheduler has reached the specified number of runs, the cyclic processing of the time scheduler is terminated. The time scheduler automatically changes

to **Execution mode stop** and the last ancillary value is issued at the output.

If the time scheduler is set to *Off* during a run, the run count starts at zero when the time scheduler is set to *On* again.

Operating mode

The manual/automatic operating mode controls the use of the offset value: in automatic mode, the time scheduler works with an internal offset that was assigned to the function block during configuration in Freelance Engineering; in manual mode it works with the offset value set in Freelance Operations.

If no internal offset was defined during configuration, the offset entered in operating mode Manual is retained after switching to Automatic.

Execution mode

The execution mode is used to influence processing of the set trend. The following states are possible:

Off The time scheduler completes its cyclical processing and outputs the ancillary value 0. *Execution time from start* and *elapsed time* are set to 0.

Stop The time scheduler keeps the output value at the time of the stop command at a constant level. This status is maintained until a different execution mode is selected. The *Execution time from start* continues to run during this time.

On The time scheduler begins processing from its current position. If it was previously interrupted by a *Stop* during a program, it will resume processing from that precise point when the operator switches over to *On*. If the time scheduler was in *Off* status before, it will start the program from the beginning.

Skip The time scheduler leaves the current section and starts processing the next section.

Scroll The time scheduler scrolls forwards at 5 sec per section. If the max. rate of change does not allow this, the execution time for the section in question is extended accordingly.

Permanent/Cycles

In *Permanent* mode, the entire target curve is continuously performed. The curve section
configured as a cycle is run as often as configured under *Number of Cycles*. After the last run, the time scheduler changes to *Stop* execution mode.

For more detailed information on operations in the faceplates, please refer to Faceplates, page 133.

Section 11 Logs

General description – Logs

Logs are used to chronologically document historical information and messages from the process and the Freelance system. Logs are output to the printer, screen or (by data transfer) to data storage devices.

There are two different log types:

Event logs

These logs are used for logging events such as messages, faults, switching actions and operator interventions. Logging is performed spontaneously when the event takes place.

Log type: Signal sequence log

Status logs

These logs are used for cyclical process status logging. This includes the cyclical logging of a tag status or the logging of events within the process.

Log types: Disturbance course log, Operation log, Excel report

Number of logs

The following logs can be created for each operator station:

Operation log	Max. four logs
Disturbance course log	Max. four logs
Signal sequence log 1	Max. one log
Signal sequence log N	Max. three logs
Excel reports	Not limited

File transfer

Using the file transfer function it is possible to transfer a copy of the log files from the local Freelance Operations PC to another PC. The target PC must feature a network communication connection (FTP) to the Freelance Operations PC. Log files are usually transferred to another PC in the network. However, transfer to another disk drive of the local Freelance Operations PC is also possible. The file transfer target is configured in Freelance Engineering and cannot be changed under Freelance Operations. The exported files can be visualized using the Archive Browser add-on program or MS Excel for Excel reports. The Archive Browser also provides conversion of the files to standard CSV format, so that an evaluation with other programs (e.g. MS Excel) is possible.

Display

After having called up a log, the title line indicates the log type plus the log name, short text and long text. A list of available log files is displayed below the toolbar.

The following information applies to **all logs except for the Excel reports**:

The contents of the first log file are shown below the list.

The list header contains the following information:

- Sequential number, number of entries
- Time specified for the start of the logging

- Time specified for the end of the logging (if already terminated)
- Information on the log status.

The following information applies to **Excel reports**:

The file contents are only visible in Excel.

The list header contains the following information:
- Sequential number
- Entries
- Size
- Last acquisition
- Status
- File name

Status

Logs (except for Excel reports) can assume the following statuses **in printer queue**, **printing**, **printed** and **deleted**.

in printer queue
The log file is in the printer queue.

printing The log file is being printed.

printed The log file was printed.

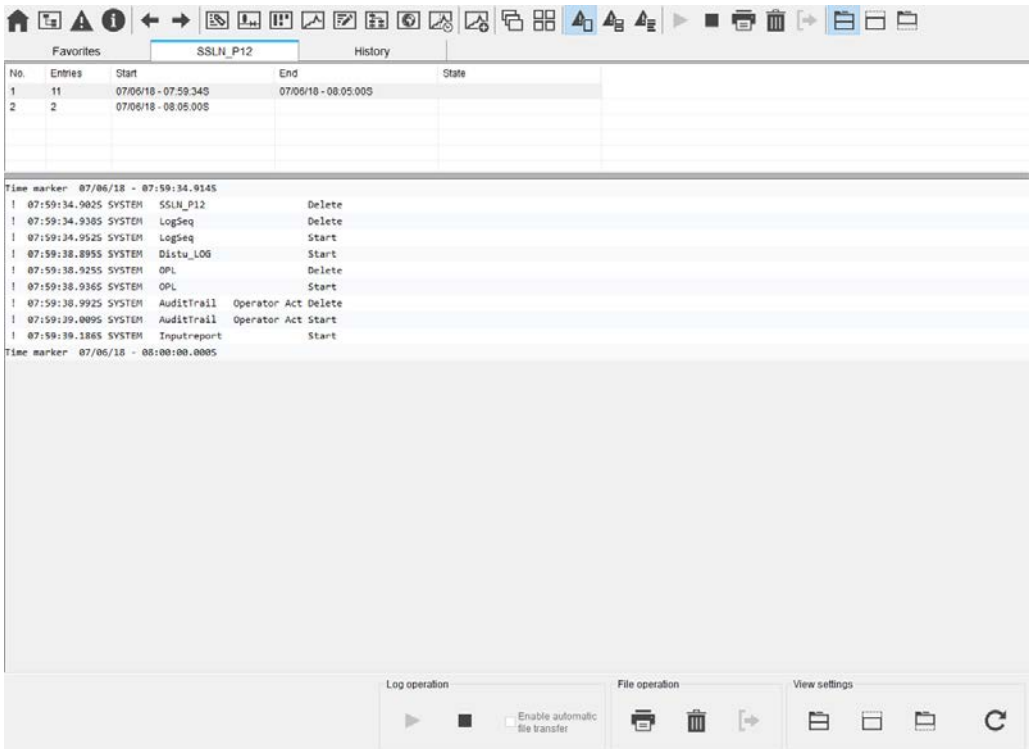
deleted The log file is automatically deleted when the configured maximum number of files that can be archived is reached and automatic deletion has been enabled. When the screen view is changed, these files are deleted from the log list.

Excel-Reports can assume the status **acquiring**, **completed** and **(deleted)**.

acquiring Data for the Excel report are being acquired.

completed Data acquisition for the file is finished.

(deleted) The Excel report was deleted. This line is cancelled from the file list with the next display change.



Log overview.png

The current log file can be identified by the fact that there is an entry in the Start column, but no entry in the End column. The operation of the disturbance course log, operation log, and signal sequence log is largely identical. Therefore, it is described once for all log types.

Operate menu

The *Operate* menu for logs contains the following menu items:

- Start
- Stop
- Print...
- Delete...
- File transfer
- Split
- Details only
- File list only

Calling up logs

Via the toolbar

Call up log.png

Left-click toolbar icon > In the display explorer double-click appropriate log

Via the Display menu item

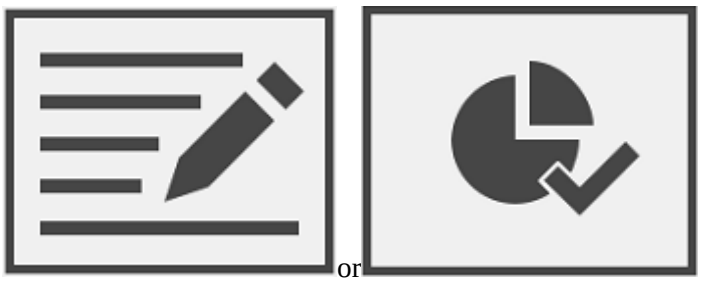
Display > **Logs** > In display explorer double-click appropriate log
or
CTRL + F9 > Use CURSOR KEYS to select appropriate log or enter first letters of the log name > ENTER

Via the context menu

In order to call up a log via the context menu, you must first select a tag to which a log has been assigned in Freelance Engineering using the *Display access* function.

Select tag > Call up context menu > Select appropriate log

From the overview display



log.png; excel.png

Left-click appropriate log symbol
or
Use CURSOR or TAB keys to select appropriate log symbol > ENTER

From a graphic display

In order to call up a log from a graphic display, a graphic object that features the *Show display* action with a log configured in Freelance Engineering must have been previously selected.

Left-click graphic object with appropriate configuration
or
Use TAB KEY to select appropriate graphic object > ENTER

Operating logs

There are three methods available to operate the different logs in the Freelance system:

- via the buttons in the toolbar,
- via menu item Operate (mouse and keyboard operation),
- via the buttons in the bottom operating element area.

Changing the view settings

The logs - except for the Excel reports - can be viewed in various modes: **split**, **details only** and **file list only**.

Split

The upper display area shows the list of log files, the lower the contents of the selected log. When a log is called up, the first file of the list is selected. Click with the mouse or use CURSOR KEYS to select a different file from the list.

In toolbar or operating element area: Left-click 
or
Operate > **Split**
or
ALT > **L**

Details only

Show only contents of selected log.

In toolbar or operating element area: Left-click 
or
Operate > **Details only**
or
ALT > **E**

File list only

Show log file list only.

In toolbar or operating element area: Left-click 
or
Operate > **File list only**
or

ALT > **O**

Starting the logging

Logging can be started by the operator only if **manual starting and stopping** has been enabled during configuration in Freelance Engineering.

Logging can be started when:

- logging has not been started yet,
- the maximum number of log files has been reached and automatic delete is enabled.

In toolbar or operating element area: Left-click 
or
Operate > **Start**
or
ALT > **S**

Do not open an Excel report file while data are being acquired. Opening an Excel report will interrupt data acquisition.

Stopping the logging

Logging can be stopped by the operator only if **manual starting and stopping** has been enabled during configuration in Freelance Engineering.

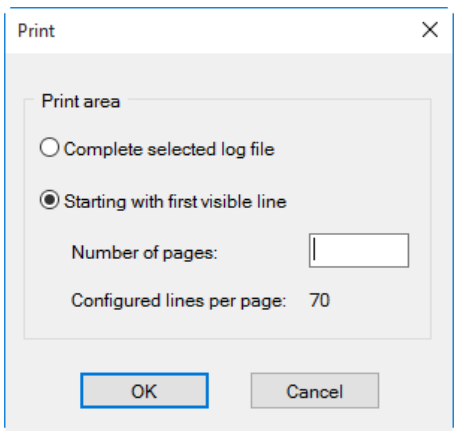
In toolbar or operating element area: Left-click 
or
Operate > **Stop**
or
ALT > **T**

Printing a log file

The contents of the selected log file can be printed. The selected log file can only be printed if **Manual print** was enabled for this log during configuration in Freelance Engineering.

In toolbar or operating element area: Left-click
or
Operate > **Print**
or
Call up context menu> **Print**
or
ALT > **P**

In the subsequent dialog you define what is to be printed. Either the whole file, the current page or a range of pages may be selected for printing. (These options are not available for all log types.)



Print.png

Deleting a log file

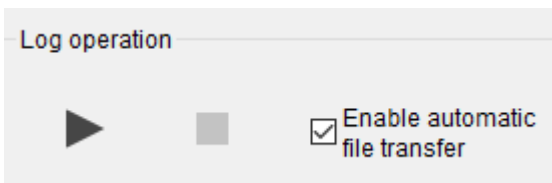
The selected log file can be deleted. The selected log file can only be deleted if **Manual delete** was enabled for this log during configuration in Freelance Engineering.

In toolbar or operating element area: Left-click
or
Operate > **Delete**
or
Call up context menu> **Delete**
or
ALT > **D**

Enabling/disabling automatic file transfer

If the automatic file transfer is enabled, the log data are copied to the specified target directory either cyclically or after closing a file, depending on the configuration.

The automatic file transfer can only be enabled or disabled if **manual enable and disable** was expressly enabled during configuration in Freelance Engineering.



File Transfer enabled.png

In operating element area: Click check box

Initiating manual file transfer

The data of the selected log file is copied to another computer or another folder according to the configuration. With this option, it is also possible to transfer not completed log files.

Manual file transfer can only be initiated if **manual file transfer** was enabled during configuration in Freelance Engineering.

In toolbar or operating element area: Left-click 
or
Operate > **File transfer**
or
ALT > **F**

Updating log files

The list of available log files is automatically updated. The contents of the respective log file can be updated manually (except for Excel reports).

In toolbar or operating element area: Left-click 
or
ALT > R

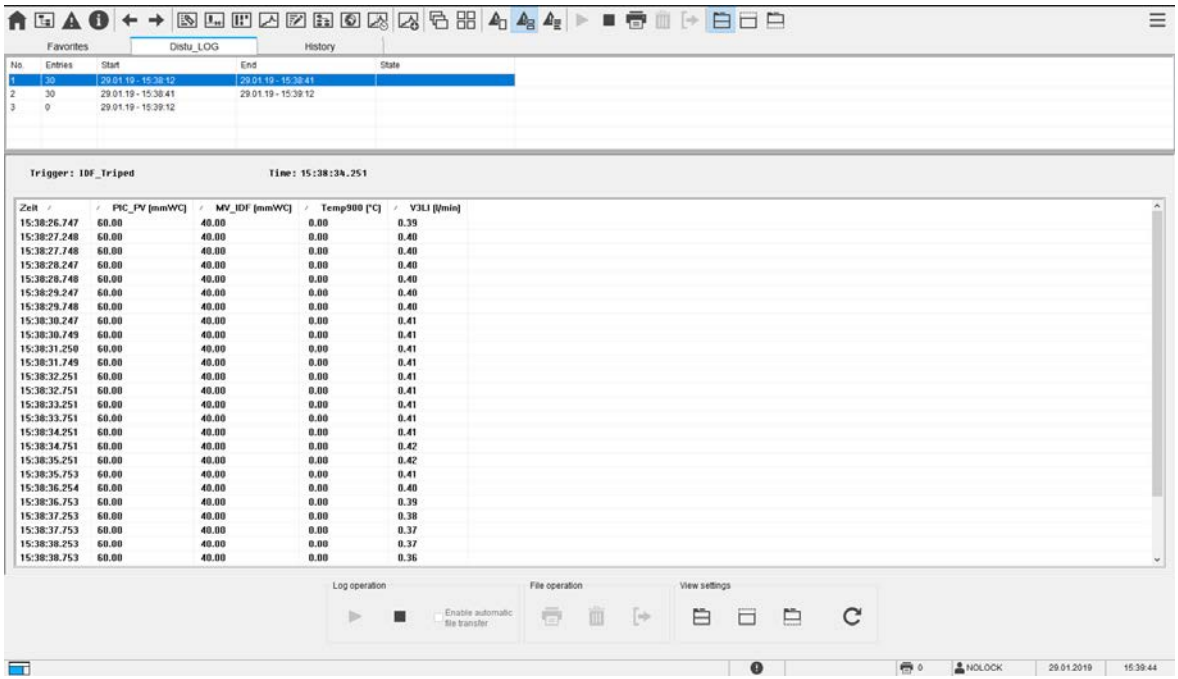
Disturbance course log

The **disturbance course log** belongs to the status logs. It is used for high-resolution tracking of time-related changes in a maximum of six variables, which are selected during configuration of analog and binary process variables. You can use it e. g. for permanently archiving the most important process variables in this time period in case of a disturbance.

The disturbance course log uses a special disturbance course acquisition function block in the process station. This function block captures the input signals cyclically and stores them in a ring buffer containing up to **max. 200 values** per input signal. The disturbance course acquisition module can be configured in such a way that the event triggering the log – i.e. the disturbance – is recorded at the beginning, in the middle or at the end of the acquired data. Depending on the configuration, either the preliminary events that have caused the disturbance or the consequences or both can be analyzed. The log can either be started manually or by a specific event.

Displaying the disturbance course log

Below the toolbar the available log files are listed. The contents of the selected log file are displayed in the area below the list.



Disturbance log.png

Operating the disturbance course log

For information on operating the disturbance course log, please refer to Operating logs, page 222.

Format of the disturbance course log

The log header shows the name of the item that triggered the disturbance and the start time of the log. The process variables of the input signals used by the disturbance course acquisition module are displayed in a list with the associated time stamps.

Example:

Trigger: Disturb Time: 09:51:25.076

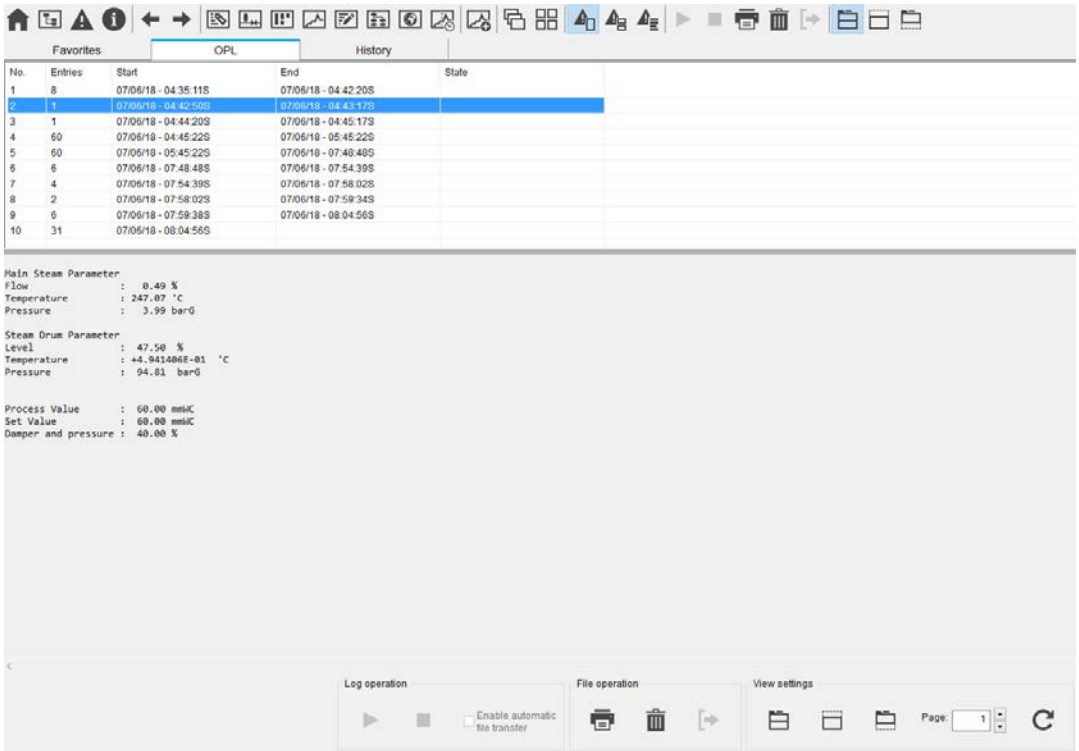
Time	Product A (l/h)	Product B (l/h)	Level	LI720(Saw)	LI720(Sinus) (%)
09:50:05.121	2.6	295.9	3.5	191.8	5.28
09:50:05.882	2.8	296.0	3.4	192.7	5.28
09:50:06.694	0.0	296.1	3.4	193.6	5.28
09:50:07.475	4.7	296.2	3.3	194.5	5.29
09:50:08.276	1.1	296.4	3.3	195.4	5.29
09:50:09.177	5.1	296.5	3.2	196.2	5.30
09:50:09.878	0.9	296.6	3.3	197.1	5.30
09:50:10.679	5.4	296.7	3.2	198.0	5.31
09:50:11.480	1.0	296.8	3.3	198.9	5.31
09:50:12.282	0.0	296.9	3.0	199.8	5.32
09:50:13.143	3.4	297.0	3.0	200.4	5.32
09:50:13.884	11.5	297.1	3.4	201.3	5.33

vh_l0116_us.png

Operation Log

The **operation log** belongs to the status logs. It is used for logging process variables. Configured texts can be added to the process variables for better understanding. The log can be started manually, cyclically or by a specific event.

Displaying the operation log



Operation log.png

Operating the operation log

For more detailed information on how to use the operating log, please refer to Operating logs, page 222.

The operation log file may consist of several pages. After the log file has been opened, the appropriate “page” can be directly selected. In the bottom operating element area you find an appropriate edit field.

Operation log-page.png

Edit field for the **page number** and button for scrolling backwards and forwards one page at a time.

The current page number and the maximum number of pages are shown in the window title bar of the log in the format (current page/max. page), e.g. (2/4).

Selecting a page in a log

Left-click edit field > Enter page number
or
Use TAB key to select edit field > Enter page number > ENTER

Scrolling backwards and forwards one page at a time

Left-click button to scroll backwards and forwards
or
Use TAB KEY to select button > ENTER

The current page number is displayed in the entry field.

Format of the Operation Log

The operation log does not feature a fixed format as its configuration in Freelance Engineering allows text to be freely combined with formatted process variable values.

Excel Report

The **Excel report** belongs to the status logs. It is used to track time-related changes of process variables. Similar to the operation log, process values are acquired for a configured time range on a cyclic basis and stored in a file. Depending on the configuration in Freelance Engineering, several equivalent Excel files can be created.

Display of the Excel report

The list of generated files is shown in Freelance Operations. A double click on the file will open the report in Microsoft Excel.

Do not open an Excel report while data are being acquired. Opening an Excel report will interrupt data acquisition.

Operating the Excel report

For details on operating the Excel report, please refer to Operating logs, page 222.

Format of the Excel report

As the contents of the Excel files for a report are defined during configuration in Freelance Engineering, there is no fixed format for Excel reports.

Signal Sequence Log

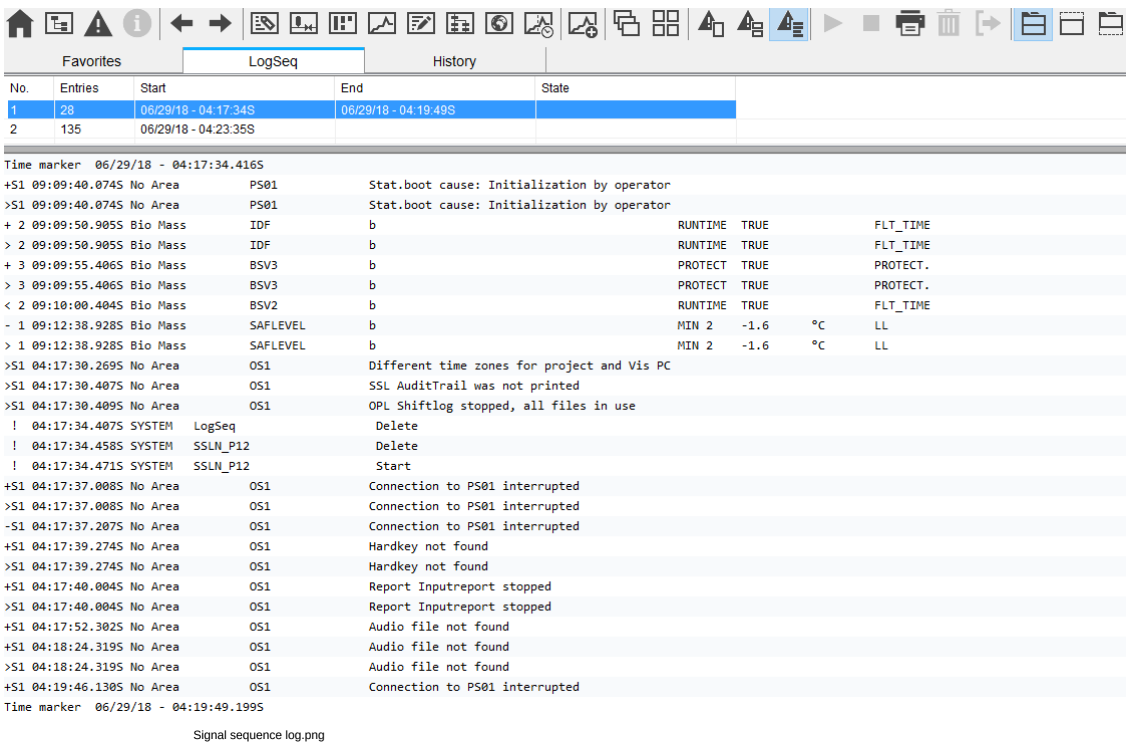
The **signal sequence log** is used for logging events and operator interventions and belongs to the event logs. This implies that the data (events) are not recorded cyclically, but only when an event actually occurs.

A distinction is made between two types of signal sequence logs:

Signal sequence log 1 continuously transfers the events occurred to a printer. This log guarantees that events are printed out in strict chronological order.

Signal sequence log N transfers events only upon completion of the logging process of after manual intervention to the printer.

Displaying the signal sequence log



Signal sequence log.png

Operating the signal sequence log

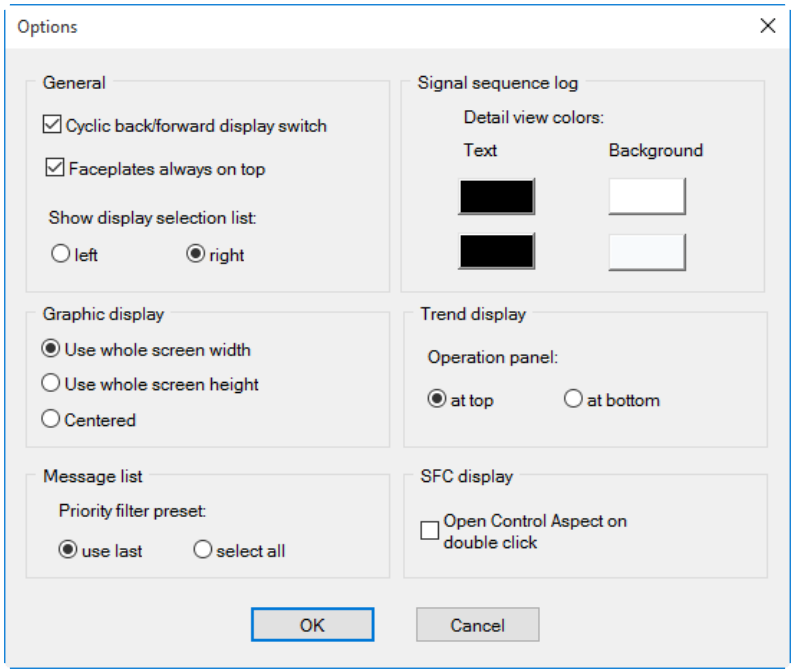
For information on operating the signal sequence log, please refer to Operating logs, page 222.

The signal sequence log is not divided into separate pages. It is therefore not possible to directly specify a page as with the operation log.

For the sake of clarity, the text and background color of the signal sequence logs can be changed.

Tools > **Options**
or
ALT + t > **P**

In the following dialog, you define the color scheme for text and background.



Signal sequence logs.png

Format of the Signal Sequence Log

The format of the signal sequence log is largely identical to the format of the message list. The first and last lines each contain a time marker comprising the date and time of day. The time marker in the first line of the signal sequence log represents the log's start time. The time marker in the last line represents the log's stop time. In addition to this, another time marker is output every hour while a log is being compiled.

In between these time markers are the various event entries. Messages can be represented in any of the following four formats: **Empty (none)**, **Value**, **Long text** or **All**. During configuration in Freelance Engineering, the display format for the events is defined. In addition, the length of the log lines (80 or 132 characters) is specified during configuration.

The following overview shows the explanations for the individual formats. The abbreviations used are explained on the next page in alphabetical order.

Format for all messages

No entry (Format **Empty**)

Format for process messages

M	Time	AR	Tag	S text	M text	Value	Dim	Type	(Format **Value**)
M	Time	AR	Tag	S text	L text	M text			(Format **Long text**)
M	Time	AR	Tag	S text	L text	M text	Value	Dim	Type (Format **All**)

Format for system messages

M Time AR Tag Sys-m-text (Format **Value, Long text, All**)

Format for operator actions

O	Time	Operator	Tag	Component	Old	New	Dim	(Format **Value, Long text, All**)
O	Time	Operator	Display	Var name	Old	New	Dim	(Format **Value, Long text, All**)

Format for Acknowledge Action

O Time Operator Tag Type M text Ack (Format **Value, Long text, All**)

Formats for Log Events

!	Time	Log	S text	Event		(Format **Value**, **Long text**)
!	Time	Log	S text	L text	Event	(Format **All**)

Format for Sequence of Events

Time AR Tag Bin-text (Format **Value, Long text, All**)

Format for System Events

!	Time	“Timeout”	Tag	Component	Old	New	Dim	(Format **Value, Long text, All**)
!	Time	“Error”	Tag	Component	Old	New	Dim	(Format **Value, Long text, All**)
!	Time	“Timeout”	Display	Var name	Old	New	Dim	(Format **Value, Long text, All**)
!	Time	“Error”	Display	Var name	Old	New	Dim	(Format **Value, Long text, All**)

Abbreviations

!	Indication of a log event.
#	Time stamp of edge of a binary value(sequence of events): +# for change from 0 to 1, -# for change from 1 to 0
“ERROR”	The write command to a process variable or component of a tag could not be executed, the text Error is indicated.
“TIMEOUT”	As the time limit is exceeded, writing to a process variable or component of a tag could not be executed, the text Timeout is indicated.
AR	Plant area. If a line length of 132 characters has been configured, the long names of the plant areas are shown. For logs with a line length of 80 characters, the short names A–O appear instead.
Bin-text	Fixed text: channel xx, sequence of events
Component	Component for tag that is written
Dim	Dimension configured for message
Display	Name of graphic display from which the action was initiated.
Event	Log event such as Start, Stop, Print, Delete, and Export
L text	Long text configured for tag
Log	Log name
M text	Message text configured for message

M	All messages are displayed with their priority (S1..S3 or 1..5) and a prefix for incoming (+) and outgoing (-). Acknowledged messages are marked with < or >: <The message was visually acknowledged > The message was point acknowledged
New	New value of process variable
O	Indication of operator action
Old	Old value of the process variable
Operator	If the User Management is enabled, this position contains the name of the operator who carried out the operator action. Without User Management, the default user name **NOLOCK** or **SYSTEM** is indicated.
S text	Short text configured for tag
Sys-m-text	Text of system message
Tag	Name of tag
Time	Time stamp
Type	Configured message type
Value	Value of the process variable
Var name	Name of the written process variable

When using a line length of 80 characters and using tag names with a length of 16 characters, the time stamp will be printed without a separator, i.e. “hhmmssmssS” will be printed instead of “hh:mm:ss.mssS”.Example: 12:30:24:333 will be printed as 123024333.

Section 12 System Display

General description – System display

The standard system display in Freelance Operations shows the current status of the hardware and software of the Freelance system at process level. The color of the displayed components of the process level allows you to recognize the current state. A Freelance operator station is always provided with one system display.

Calling up the system display

Via the toolbar

Call up system display.png

Left-click the toolbar icon

Via the Display menu item

Display > **System display**
or
ALT + D > Y

Via the context menu

Call up context menu > **System display**

Operating procedures in the system display

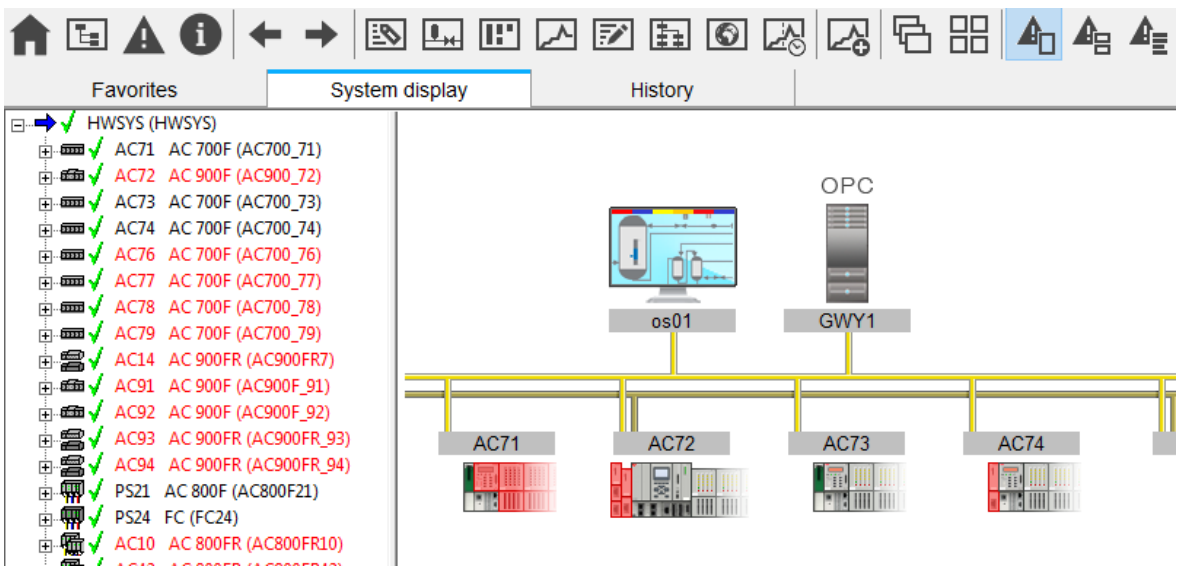
The system display provides information on the operator station and on the configured process stations.

There are two different display areas available:

- Left side: tree view
- Right side: detailed view of the objects selected in the tree view

The separator line between the display areas can be moved with the mouse (left mouse button pressed).

Graphic view of configuration (tree and system view)



System display overview.png

Display of Control Net redundancy

The system display of a Freelance Operations station always represents the system in relation to the station. If the system comprises redundant controllers that are connected to the system bus while the local station is not connected, this operator station has no access via the B line. For this reason, the B line is shown in red.

Navigating in the system display

The keyboard focus can be changed between the tree view and the module view using
the TAB key.

In the tree view: Left-click appropriate object
or
In the station view: Double-click appropriate object
or
In the tree view: Select the object using the CURSOR KEYS
or
In the system view: Select the object using the CURSOR KEYS > ENTER

Each time the system display is called, a buffer memory is set up. Each newly selected object in the tree leads to a new entry in this memory. You can call up these objects without having to navigate again.

Operate > **Previous object** or **Next object**
or
CTRL + **ALT** + CURSOR KEY left or **CTRL** + **ALT** + CURSOR KEY right
or
ALT + **O** > **P** or **ALT** + **O** > **N**

Diagnostic mode

The system display features two modes of display. The **standard mode** is designed for normal operation. It contains information and instructions for normal operations.

The **diagnostic mode** is provided for qualified personnel with special training in diagnostics. It is here that information on diagnostics and operating instructions,

over and above those in the standard mode, are provided. The title line changes from “System display” to “System display – diagnostics” to indicate that the diagnostic mode is selected.

Accessing the diagnostic mode:

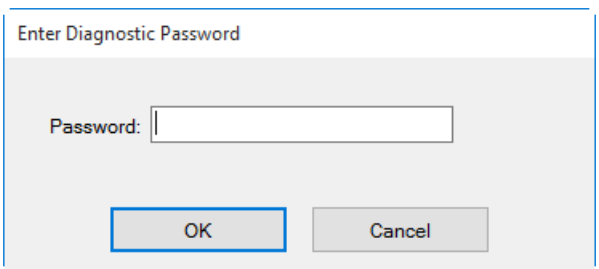
Operate > **Enter diagnostic mode...**
or
ALT + O > E

If the User Management is enabled, the user group must be assigned the “extended diagnostics” rights. A diagnostic password is not required.

If the User Management is disabled, the diagnostic mode is password protected. After entering the password the program changes to diagnostic mode.

Please refer to the **Engineering Manual - User Management** for detailed user permission configuration.

The default diagnostics password is "diag". The password can be defined and changed separately for each operator station in Freelance Engineering. Please refer to the **Engineering Manual, System Configuration, Project Tree, Editing Objects, Operator station**.



Diagnostic password.png

Exit the diagnostic mode

Operate > **Leave diagnostic mode ...**
or
ALT + **O** > **L**

If the Security Lock is not enabled, the diagnostic mode is automatically left when a new display is called.

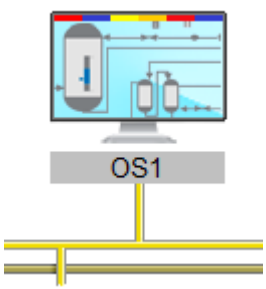
If the Security Lock is enabled, the diagnostic mode is quit upon a user change. Calling up another display will not close the diagnostic mode.

For further details, refer to **Engineering Manual - User Management**.

Operator station

Calling up the operator station

In the tree view: Left-click appropriate operator station object
or
In the station view: Double-click operator station icon
or
In the tree view: Use the CURSOR KEYS to select the operator station
or
In the system view: Use the CURSOR KEYS to select the operator station > ENTER



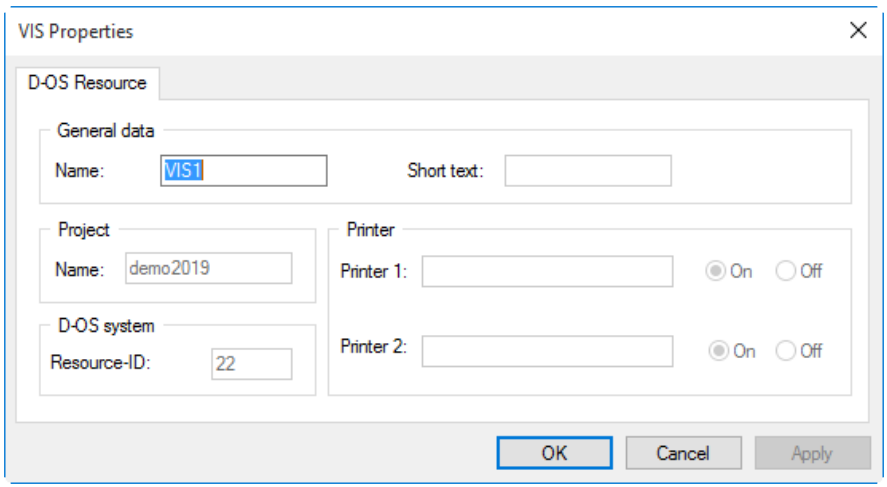
Call up operator station.png

Operator station properties

When the operator station is called up, a dialog box with both the *Operator station* and *Diagnostic data* tabs is displayed.

The *diagnostic data* tab is only visible when the program is in diagnostic mode. By default, only the *Operator station* tab is shown.

Operator Station



Operator station properties.PNG

General Data

Name, short Name and short text of the operator station

Project

Name Project name, i.e. name of the currently loaded project

System

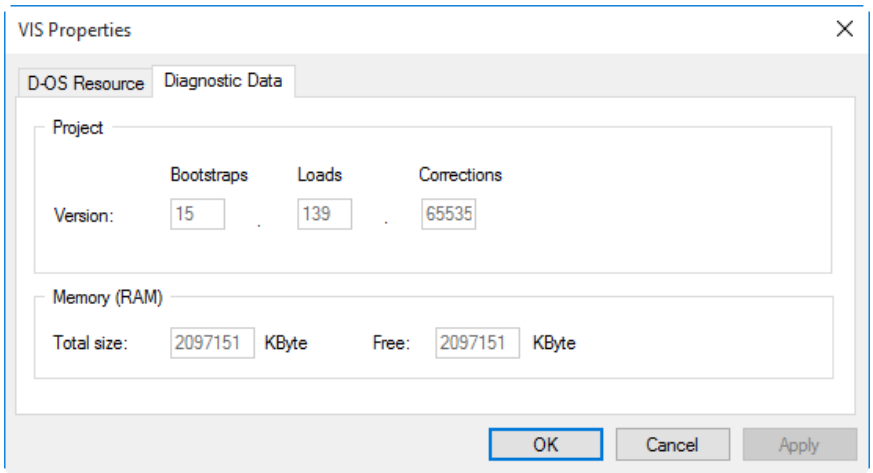
Resource ID Resource ID of the operator station

Printer

Printer 1, printer 2, On ,Off

Printer names for channel 1 and channel 2
The current status (On/Off) is displayed and can be changed by the operator.
A change-over is only possible in **diagnostic mode**. The printer settings are initialized each time Freelance Operations is started.

Diagnostic data of the operator station



Diagnose data.png

Project

Bootstraps Number of Freelance Engineering bootstrap procedures (Load, whole station)

Loads Number of Freelance Engineering loading procedures (Load, changed objects)

Corrections Number of Freelance Engineering correcting procedures (Commissioning, correct)

Memory (RAM)

Size of overall and free memory of the operator station PC

For further details on this topic, please refer to **Engineering Manual, System Configuration, Commissioning, Version check**.

Process Stations

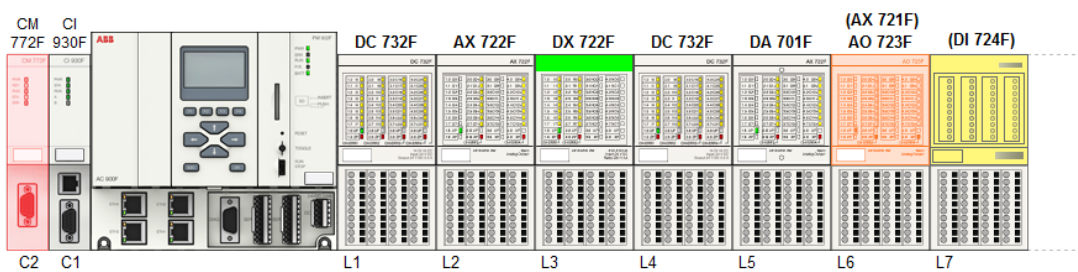
Calling up a process station

In the tree view: Left-click appropriate process station object
or
In the station view: Double-click process station icon
or
In the tree view: Use the CURSOR KEYS to select the process station
or
In the system view: Use the CURSOR KEYS to select the process station > ENTER

Displaying a process station

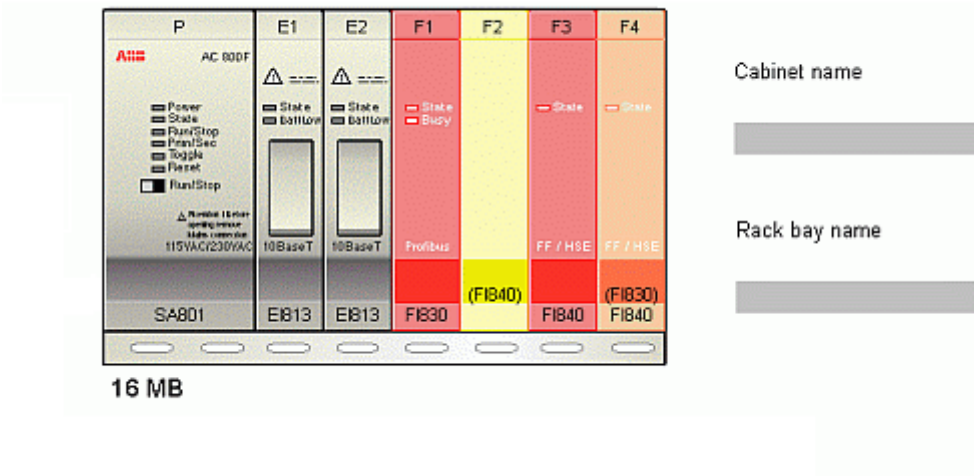
The selected process station is displayed in a more detailed manner with the configured and installed modules. Color coding of the modules distinguishes, for example, whether the module is equipped and installed (ok), equipped but not yet installed (red) or faulty (red). Other possible statuses are inactive (gray), other module found than configured (orange) or found but not configured (yellow).

Displaying an AC 900F controller in the system display



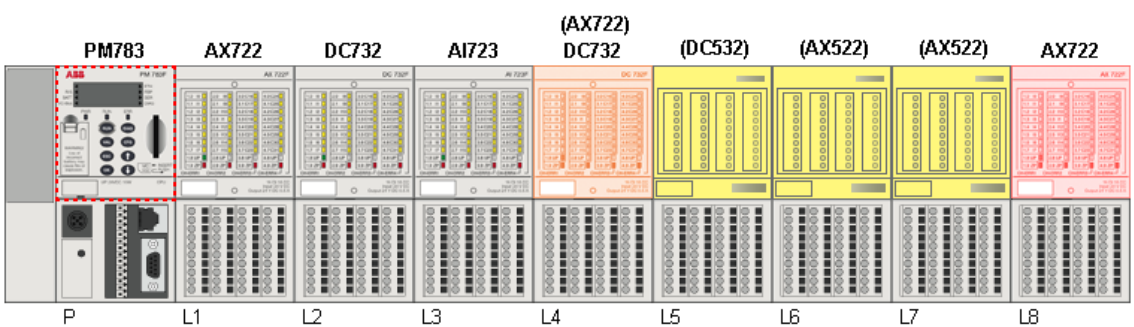
vis_I008.png

Displaying an AC 800F controller in the system display



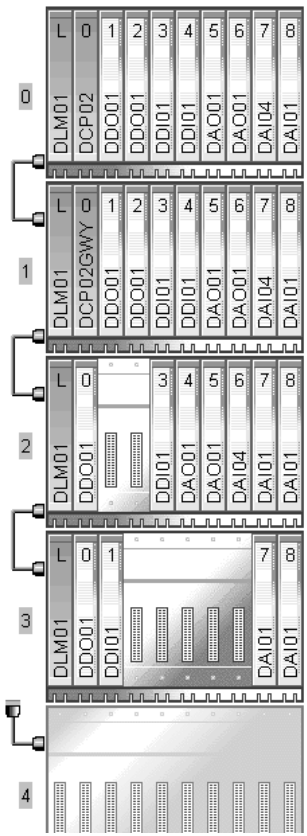
vis_l119_us.png

Displaying an AC 700F controller in the system display



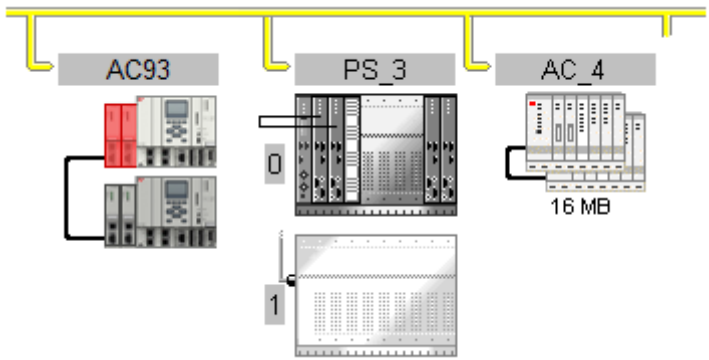
vis_l118.png

Displaying a rack-based process station in the system display



vis_I009_us.png

Displaying redundant process stations



vis_l010.png

Redundant stations can be recognized by the connecting line between the primary and secondary CPU.

While the synchronous redundancy status is indicated by a continuous line, the non synchronous redundancy status is represented by a dashed line or gray connection.

In the detail display of the redundant station, the **P** and **S** characters on the CPU front or next to the controller show which of the CPUs is currently the Primary or Secondary.

Please also refer to **Engineering Manual, System Configuration, Project tree and Hardware structure.**

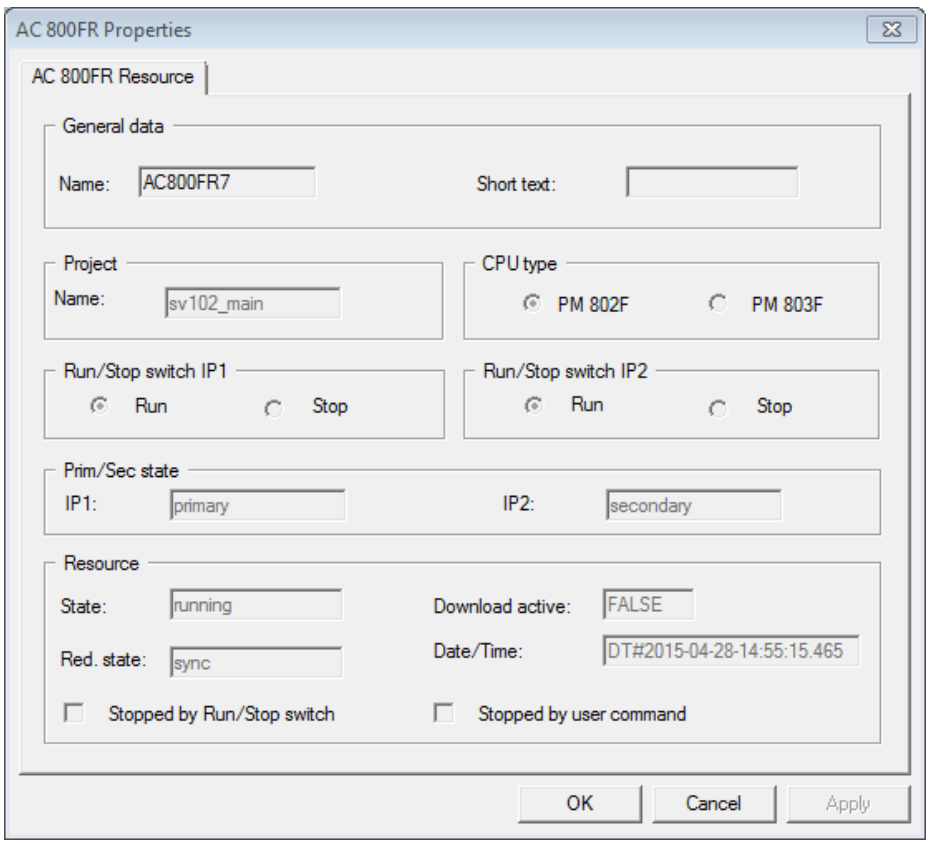
Process station properties

When the process station is called up, a dialog box with both *Operator station* and *Diagnostic data* tabs is displayed.

The *diagnostic data* tab is only visible when the program is in diagnostic mode. By default, only the *Resource station* tab is shown.

<Controller type> Resource

The display shows an example of the available information concerning a redundant AC 800F. The other resources use only parts of this dialog box.



AC800FR_us.PNG

General data

Name, Short text
Name and short text of the resource

Project

Name Name of the loaded project

CPU type

PM 802F/ PM 803F
Shows the configured CPU type of the resource (only for AC 800F)

Run/Stop switch
Status of the RUN/STOP switch on the module (not for AC 700F)

Prim/Sec status

IP1/ IP2 For a redundant resource, the **Primary** and **Secondary** texts indicate which CPU is currently applied as Primary or Secondary.

Resource

State Status of the resource, e.g. *running*

Redundancy state
Redundancy status of the resource
sync: Redundancy fully functional
not sync: Transition status while redundancy is being set up
no secondary: Redundancy partner is not accessible
no redundancy: No redundancy configured, but there is a connection to a redundant station.
Please also refer to **Engineering Manual, Process Stations, Redundancy.**

Download active
TRUE during download procedure; otherwise FALSE.

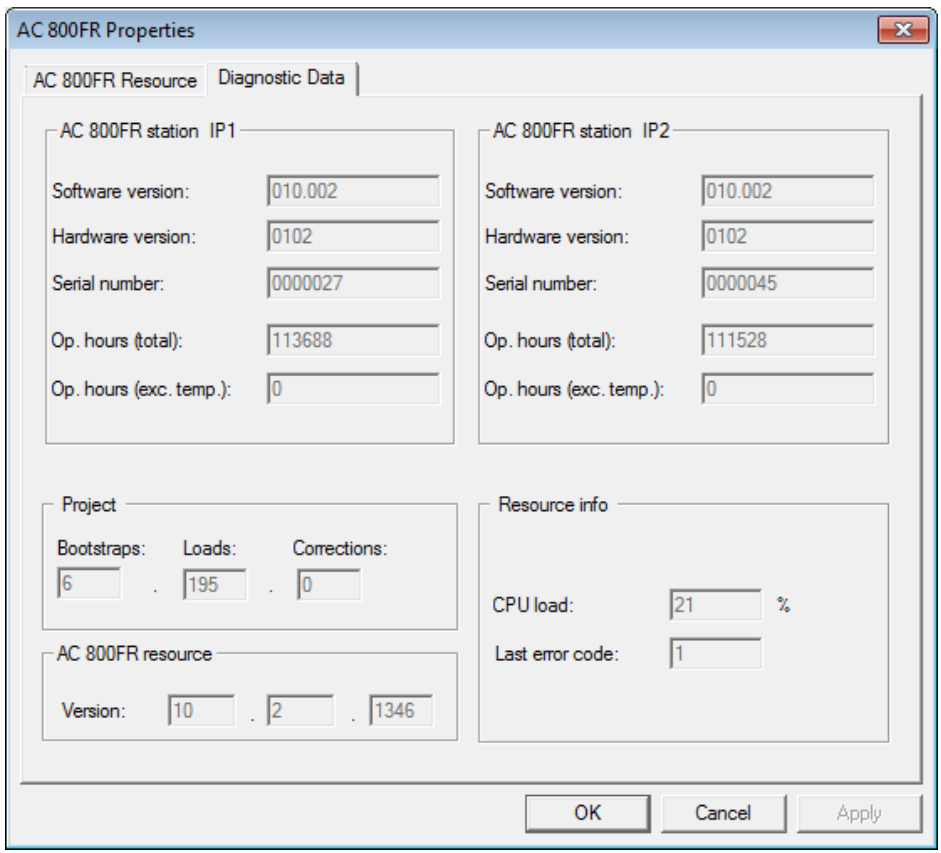
Date and time
Local time of the process station

Stopped by Run/Stop switch
The check box is selected when the resource was stopped by the Run/Stop switch.

Stopped by user command
The check box is selected when the resource was stopped by user intervention.

Diagnostic data for a Process Station

The diagnostic data are comparable for all controller types. The available information on the redundant AC 800F are shown as an example.



AC800FR_Diag_us.PNG

Station IP1/IP2(only for AC 800F and AC 900F)
Shows details of the assemblies or modules; with redundant stations, information is separately provided for both modules.

Project

Bootstraps Number of Freelance Engineering bootstrap procedures (Load, whole station)

Loads	Number of Freelance Engineering loading procedures (Load, changed objects)
Corrections	Number of Freelance Engineering correcting procedures (Commissioning, correct)

Resource

Version	Version number of the controller software

Resource info

CPU load	Capacity loading of the CPU in %
Last error code	ErrorNo system variable

Modules

Selecting a module

In the tree view: Left-click appropriate object
or
In the station view: Double-click the object
or
In the tree view: Select the object using the CURSOR KEYS
or
In the system view: Select the object using the CURSOR KEYS > ENTER

The selected assembly or module is displayed in zoomed format.

vis_m1013_us.png

IP1 : No module found

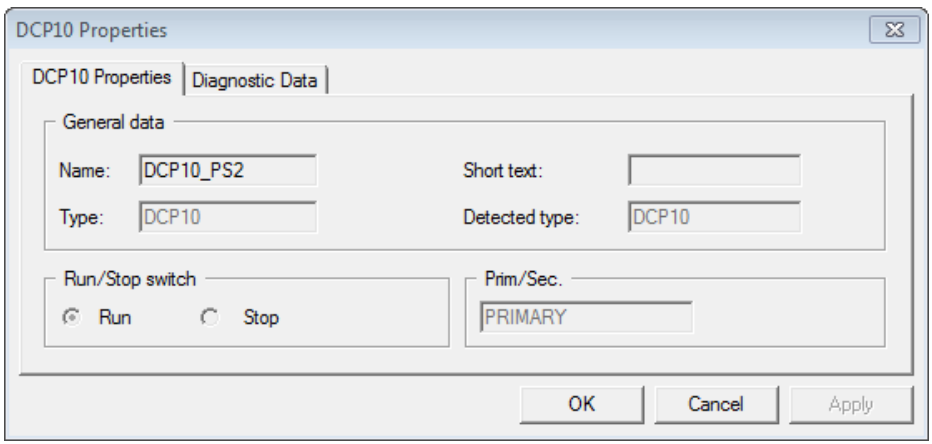
Configured: EI812F
Detected: EI802F
IP2 : Wrong module type

Brief description:	Ethernet module AUI
Module type:	EI812FR
Tag name:	EI812F_8_E1
Station position:	8
Slot:	E1

More detailed information about the object can be obtained in the following way:

In the tree view: Double-click the object
or
In the detail view: Double-click the object
or
In the tree view: Select the object using the CURSOR KEYS > ENTER
or
In the detail view: ENTER

General properties of the objects



DCP10_us.PNG

General data

Name Name of the module according to configuration

Type Module type

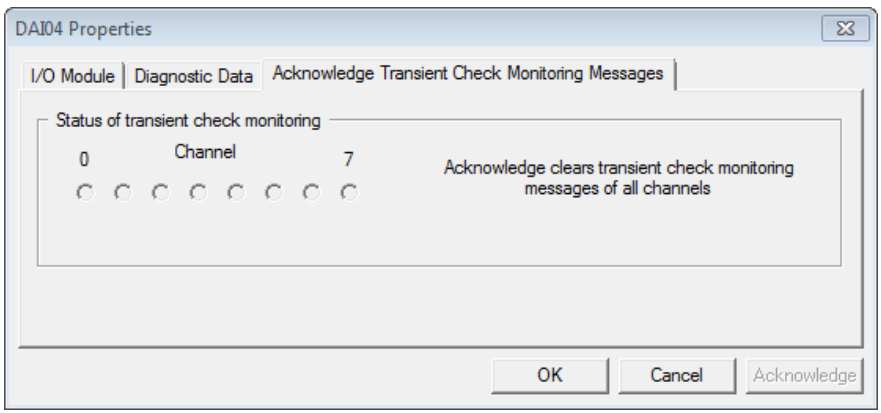
Short text Configured short text

Detected type Type designation of the module mounted in this slot

Run/Stop switch
Displays the Run/Stop switch position (for CPU modules only)

Prim/Sec Current status is PRIMARY or SECONDARY (only for CPU modules with redundant process stations)

DAI 04 - Transient check monitoring



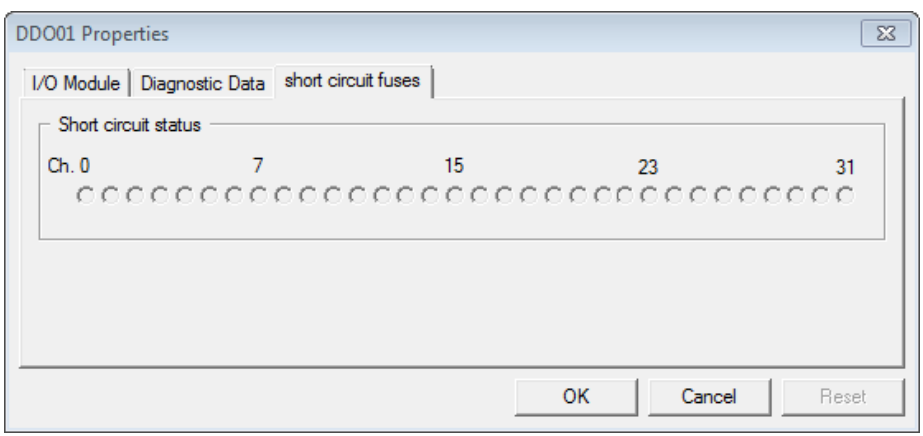
DAI04_us.PNG

Status of the transient check monitoring

Display of the transient check monitoring messages

ACKNOWLEDGE The error status of all channels is reset and the normal operation for the respective channels is resumed

DDO 0 Properties - Short circuit fuses

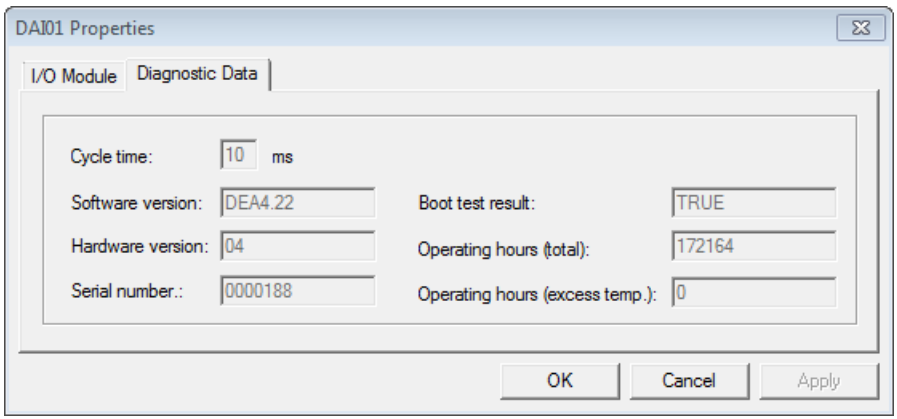


DDO01_us.PNG

Short circuit status
Short circuits displayed for each channel.

Reset Reset of the short-circuit fuses

Diagnostic data - modules



DAI01_Diag_us.PNG

Cycle time Configured cycle time (not for DCP modules)

Software version
Version of the I/O or Boot EPROM

Hardware version
Hardware version of the module

Serial number Number of the production line

Boot test result
TRUE/FALSE: module operates correctly or incorrectly

Operating hours
Total operating time of the module

Operating hours (excess temp.)
Operating time with excess temperature

Information windows can be selected for all modules. The information content depends on the module type and may be more extensive than in the example provided.

Status Display of the Objects

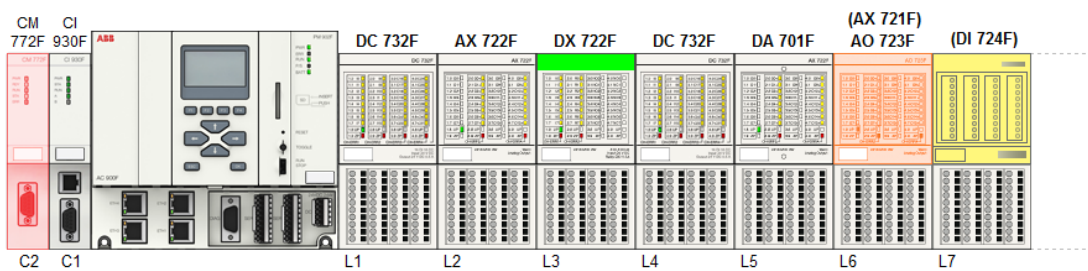
States displayed in the tree view

The status details active (black), faulty (red) and inactive (gray) are displayed in the tree view. Color coding is applied to the object information (text) and not to the icon.

If subsidiary level errors are encountered (I/O cards, PROFIBUS, FF), the objects are displayed
as disturbed up to the process station in the tree view. Errors can thus be detected in the collapsed view already.

Status in system and station view

In the system and the station view, the actual status of the modules is visualized by different colors.



vis_I008.png

Module status color

Transparent (rear view)
There is no module configured at the slot or installed in the station.

gray The module is configured and the correct module type is mounted.

red A module is configured in this slot, but not present in the process station.

yellow A module (e.g. of type DI 724F) has been detected as installed in this slot, but there is no configuration available.

orange The module type configured in the hardware structure (e.g. AO 723F) does not correspond to the installed module type (e.g. AX 721F).

Force state

green There is a green rectangle displayed in the upper area of the module (I/O modules only). At least one I/O channel from an I/O module is forced, i.e. allocated a debug value. Please refer to **Engineering Manual, System Configuration, Commissioning, Forcing inputs and outputs.**

Rack or basic unit status

dark gray / green
The sub-rack or the basic unit is activated.

red The sub-rack or the basic unit cannot be addressed.

Status displayed in the detail view

An error or diagnosis status is visualized in the graphic view by a colored warning sign next to the detail view of the module.

No module found (red warning sign)

A module is configured in this slot, but not present in the station.

vis_m0023_us.png

Wrong module type detected (orange warning sign)

The module type configured in the hardware structure does not correspond to the installed module type (e.g. DAI0404).

vis_m0024_us.png

Forced channel detected (green warning sign)

At least one I/O channel from an I/O or slave module is forced, i.e. allocated a debug value. See **Engineering Manual, System Configuration, Commissioning, Forcing inputs and outputs.**

vis_m0025_us.png

Diagnostic value present (blue warning sign)

A diagnostic value has been logged for the slave or one module of the slave. The diagnostic value is shown in the detail view of the slave below the graphic view. Please also refer to **Engineering Manual, Communications and Fieldbusses, PROFIBUS, Diagnostic data**.

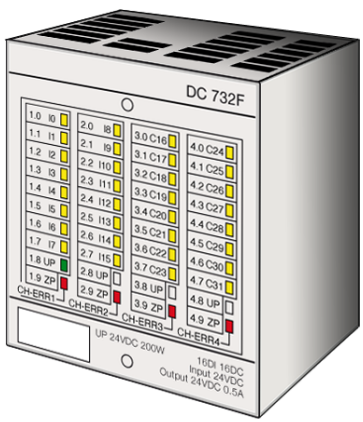
Diagnostic data present

vis_m0026_us.png

Modules and field devices

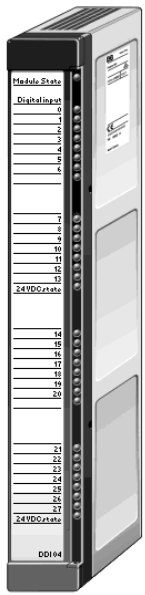
Detail displays of the I/O modules

System information is displayed next to the module display on the right side. The status of the module is indicated by a colored triangle. See also Status displayed in the detail view, page 258.



Wrong module type
Configured: DC732
Detected: AX722

vis_m1119_us.png



No module found

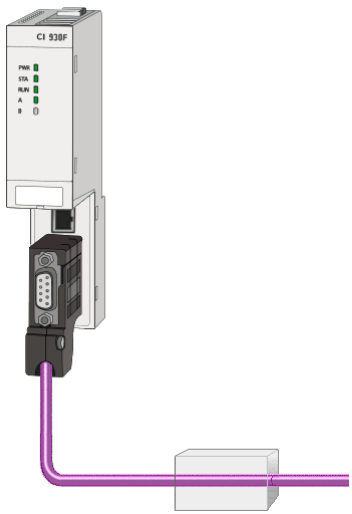
vis_m1019_us.png

Detail displays of the PROFIBUS

Detail display of the PROFIBUS module

In addition to module-specific status information, the detail display of the PROFIBUS module provides information on the associated PROFIBUS master. The PROFIBUS master is represented by the gray box on the PROFIBUS line. Errors are indicated by a red warning sign.

CI 930F PROFIBUS module



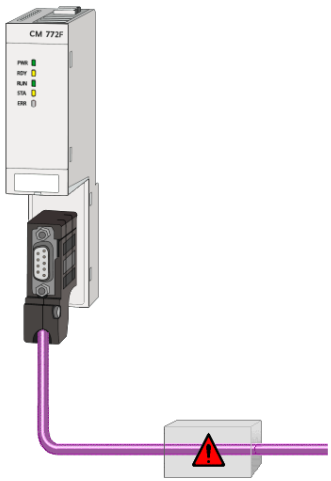
vis_l012_us.png

IP1 : Module OK

IP2 : Module OK

Brief description:	Profibus module
Module type:	CI 930F
Tag name:	CI930F_5_C1
Station position:	0
Slot:	C1

CM 772F PROFIBUS module

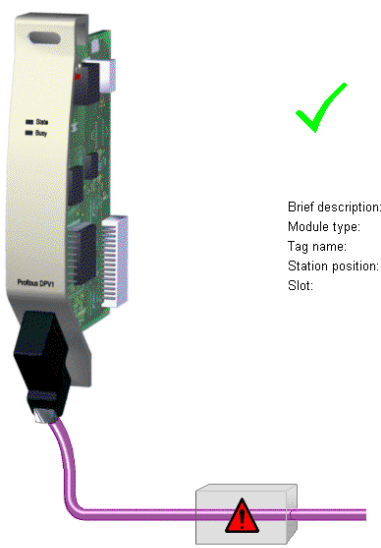


Module OK

Brief description:	Profibus module
Module type:	CM 772F
Tag name:	CM772F_4_C1
Station position:	0
Slot:	C1

vis_I013_us.png

FI 830F PROFIBUS module



Module OK

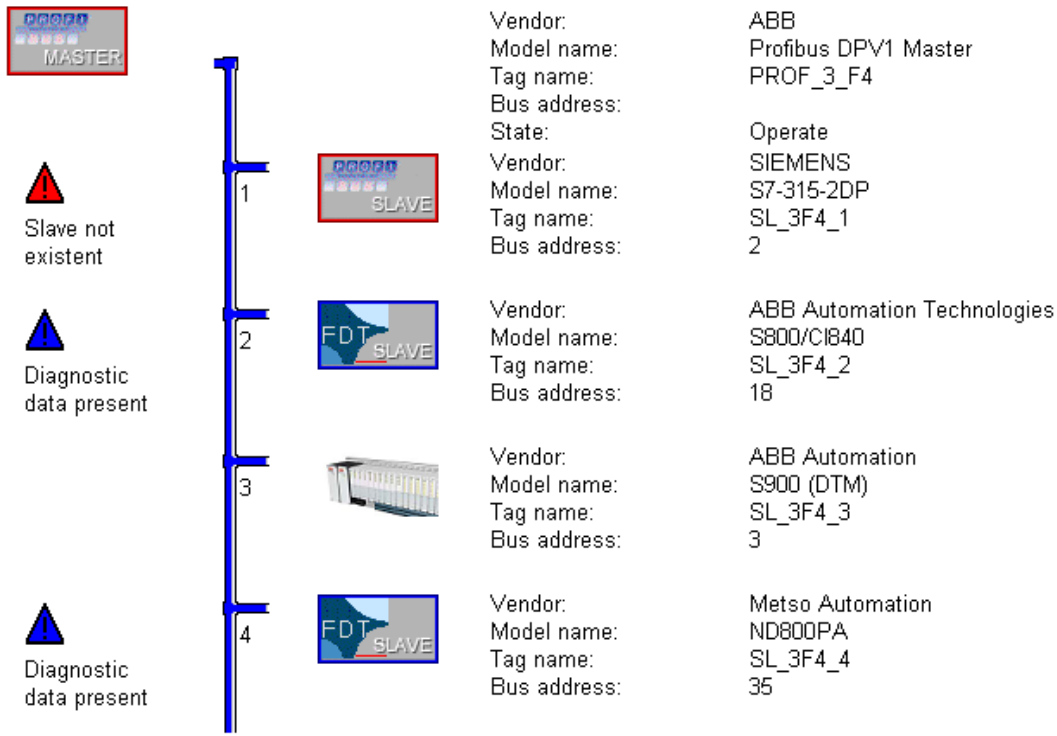
Brief description:	Profibus module
Module type:	FI830F
Tag name:	FI830F_3_F4
Station position:	3
Slot:	F4

vis_I014_us.png

Detail display of the PROFIBUS master

The detail display of the PROFIBUS Master features a bus line with the slaves configured on the bus. The status information for the master as well as the slaves or the field devices
are shown on the left side of the bus line. See also Status displayed in the detail view, page 258.

The slaves are represented by bitmaps on the right side of the Fieldbus line. With GSD-based slaves, these bitmaps can be referenced in the GSD file. In Freelance Engineering, manufacturer-specific bitmaps can be subsequently assigned to each slave. If no bitmap files are specified, the standard bitmaps will be shown. The assigned bitmaps are not automatically loaded on the Freelance Operations station, but must be copied into the **<FreelanceData>\bitmaps directory** of the operator station.



vis_m0021_us.bmp

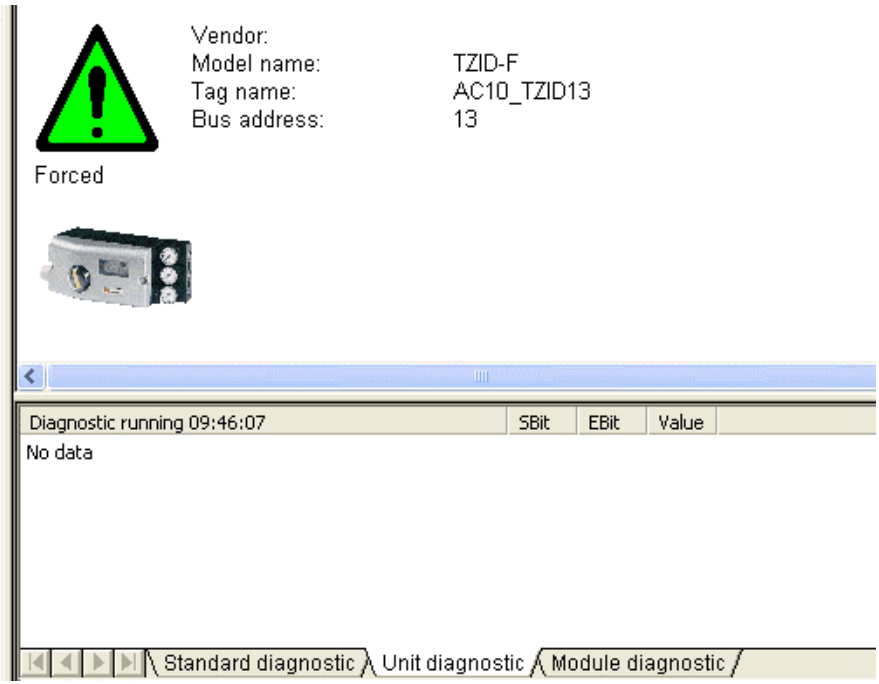
Detail display of the PROFIBUS slave

The detail display of the PROFIBUS slave is divided into two sections. The upper section shows the device view in the form of an individual bitmap, which can be assigned to the slave in the parameter window.

In addition, general information on field devices and their status are displayed.

Please also refer to Status displayed in the detail view, page 258 and to the **Engineering Manual, Communications and Fieldbusses, PROFIBUS, Diagnostic Data**.

Additional diagnostic details are listed below the graphical representation of the field device. The diagnostic values of the units are distinguished here from those of the modules. The diagnostic values are device-dependent. Refer to the appropriate manual for details on content and function.



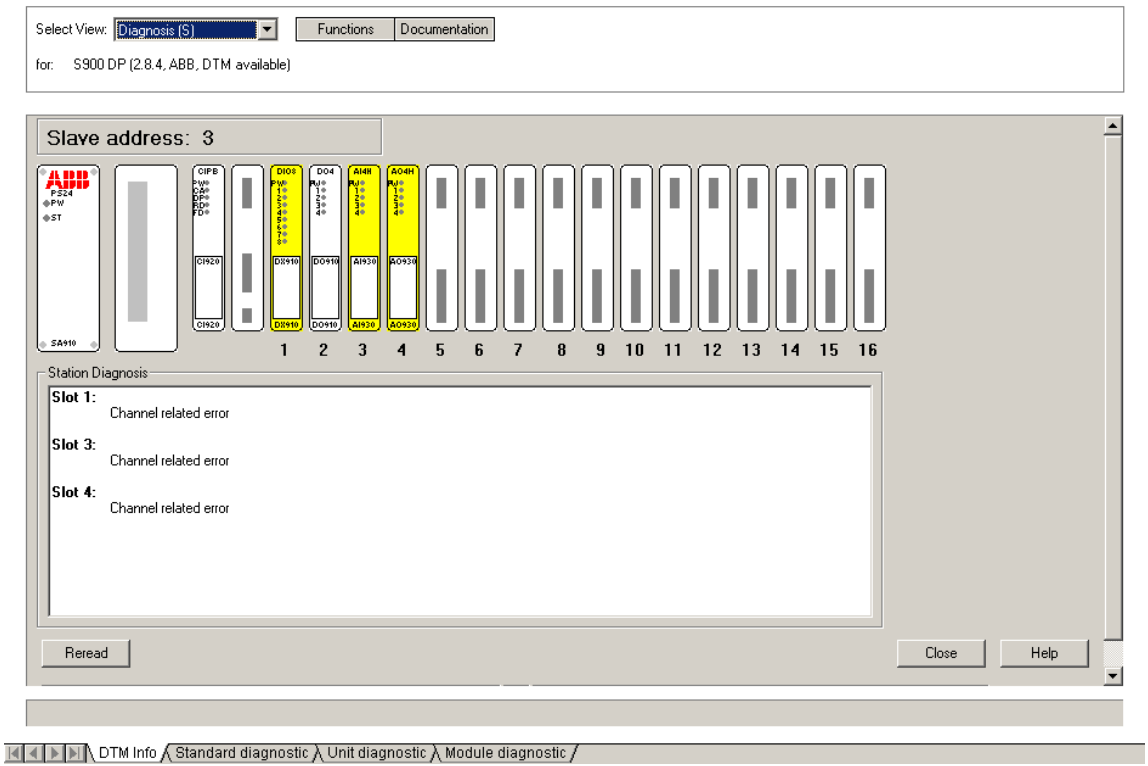
vis_m1022_us.png

An additional “DTM info” page is available in the lower section of the detail display for slaves and modules provided with a DTM.

One Freelance Operations station in the project can be configured with **extended diagnostic features**. Provided this Freelance Operations station includes the required license, the available DTM function block interfaces can be called up via view selection.

The graphical interfaces are device-dependent and can be restricted by different user access rights.

If the extended diagnostic features are not configured, this page simply displays the bitmap that is associated with the device.



vis_m0028_us.png

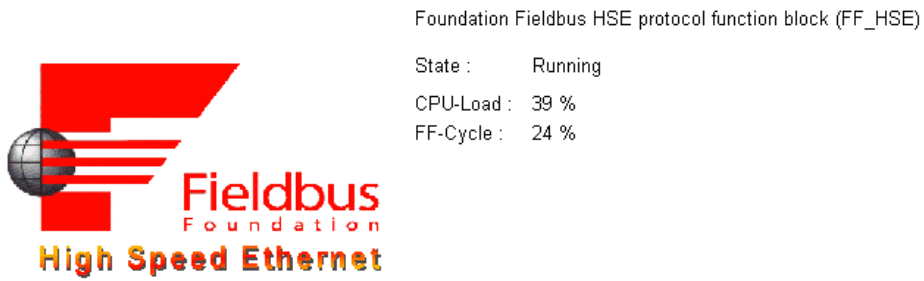
The device DTMs can also provide functions without graphical interfaces for diagnostics, operations or documentation purposes. The available functions can be viewed and called up via the “Functions” or “Documentation” items.

The functions are device-dependent and can be restricted by different user access rights.

Please also refer to **Engineering Manual, System Configuration, Project tree, Editing Objects** and **Engineering Manual, System Configuration, Hardware structure, User access**.

Detail display of the FOUNDATION Fieldbus (FF)

Detail display – FOUNDATION Fieldbus, HSE protocol module



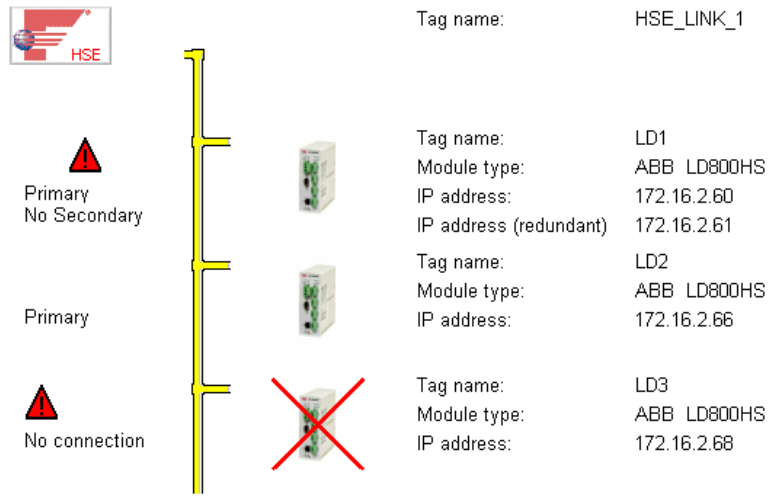
vis_m0029_us.png

The detail display of the FF protocol module shows the status and the load capacity of the FF communication.

In addition to the CPU load, the current total load of the HSE FI840F module is displayed. The FF cycle value indicates the capacity loading of the cycle configured for the Publisher subscriber service. If the system is overloaded, this value can exceed 100%. In this case, a system message is triggered.

The CPU loading can abruptly increase for a short term during client-server access. If the FF values are read via an OPC server, make sure that both load values are clearly below 100% as otherwise the read service may not be executed properly.

Detail display – FOUNDATION Fieldbus, HSE link



vis_m0030_us.png

The detail display of the FF HSE link object shows the “Tag name” and the HSE devices (linking devices) configured on the HSE segment in question.

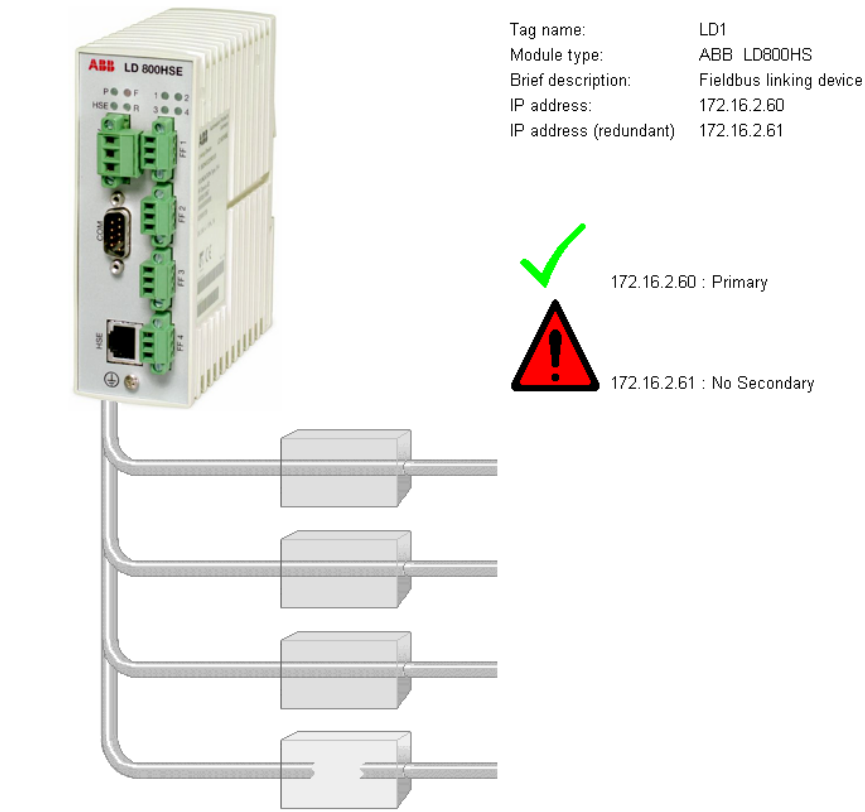
The status of the configured FF linking devices is shown on the left side of the HSE subnet.

Details link the “Tag name”, “Module type” and “IP address” are displayed on the right of the HSE subnet.

In the tree view, the “Live list” for this HSE link can be called up via the context menu. All currently active HSE and H1 devices are displayed here.

Please refer to Detail display showing subscribers in the HSE segment, page 275.

Detail display – FOUNDATION Fieldbus linking device



vis_m0031_us.png

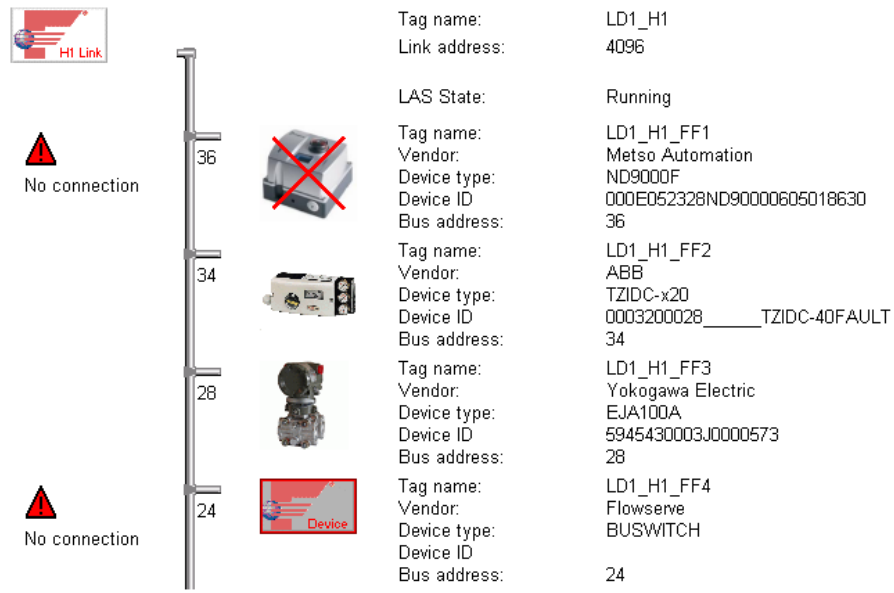
The detail display of the FF HSE linking device shows the configuration data such as “Tag name”, “Module type”, “Short text”, “IP address”, “IP address (redundant)” (only for redundant linking devices) and the configured H1 links.

The current status of the connection is shown under the configuration data.

In the tree view, the “Live list“ for this HSE link can be called up via the context menu. All currently active HSE and H1 devices are displayed here.

See also Detail display showing subscribers in the HSE segment, page 275.

Detail display – FOUNDATION Fieldbus, H1 link



vis_m0032_us.png

The detail display for the FF H1 link object shows the configuration data “Tag name”, “Manufacturer name” and “Link address” as well as the current “LAS status” (status of the “Link active scheduler”).

The “LAS status” can be as follows:

- “Running”
- “Stopped”
- “Unknown”
- “Not loaded”
- “Configuration error”

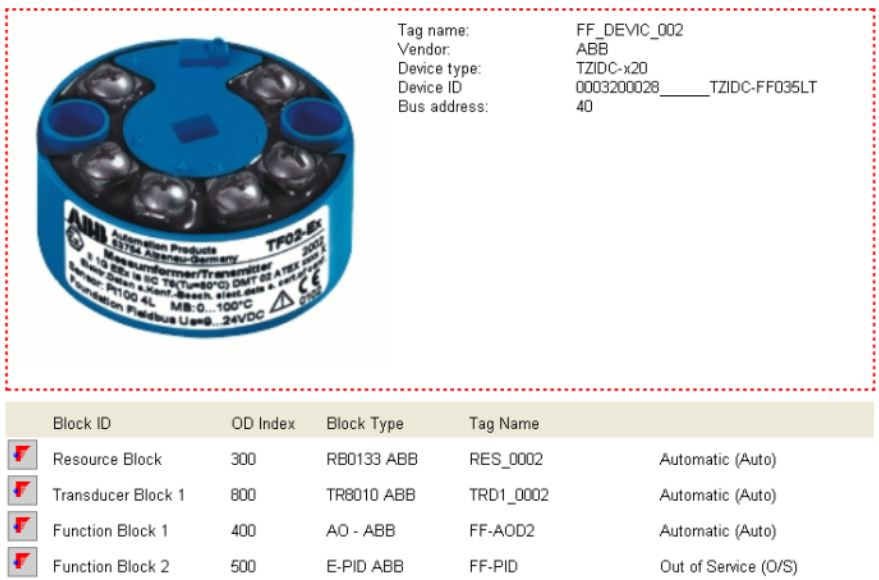
The status of the configured devices is shown on the left side of the H1 bus.

Device-specific bitmaps and the configuration data “Tag name”, “Manufacturer name”, “Device type”, “Device ID” as well as the bus address of the devices are displayed on the right side of the H1 bus.

If no bitmap is configured, the standard bitmap is displayed.

In the tree view, the “Live list” for the H1 link can be called up via the context menu. All configured H1 devices and all currently active H1 devices are displayed in this list. See also Detail display showing subscribers in the H1 segment, page 277.

Detail display – FOUNDATION Fieldbus, H1 device



vis_m0034_us.png

The detail display for the FF H1 device shows the configuration data “Tag name”, “Manufacturer name”, “Device type”, “Device ID” and the bus address of the device in addition to the bitmap.

In the event of an error, a warning sign is displayed below these data.

The resource, transducer and function blocks and their current mode of operation are displayed below the general information for the device.

The mode of operation of the blocks is indicated as follows:

- Automatic (Auto)
- Out of Service (O/S)

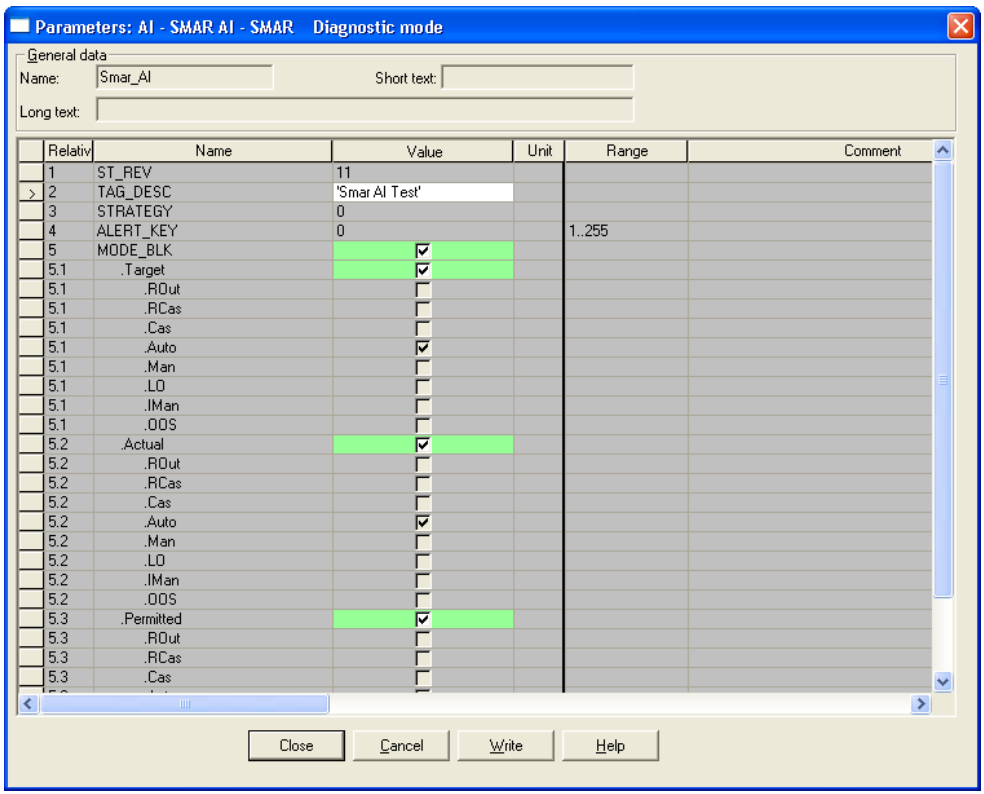
- Remote Output (ROut)
- Remote Cascade (RCas)
- Cascade (Cas)
- Manual (Man)
- Local Override (LO)
- Initialization Manual (IMan)
- „ ” (In case of an error: no display)

One Freelance Operations station in the project can be configured with extended diagnostic features. Provided this Freelance Operations station includes the required license, the parameters of the FF functions block can be viewed and even changed, if the user has the appropriate access rights. Only parameters that have been enabled in the function block class for access to Freelance Operations are displayed.

The dialog displays the relative index, name, value, unit, value area, and the comment for these parameters.

The title bar changes to “Diagnostic mode” to show that the user is in the diagnostic mode.

Please refer to **Engineering Manual, System Configuration, Project Tree, Editing Objects, Operator station D-LS**.



vh_m0035_us.png

The Freelance Operations access requires additional Client/Server services on the H1 Link, which could affect the data transfer rate. This is why only the following standard parameters are enabled for the Freelance Operations access by the system:

- ST_REV
- TAG_DESC
- MODE_BLK
- BLOCK_ERR

Further parameters can be enabled in Freelance Engineering in the function block class for access from Freelance Operations. However, the limited data rate of an H1 link must be taken into consideration.

Please also refer to **Engineering Manual, Communication and Fieldbusses, FOUNDATION Fieldbus, Configuration, FF Libraries, FF function block library**.

Writing FF function block parameters

A logged-in user with the **Operate** access right may edit a value parameter in the "value" column and subsequently write it into the H1 device using the "write" button.

If the User Management is disabled, only the configured access rights are evaluated. In Freelance Engineering, the access right is configured in the HWSYS node in the tree view of the hardware structure (Edit / Access rights).

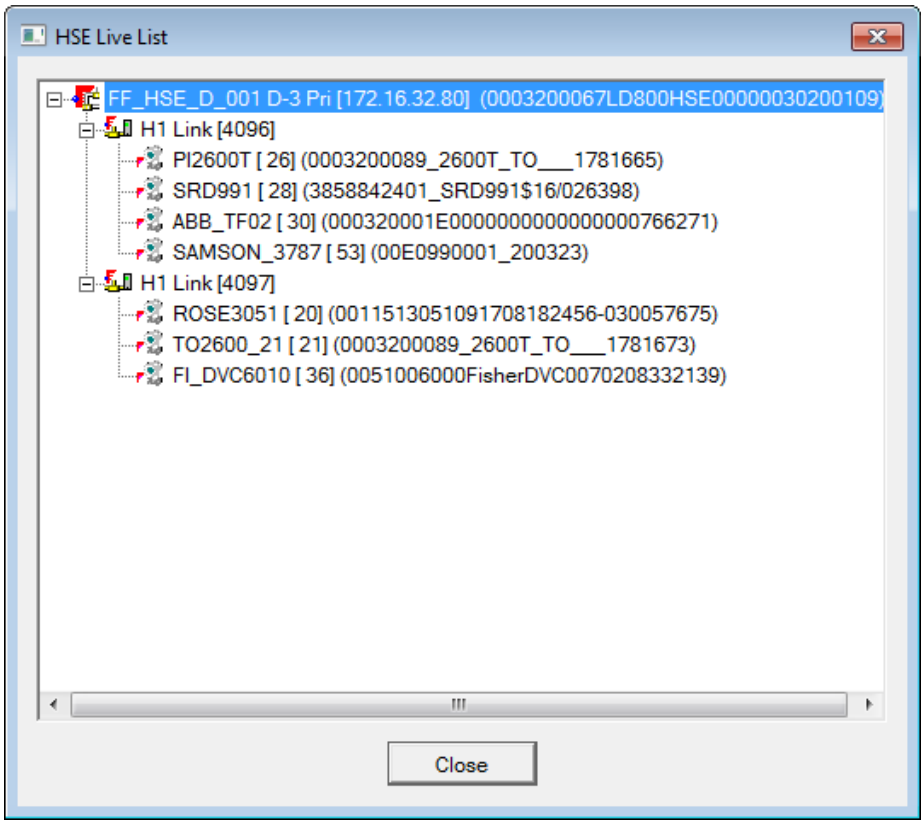
Logging of operator interventions

Writing of FF function block parameters is recorded and stored in the signal sequence log.

The format corresponds to the entry in the case of operating procedures in the faceplates.

Detail display showing subscribers in the HSE segment

The "Live list" for the HSE link can be displayed in the tree view on the objects FOUNDATION
fieldbus HSE link (FF_HSE_LINK) and the FOUNDATION Fieldbus linking device
(FF_HSE_DEV) via the context menu. All HSE and FF devices that are currently active in the HSE segment are displayed in a hierarchic structure. Devices of other projects will also be displayed, if any.



HSE_Live_list_us.PNG

The device-specific entry is composed of:

Tag name Tag name for the device. The tag name configured for a device is written into the actual device during device assignment.

Redundancy mode
With an HSE device, the tag name is followed by the redundancy mode (Pri, Sec). Non-redundant devices are indicated by the “Pri” mode.

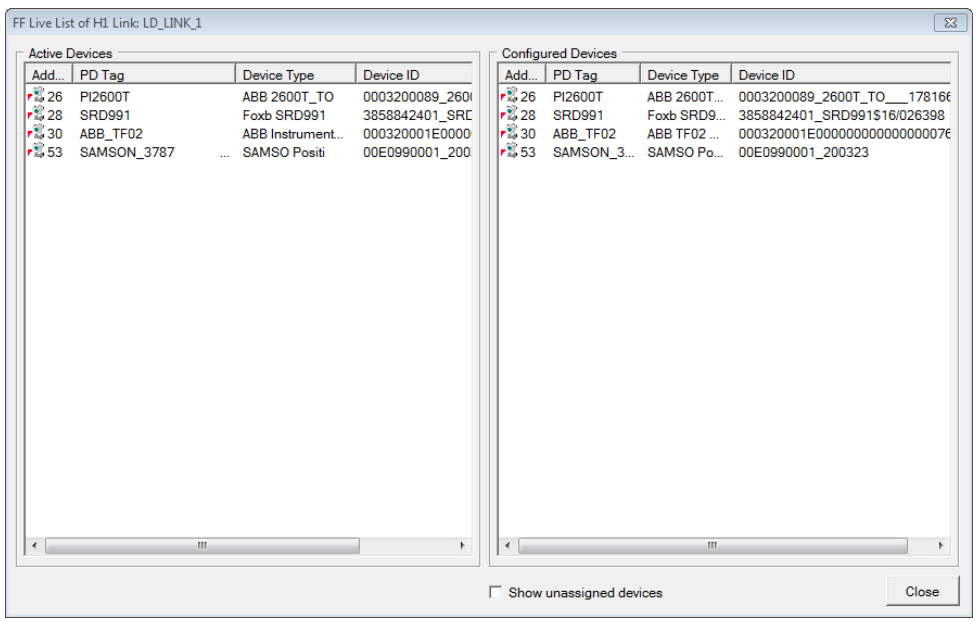
Address Device address.
For HSE devices - the IP address of the HSE device.
For H1 devices - the bus address on the H1 segment. The bus address configured is written into the actual device during device

assignment.
For H1 links - the segment address of the H1 segment.

Device ID Unique identification number of the device. A unique device ID is assigned to each device by the manufacturer and remains unchanged. During device assignment, the device ID is read from the device and recorded in the database.

Detail display showing subscribers in the H1 segment

The “Live list” of the H1 link can be displayed at the FOUNDATION fieldbus H1 link (FF_H1_LINK) object in the tree view via the context menu. All configured H1 devices and all currently active H1 devices for this H1 link are displayed in this list.



H1_LiveList_us.PNG

Address Bus address of the device. The bus address configured is written into the actual device during device assignment.

Tag name Tag name for the device. The tag name configured for a device is written into the actual device during device assignment.

Device ID Unique identification number of the device. A unique device ID is assigned to each device by the manufacturer and remains unchanged. During device assignment, the device ID is read from the device and recorded in the database.

Device type The device type specified in the description of the device.

Show unassigned device

A filter can be activated in order to reduce the number of devices displayed. When this filter is set, only devices that are not assigned are displayed in the display window, namely

- configured devices without device ID,
- active devices with temporary addresses (248... 251),
- active devices with permanent addresses (20...247) that have not been entered into the configuration.

Status displays of FOUNDATION Fieldbus devices

Status display of an HSE device

Normal status. There is a connection to the HSE device; the device appears in the "live list":

There is **no communication link** to the HSE with the specified IP address, the tag name or the device ID:

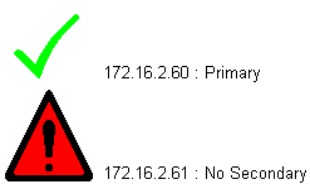
Possible error cause	Corrective measure
The physical HSE device is not connected to the HSE segment.	Connect the physical HSE device to the HSE segment.
The Freelance Operations station is not connected to the AC800F controller that is linked via an FI840 module to the HSE segment.	Establish the connection to the AC800F controller.
The FI840 module is not connected with the HSE segment.	Establish the connection between the FI840 module and the HSE segment.

The FI840 module is switched off.	Switch-on the FI840 module.
The configuration is not loaded to the AC 800F controller.	Load the configuration into the AC 800F controller.
The current configuration is not loaded to the Freelance Engineering station.	Load the configuration into the Freelance Engineering station.
At least one of the configured parameters in the database: IP address, tag name or the device ID does not correspond to the current value in the physical device.	If necessary, change the IP address in the configuration and/or in the physical device and assign the device once again.

Status display of a redundant HSE device

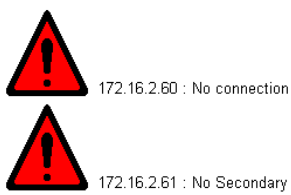
Normal status. There is a connection to the primary and secondary HSE device; both devices appear in the “Live list”:

There is no **communication link to the secondary HSE device**. Only the primary HSE devices appears in the “Live list”:



Possible error cause	Corrective measure
The secondary device is in error status; it is not ready to assume the function of the primary linking device.	Replace the defective HSE device. Follow the instructions on replacing a defective linking device in a redundant configuration of linking devices.
The physical HSE device is not connected to the HSE segment.	Connect the physical HSE device to the HSE segment. Follow the instructions on commissioning redundant linking device as specified in the user documentation for FF linking devices.
The IP address configured in the database does not correspond to the current IP address of the physical device.	If necessary, change the IP address in the configuration and/or in the physical device. Follow the instructions on commissioning a redundant linking device as specified in the user documentation for FF linking devices.

There is no communication link to **both redundant** HSE devices. None of the HSE devices appears in the “Live list”:



Possible error cause	Corrective measure
Both HSE devices of the redundant configuration are not connected to the HSE segment.	Connect the physical HSE devices to the HSE segment. Follow the instructions on commissioning a redundant linking device as specified in the user documentation for FF linking devices.

The Freelance Operations station is not connected to the AC800F controller that is linked via an FI840 module to the HSE segment.	Establish the connection to the AC800F controller.
The FI840 module is not connected with the HSE segment.	Establish the connection between the FI840 module and the HSE segment.
The FI840 module is switched off.	Switch-on the FI840 module.
The configuration is not loaded to the AC 800F controller.	Load the configuration into the AC 800F controller.
The current configuration is not loaded on to the Freelance Operations station.	Load the configuration into the Freelance Operations station.
The IP addresses configured in the database do not correspond to the current IP addresses of the physical devices.	If necessary, change the IP addresses in the configuration and/or in the physical devices and assign the device once again. Follow the instructions on commissioning a redundant linking device as specified in the user documentation for FF linking devices.

Status displays of an FF H1 link object

No connection to the H1 channel of the linking device.

Possible error cause	Corrective measure
No connection to the HSE device (FF linking device) containing the H1 channel. For possible causes, refer to the “Status of an HSE device” tables.	See “Status of an HSE device” tables.

The H1 channel in the HSE device (FF linking device) associated with this H1 segment is not activated.	Activate the H1 channel and commission the linking device (“Load the configuration of the H1 port”).

Status displays of an FF H1 device

There is no communication link to the H1 device with the specified bus address, the tag name or the device ID:

No connection

Possible error cause	Corrective measure
No connection to the H1 channel of the HSE device (FF linking device). For possible causes, please refer to the “Status H1 link” tables.	See “Status H1 link” tables.
The physical H1 device is not connected to the H1 link.	Connect the physical H1 device to the H1 link.
At least one of the configured parameters in the database: IP address, tag name or the device ID does not correspond to the current value in the physical device.	Perform an assignment of this H1 device.

Section 13 WEB Display

General description – WEB display

When a WEB display is called up in Freelance Operations, the local WEB browser is loaded and the link to the configured Web site is activated.

The WEB display starts the local WEB browser. Users of Freelance Operations could thus access files on the local machine or other machines in the Intranet or global Internet.
Mind the risks and hazards involved.

Calling up the WEB display

Via the toolbar

Call up web display.png

Left-click toolbar icon > In the display explorer double-click appropriate WEB display

Via the Display menu item

Display > **WEB displays** > In display explorer double-click appropriate Web display
or
ALT+D > **W** > Use CURSOR KEYS to select appropriate Web display or

enter first letters of the display name > ENTER

Via the context menu

In order to call up a Web display via the context menu, you must first select a tag to which a Web display has been assigned in Freelance Engineering using the *Display access* function.

Select tag > Call up context menu > Select Web display

From the overview display

Web display.PNG

Left-click appropriate Web display icon
or
Use CURSOR or TAB keys to select appropriate Web display icon > ENTER

From a graphic display

In order to call up a Web display from a graphic display, a graphic object that features the *Show display* action configured with a Web display in Freelance Engineering must have been previously selected.

Left-click graphic object with appropriate configuration
or
Use TAB KEY to select appropriate graphic object > ENTER

Operating procedures in the WEB display

The operating procedures in the WEB display are given by the activated WEB site.

Section 14 Multi Monitor

General description – Multi Monitor

Multi Monitor allows user to customize the display types on up to four monitors during engineering. This gives users a better overview with improved structured displays.

Freelance Operations goes to Emergency mode if more monitors are configured in Freelance Engineering than licensed in Freelance Operations. Thus, user needs to upgrade the Freelance license or change the monitor settings.

For detailed information about Quad Monitor, please refer to the chapter in user manual of **Engineering – Operator Station Configuration**.

Section 15 System Messages

Alphabetic list of system messages

Message text The text is displayed in the message list or the signal sequence log

Pr Priority level S1, S2 or S3

Mr Message rate:
1 = Message with one state, e.g. ‘Redundancy toggle occurred’
2 = Message with two states, e.g. ‘Battery low’ and ‘Battery low is gone’

[...] The text in the brackets is not displayed in every case.

Message text	Pr	Mr	Cause of message	Remedy
Acquisition of trend 'xxxx' interrupted	S1	1	Trend values were (partly) not received from OPC server.	Check the connection to the OPC server PC and the project configuration.
Acquisition of trend 'xxxx' not started	S1	1	The trend could not be started; writing to trend function blocks failed.	Check the connection to the process station and the project configuration.
Archiving of trend 'xxxx' has been stopped	S1	1	An unexpected error occurred while writing trend archive data, e.g. the hard disk is full.	Create more space on the disk in question or switch the storage of log files etc. to a disk with more space available.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
Audio file not found	S1	1	A wave file can be configured for each process alarm.	Contact your authorized service engineer.
Battery low (IP1/2)	S2	2	CPU module battery is flat or disconnected.	Replace or connect battery.
Battery low in CPU module	S2	2	CPU module battery is flat or disconnected.	Replace or connect battery.
Battery low in link module	S2	2	Battery of link module is flat or disconnected.	Replace or connect battery.
Battery low in module E1/E2 [(IP1/2)]	S2	2	Battery of the module is flat or disconnected.	Replace or connect battery.
Channel xxx, edge detection	S1	2	In a DDI01 a change of edge of the input signal was detected from channel xxx and reported with the accompanying time stamp. The report is written only in the record and not in the report page.	
Coldstart by firmware	S1	1	Due to a problem, a cold start was triggered on the CPU module.	Contact your authorized service engineer.
Coldstart by operator	S1	1	An operator action (in Freelance Engineering) has caused a cold start on the process station.	Normal operation.
Coldstart by program	S1	1	The application program has caused a cold start on the process station.	Normal operation.

Message text	Pr	Mr	Cause of message	Remedy
Coldstart by reset switch	S1	1	A cold start has been triggered on the CPU-MODULE by the reset button. Reset button pressed for more than 5 seconds.	Normal operation.
Coldstart from safety state	S1	1	After reaching the safety state a cold start on the process station has caused.	Check reason for safety state using the boot cause information dialog.
Connection to 'xxxx' interrupted	S1	2	The link to station 'xxxx' has been disturbed.	Check that the process station is functioning correctly and check its system net connection.
Counter overrun on channel 'xxxx'	S2	2	The internal counter in the frequency input module has overrun.	Contact your authorized service engineer.
Create file on FTP 'xxxx' failed	S1	1	FTP access at target station failed, e.g. the configured path may be wrong.	Check the configured archive path of the trend display configuration.
Data lost for all modules of process bus 1 [to 3]	S2	1	Data may have been lost by all subscribers as a result of a CAN bus error.	Check the terminating resistors and the cable lengths or contact your authorized service engineer.
DCL 'xxxx' stopped, all files in use	S1	1	The disturbance course log 'xxxx' has been halted automatically. The maximum volume of data for this log has been reached, and automatic deletion has not been configured.	Delete or export log data and re-start the log. You can also configure automatic deletion.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
DCL 'xxxx' was not printed	S1	1	The print job for the disturbance course log could not be carried out. Presumably the printer driver is not installed or the printer queue is full.	Check your system installation or check that the printer is on-line.
DDI01 module not exist	S2	2	Internal error when invoking the module method.	Check the configuration or contact your service technician.
Diagnosis fault for module n l m	S3	2	Diagnosis faults were reported for the specified module.	Check the associated PROFIBUS module or contact the slave manufacturer's service technician.
Diagnosis fault for unit	S2	2	A PROFIBUS unit has sent diagnosis faults.	Check the connected PROFIBUS units or contact your authorized service engineer.
Different time zones for project and Vis PC	S1	1		Contact your authorized service engineer.
Disturbance course log 'xxxx' stopped	S1	2	Log in emergency halt. An unexpected error occurred while writing log data, e.g. the hard disk is full.	Create more space on the disk in question, or switch the storage of log files etc. to a disk with more space available
EN-Wire break on channel 'xxxx'	S3	2	The cable connection for the control input EN (Enable) is faulty.	Check the relevant process signal cable.

Message text	Pr	Mr	Cause of message	Remedy
Environment variable TZ is set	S1	1	Under previous Windows systems this variable was used to define the time zone. It can no longer be used as nowadays the time zone is handled differently.	Remove the environment variable from the system or user settings.
Error: Restart FTP server ‘xxxx'	S1	1	FTP access at target station failed.	Restart the FTP server or contact your authorized service engineer.
Export failed due to copy file	S1	1	FTP export: Failure to save export file in temporary storage in the Temp directory of the sending PC.	Increase size of Temp directory or delete unnecessary files from it.
Export queue full	S1	1	The export of log data requires a certain length of time, depending on the type of network connection to the FTP server and on the volume of data The Freelance Operations station is producing transmit jobs faster than they can be processed.	Use a faster network connection to the FTP server, or a more powerful server. Alternatively, reduce the number of transmit tasks per unit of time.
Export: FTP conn. ('xxxx') failed	S1	1	No connection could be established to the export target device addressed 'xxxx'.	Check the target device.
Export: FTP not accepted ('xxxx')	S1	1	Access to the export target device addressed 'xxxx' was denied due to an incorrect password.	Check the password.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
Export: General FTP error ('xxxx')	S1	1	A general error has occurred while exporting the archive data.	Check the amount of storage available on the target device.
Extended diagnostic data overflow	S3	2	A PROFIBUS slave has given an overflow of diagnostic data. Probably a 'flutter' signal.	Check the PROFIBUS slave or contact slave manufacturer's service technician.
Fault in diagnosis data	S3	1	The module has announced the unknown diagnostic data.	Check the effected I/O module or contact your service
Fault in output channel 'xxxx'	S2	2	There is a short circuit on output channel 'xxxx'	Check the process signal connection, eliminate short-circuit.
FF configuration identity mismatch	S2	2	The configuration that is to be loaded into the FOUNDATION Fieldbus devices is not suitable for the devices which are physically present.	Adapt the configuration in Freelance Engineering according to the physical conditions.
FF cycle overrun	S2	2	The configured HSE bus cycle time was exceeded.	Change the FF configuration, e.g. increment the bus cycle time.
FF data exchange	S2	2	The communication of FF data has been reestablished.	
FF HSE initialization error	S2	2	An internal error occurred during initialization of the HSE protocol function block.	
FF PNA error	S2	2	An internal software error has occurred in one of the FOUNDATION Fieldbus devices.	Check the fieldbus devices and replace the defective device.

Message text	Pr	Mr	Cause of message	Remedy
FF protocol error	S2	2	An error has been detected in the communication protocol of the FOUNDATION Fieldbus line.	
FF state not ready	S2	2	Not possible to communicate FF data.	Check the hardware installation and the configuration.
FI840 IP [1/2] link broken	S2	2	Communication disruption on the Ethernet link of the FI840 module, possibly a faulty cable, or cable not plugged in.	Check the Ethernet cable.
FI840 IP [1/2] link running	S2	2	Ethernet connection of FI840 module established.	
First adjustment not finished	S1	2	An internal error has occurred on the secondary CPU during data balancing between the CPU modules.	Contact your authorized service engineer.
Frame-Error on channel 'xxxx'	S2	2	An error has occurred in the measurement timing on the channels indicated.	The time sequence of input signals at the frequency input module DFI 01 should be checked, depending on operating mode.
Error Configuration change Freel Operations	S1	1	An error has occurred while loading new project data to the Freelance Operations station.	Check available disk space at your Freelance Operations PC or contact your authorized service engineer.

Message text	Pr	Mr	Cause of message	Remedy
Hardkey not found	S1	2	The hard key required for operating the software was not found.	Check that the hard key is installed, and/or check its connection. Otherwise, contact your authorized service engineer.
High temperature in CPU [(IP1/2)]	S2	2	The temperature of the CPU module is more than 70 °C.	The ambient temperature is probably more than 50 °C. Reduce ambient temperature.
High temperature on I/O module	S2	2	The temperature at the I/O module is above 70 °C.	The ambient temperature is probably more than 50 °C. Reduce ambient temperature.
HW module assembly is different	S1	1	The processing station cannot reach ‘sync’ state, because the assembly of the two process stations is different.	Check the assembly of the modules in both controllers.
IN-Wire break on channel 'xxxx'	S3	2	The cable connection for the input signal IN is faulty.	Check the relevant process signal cable.
IO Bus: Module not ready	S2	2	The IO module is detected, but it is not ready for cyclic data exchange.	Check the IO module and check the process voltage of the IO modules.
IO Bus: Parameterization failed	S2	2	The module could not parametrized.	Check the IO module or contact your authorized service engineer.
IO Module: Checksum error (19)	S2	2	The module has announced the diagnostic value 19 – Checksum error.	Check the IO module or contact your authorized service engineer.
IO Module: Diagnosis overflow (9)	S2	2	The module has announced the diagnostic value 9 – Overflow of diagnostic messages.	Check the IO module or contact your authorized service engineer.

Message text	Pr	Mr	Cause of message	Remedy
IO Module: Different versions (40)	S2	2	The module has announced the diagnostic value 40 – Version error.	Check the IO module or contact your authorized service engineer.
IO Module: Internal data exchange (36)	S2	2	The module has announced the diagnostic value 36 – Error during internal data exchange.	Check the IO module or contact your authorized service engineer.
IO Module: Internal error (43)	S2	2	The module has announced the diagnostic value 43 – Internal error.	Check the IO module or contact your authorized service engineer.
IO Module: Low process voltage (11)	S2	2	The module has announced the diagnostic value 11 – Low process voltage.	Check the IO module or contact your authorized service engineer.
IO Module: No Communication / Slot empty	S2	2	The module has not communicated properly for a specified length of time or the module is not plugged.	Change the module or contact your authorized service engineer.
IO Module: Parameter error (26)	S2	2	The module has announced the diagnostic value 26 – wrong parameter values found.	Check the IO module or contact your authorized service engineer.
IO Module: Process voltage switched off (45)	S2	2	The module has announced the diagnostic value 45 – No process voltage.	Check the IO module or contact your authorized service engineer.
IO Module: Timeout (3)	S2	2	The module has announced the diagnostic value 3 – Timeout.	Check the IO module or contact your authorized service engineer.
IO Module: Type not supported	S2	2	The detected module type is not supported with this software version.	Check the plugged modules.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
IO Module: Wrong type plugged	S2	2	The configured and plugged module types are different.	Correct the configuration.
Lateral communic: Timeout from station 'xxxx'	S2	2	Station 'xxxx' has sent its data in the specified interval time.	Check that the process station is functioning correctly, and check its system network connection. Check the possibility that the station may be operating under overload and therefore be unable to send its lateral data in the specified interval.
Less than 'xxxx' MB free disk space on drive "yyyy":	S1	1	Hard disk "yyyy" on the Freelance Operations PC no longer has sufficient free space (less than 'xxxx' MB).	Create more space on the disk in question or switch the storage of log files etc. to a disk with more space available.
Less than 'xxxx' KB free memory	S1	1	Low free memory on the Freelance Operations PC (less than 'xxxx' KB).	Check all active programs on the Freelance Operations PC and close those applications which are currently not needed. If possible restart Freelance Operations and/or the Freelance Operations PC.
Maximum of redundancy data exceeded	S1	2	The volume of redundancy data per task is limited to 64 KB. One of the tasks has exceeded this limit, and the redundancy has been completely deactivated.	Dividing the program of the task in question into several parts reduces the volume of redundancy data.

Message text	Pr	Mr	Cause of message	Remedy
Message connection to station 'xxxx' lost	S1	2	The message connection for logs and messages to station 'xxxx' is lost.	Check that station 'xxxx' is functioning correctly and/or check its system net connection.
Message list overflow	S1	1	The system is producing more messages than the Freelance Operations message list can accommodate.	In the message list configuration, increase the number of messages (up to 4000 are possible). If this parameter is already at the maximum, try reducing the number of messages or changing the acknowledge levels.
Messages lost: overflow for prio 'xxxx'	S1	1	The internal message management of the controller is overloaded.	The Freelance Controller is unable to process the messages as quickly as they are generated (more than 1000 new alarms per second).
Miss. external power supply channel group 1 [to 4]	S3	2	No auxiliary power or disrupted auxiliary power to the channel group in question.	Check the connection for this auxiliary power supply, or the supply itself.
Missing transmitter supply channel group 1 [to 2]	S3	2	No external power supply for the channel in question.	Check the connection for this power supply, or the voltage itself.
Module fault	S2	2	Errors occurred in the module.	Change the module or contact your authorized service engineer.
Module fault: Boot test error	S2	2	Errors occurred in the module’s boot test.	Change the module or contact your authorized service engineer.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
Module fault: Communication error	S2	2	The module has not communicated properly for a specified length of time.	Change the module or contact your authorized service engineer.
Module fault: Configuration error	S2	2	The configuration of the module is not valid.	Change the configuration or contact your authorized service engineer.
Module fault: Identification error	S2	2	The module cannot be identified.	Change the module or contact your authorized service engineer.
Module fault: No master	S2	2	No master can be found on the PROFIBUS.	Check the PROFIBUS connection.
Module fault: Parameter error on master	S2	2	The configuration of PROFIBUS master does not match to the connected device.	Change the configuration or contact your authorized service engineer.
Module fault: Parameter error on slave	S2	2	The configuration of PROFIBUS slave does not match to the connected device.	Change the configuration or contact your authorized service engineer.
Module fault: Self test error	S2	2	In its cyclical self-test the module has detected a fatal error.	Contact your authorized service engineer.
Module fault: Slave not existent	S2	2	The configured PROFIBUS slave cannot be connected.	Change the configuration or contact your authorized service engineer.
Module fault: Slave not ready	S2	2	The configured PROFIBUS slave does not communicate correctly.	Change the configuration or contact your authorized service engineer.

Message text	Pr	Mr	Cause of message	Remedy
Module fault: Slot empty	S2	2	A specific module type has been configured for a slot, but no module has been plugged in.	Alter the configuration to match the hardware installed.
Module fault: Wrong firmware version	S2	2	The module has an incorrect firmware version.	Load a new firmware version in the module, change the module, or contact your service technician.
Module [IP1/2]: Number self test errors 'nnn'	S1	2	The number of self-test errors detected in the module is dumped. If the number of self-test errors reaches 5, then the module will no longer boot up.	Contact your authorized service engineer.
Module self test error [IP1/2] 'xxxx'	S2	2	In its cyclical self-test the module has detected a failure that cannot be accepted.	Contact your authorized service engineer.
Network buffer error, warmstart recommended	S1	1	There are no more network buffers available; communication with the process stations does not work correctly.	A warm start will solve the current problem. Check and clean your network to avoid this problem for the future.
Network buffer low, warmstart recommended	S1	1	Only few network buffers are available, communication with the process stations is endangered.	A warm start will solve the current problem. Check and clean your network to avoid this problem for the future.
Network 'xxxx' connection failure [IP1/2]	S1	1	The system bus network connection of the process station does not work.	Check the system net connection of the process station.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
No connection to 'xxxx' (IP1/2) via line A/B/A+B	S1	2	The mentioned network connection is disturbed; cable may be defective or not connected.	Check the network connections.
No external power supply output channel 'xxxx'	S3	2	No auxiliary power or disrupted auxiliary power to the frequency input module in question.	Check the connection for this auxiliary power supply, or the supply itself.
No prim. and second. master connection	S2	2	The redundant PROFIBUS connection is disturbed.	Check the connection and configuration of the redundant PROFIBUS line.
No RED Link connection	S1	2	Communication disruption on the RED link, possibly a faulty cable, or cable not plugged in.	Check cable connection.
No valid daylight saving time defined	S2	2	Time cannot be converted to daylight saving time. The summer-time table’s period of validity has expired, or the table does not contain any times in standard chronological order. Another possible cause is that the time to be converted lies precisely within the one undefined hour when daylight saving time starts.	Correct or extend your summer-time table, or check the time to be converted against the last error source declared.

Message text	Pr	Mr	Cause of message	Remedy
Object error, first adjustment not possible	S1	2	The user program could not be loaded fully.	Do not load user program with “Load selected objects”. Instead, update the project data with “Load entire station” or at least with “Load changed objects”.
Operation log 'xxxx' stopped	S1	2	Log in emergency halt. An unexpected error occurred while writing log data, e.g. the hard disk is full.	Create more space on the disk in question, or switch the storage of log files etc. to a disk with more space available
OPL 'xxxx' stopped, all files in use	S1	1	The operation log 'xxxx' has been halted automatically. The maximum volume of data for this log has been reached, and automatic deletion has not been configured.	Delete or export log data and re-start the log. You can also configure automatic deletion.
OPL 'xxxx' was not printed	S1	1	The print job for the operation log could not be carried out. Presumably the printer driver is not installed or the printer queue is full.	Check your system installation, or check that the printer is on-line.
Outdated daylight saving time information	S1	1		Contact your authorized service engineer.
Output 10V faulty at I: 'xxxx'	S3	2	Output voltage 10 V faulty.	Check output load.
Over / underranging / wire break channel 0 [to 7]	S3	2	The measuring range has been over/under-ranged for the channel in question, or the cable is damaged there.	Ensure that values remain within the permissible measuring range and/or check the process signal cable.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
Overflow/broken wire at C: 'xxxx'	S3	2	The measuring range has been overranged for the listed channel or the cable is damaged there.	Ensure that values remain within the permissible measuring range and/or check the process signal cable.
Overflow/broken wire at I: 'xxxx'	S3	2	The measuring range has been overranged for the listed input channel or the cable is damaged there.	Ensure that values remain within the permissible measuring range and/or check the process signal cable.
Overflow/broken wire at O: 'xxxx'	S3	2	The measuring range has been overranged for the listed output channel or the cable is damaged there.	Ensure that values remain within the permissible measuring range and/or check the process signal cable.
Overload, first adjustment not possible	S1	2	The CPU module is operating with an overload, with the result that redundant operation cannot be initiated. The redundancy has been completely deactivated.	Rectify the overload by altering the task interval times or splitting up the program.
Power fail of power supply 1 [to 2]	S1	2	The power supply in question has failed.	Check cable connection and the supply itself.
Prim/Sec toggle by fieldbus communication	S1	1	Failure of the fieldbus communication has triggered a redundancy toggle.	Check the connection and configuration of the fieldbus devices.
Prim/Sec toggle by function	S1	1	Redundancy toggle caused by user function call PRIM/SEC in the normal program.	Normal operation.
Prim/Sec toggle by HW module failure	S1	1	Redundancy toggle occurred due failure of a module of the process station.	Replace the defective module or check for other causes.

Message text	Pr	Mr	Cause of message	Remedy
Prim/Sec toggle by network error	S1	1	Redundancy toggle through detection of an error in the system net connection.	Check the system net connection of the CPU modules, in particular that of the current secondary.
Prim/Sec toggle by primary failure	S1	1	Redundancy toggle caused by failure of the primary CPU-module.	Replace faulty CPU, or investigate other causes.
Prim/Sec toggle by toggle button	S1	1	Redundancy toggle by operating the toggle button in Freelance Engineering.	Normal operation.
Prim/Sec toggle by toggle switch	S1	1	Redundancy toggle by operating the toggle button on the primary CPU-module.	Normal operation.
Process bus 'xxxx' data lost: Reception overload	S2	1	The CPU-module was unable to process the received data quickly enough.	Check the terminating resistors and the cable lengths or contact your authorized service engineer.
Process bus 'xxxx' data lost: Sending overload	S2	1	The CPU-module was unable to send any data for a certain length of time.	Contact your authorized service engineer.
Process bus data lost while receiving	S2	1	The module was unable to process the received data quickly enough.	Check the terminating resistors and the cable lengths or contact your authorized service engineer.
Process bus data lost while sending	S2	1	For a certain period of time the module was unable to send any data.	Check the terminating resistors and the cable lengths or contact your authorized service engineer.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
Process bus data lost / sending (Distance)	S2	1	For a certain period of time the module was unable to send any data. It is likely that the connection distance to the supplementary racks is too great.	Reduce the distance or contact your authorized service engineer.
Profibus: Diagnosis buffer overflow	S2	2	The PROFIBUS slaves have given an overflow of diagnosis data. Probably 'flutter' signals.	Check the PROFIBUS configuration and, if possible, increase the number of the PROFIBUS diagnosis buffers of the master. Check the PROFIBUS slaves or contact the slave manufacturer's service technician.
Profibus: DP Master Bus Cycle Timeout	S2	2	The maximum bus cycle time of the PROFIBUS communication was exceeded. The PROFIBUS master was reset.	Check the configuration and connections of all PROFIBUS devices or contact your service technician.
Profibus: DP Master in state CLEAR	S2	2	PROFIBUS DP Master is in the CLEAR state.	Check the configuration, connection and status of all PROFIBUS devices.
Profibus: DP Master in state ERROR [(IP1/2)]	S2	2	PROFIBUS Master is disturbed, all devices fail.	Check the configuration and connection to the PROFIBUS master and the status of the PROFIBUS module.
Profibus: DP Master in state OFFLINE	S2	2	The PROFIBUS DP Master is in the OFFLINE state.	Check the configuration and connection to the PROFIBUS master and the status of the PROFIBUS module.

Message text	Pr	Mr	Cause of message	Remedy
Profibus: DP Master in state STOP	S2	2	PROFIBUS DP Master is in the STOP state.	Check the configuration, connection and status of all PROFIBUS devices.
Profibus: Duplicate Master addr detected	S2	2	The PROFIBUS master software has detected that another PROFIBUS master with an identical address is active on the same PROFIBUS line.	Check the configuration of the PROFIBUS line.
Profibus: Firmware API malfunction	S2	2	The PROFIBUS master software has detected an error in the protocol stack. Depending on the nature of the error, a reset of the protocol stack is initiated and PROFIBUS communication is resumed.	
Profibus: Firmware API timeout	S2	2	The PROFIBUS master software has detected a timeout in the protocol stack. Depending on the nature of the error, a reset of the protocol stack is initiated and PROFIBUS communication is resumed.	
Profibus: Firmware error (xxx)	S2	2	An internal error has occurred in the communications software of the PROFIBUS Master.	Contact your service technician.

Message text	**Pr**	**Mr**	**Cause of message**	**Remedy**
Profibus: Firmware version error [IP1/2]	S2	2	The Firmware version of the PROFIBUS module is outdated.	Load a new Firmware version into the module, change the module or contact your service technician.
Profibus: Line A/B no data reception [IP1/2]	S2	2	The redundancy of the PROFIBUS line is disturbed.	Check the configuration and the devices of the PROFIBUS.
Profibus: Master bus cycle timeout	S2	2	The communication to the PROFIBUS devices is disturbed.	Check the configuration and the devices of the PROFIBUS.
Profibus: No connection to any slave [IP1/2]	S2	2	The PROFIBUS master software has detected a physical error on the line, and it is no longer possible to perform any communication.	Check the configuration of the PROFIBUS line.
Profibus: Physical layer malfunction	S2	2	The PROFIBUS master software has detected a physical error on the line, and it is no longer possible to perform error-free communication.	Check the configuration of the PROFIBUS line.
Readback fault in output channel	S2	2	An error has occurred during signal readback on an output channel.	Contact your authorized service engineer.
Recover from SD card	S2	1	The SD card backup was restored to the controller.	
Red. startup without actual process values	S1	1	After redundancy toggle, the new primary CPU is not receiving any current input data within the configured waiting time.	Check the configuration of the processing station, in particular, the parameter “Toggle timeout for field bus inputs”.

Message text	Pr	Mr	Cause of message	Remedy
Redundant fieldbus comm. not available	S1	1	The redundant communication of a fieldbus has failed.	Check the connections and configuration of the connected field busses.
Report 'xxxx' stopped	S1	2	Report in emergency halt. An unexpected error occurred while writing data, e.g. the hard disk is full.	Create more space on the disk in question, or switch the storage of files etc. to a disk with more space available
Report 'xxxx' stopped, all files in use	S1	1	The report 'xxxx' has been halted automatically. The maximum volume of data for this log has been reached, and automatic deletion has not been configured.	Delete or export log data and re-start the report. You can also configure automatic deletion.
Report 'xxxx' was not printed	S1	1	The print job for the report log could not be carried out. Presumably the printer driver is not installed or the printer queue is full.	Check your system installation or check that the printer is on-line.
RS-Wire break on channel 'xxxx'	S3	2	The cable connection for the input signal RS (Run/Stop) is faulty.	Check the relevant process signal cable.
RUN / STOP mismatch P-RUN <-> S-STOP	S1	2	Mismatched positions of RUN/STOP switches on CPU-modules, with current positions displayed.	Adjust switch positions.
RUN / STOP mismatch P-STOP <-> S-RUN	S1	2	Mismatched positions of RUN/STOP switches on CPU-modules, with current positions displayed.	Adjust switch positions.

Message text	Pr	Mr	Cause of message	Remedy
RUN/STOP mismatch switch <-> state	S1	2	The positions of the RUN / STOP-switches of the Primary and Secondary are different. After redundancy toggling, the switch position and state (RUN / STOP) on the new primary do not correspond.	Match the switch positions.
SD card removed [IP1/2]	S2	2	SD card could not be detected in the controller.	Insert a valid SD card in the controller.
Sec boot cause: CPU fault detected	S1	1	A fatal software error has occurred on the module.	Contact your authorized service engineer.
Secondary failure	S1	2	In the course of synchronous operation, the secondary has failed.	Check that the CPU module is fully functional. Also occurs when there is a fault in the RED link connection.
Secondary fatal error %s	S1	1	A fatal software error has occurred on the secondary CPU module.	Contact your authorized service engineer.
Secondary not found	S1	2	The redundancy partner (secondary) cannot be found, and consequently cannot be loaded.	Check whether there is a secondary CPU, and whether the RED link is connected correctly.
Secondary not reachable after boot	S1	2	After the operating system has been loaded, the secondary cannot be accessed.	Check whether the secondary was unable to terminate the boot-up of its operating system.
Secondary reboot: Coldstart by firmware	S1	1	Due to a problem, a cold start was triggered on the secondary CPU module.	Contact your authorized service engineer.

Message text	Pr	Mr	Cause of message	Remedy
Secondary reboot: Coldstart by operator	S1	1	An operator action (in Freelance Engineering) has caused a cold start on the secondary CPU module.	Normal operation.
Secondary reboot: Coldstart by reset switch	S1	1	A new synchronization has been triggered on the CPU-module by the reset button. Reset button pressed for longer than 5 seconds.	Normal operation.
Secondary reboot: CPU fault"	S1	1	A fatal software error has occurred on the module.	Contact your authorized service engineer.
Secondary reboot: Critical error	S1	1	A critical software error has triggered a new synchronization by the primary CPU-module.	Contact your authorized service engineer.
Secondary reboot: Default config only	S1	1	No boot configuration is present in the process station. The process station has been initialized since it does not contain a boot configuration. The standard (default) configuration has been reverted to.	Contact your authorized service engineer.
Secondary reboot: Fatal error	S1	1	A fatal software error has occurred on the module.	Contact your authorized service engineer.
Secondary reboot: Firmware update	S1	1	An operator action (in Freelance Engineering) has caused a firmware update on the CPU-module.	Normal operation.

Message text	Pr	Mr	Cause of message	Remedy
Secondary reboot: Initialize by operator	S1	1	An operator action (in Freelance Engineering) has caused a cold start on the process station.	Normal operation.
Secondary reboot: Power fail	S1	1	The secondary CPU was synchronized again by the primary CPU after a power failure.	Normal operation, check your power supply if necessary.
Secondary reboot: Recover mode	S1	1	A warm start has been activated on a process station.	Contact your authorized service engineer.
Secondary reboot: Redundancy boot	S1	1	CPU starts after a redundancy toggle.	
Secondary reboot: Warmstart by operator	S1	1	An operator action (in Freelance Engineering) has caused a warm start on the process station.	Normal operation.
Secondary reboot: Warmstart by reset switch	S1	1	A warm start has been triggered on the CPU-moduleby the reset button.	Normal operation.
Secondary reboot: Watchdog	S1	1	The CPU-module watchdog has triggered a new synchronization by the primary CPU-module.	Contact your authorized service engineer.
Secondary with invalid operating system	S1	1	The station cannot accept the ‘sync’ state, because the operating system of the secondary does not correspond to that of the primary.	Load the operating system of the secondary using the Settings tool.

Message text	Pr	Mr	Cause of message	Remedy
Short circuit at C: 'xxxx'	S3	2	A short circuit has been detected for one or more digital channels; all channels are listed if enough space in text.	Check the relevant process signal cable.
Short circuit at I: 'xxxx'	S3	2	A short circuit has been detected for one or more input channels; all channels are listed if enough space in text.	Check the relevant process signal cable.
Short circuit at O: 'xxxx'	S3	2	A short circuit has been detected for one or more ouput channels; all channels are listed if enough space in text.	Check the relevant process signal cable.
Shortcut on channel 'xxxx'	S3	2	The cable connection for the analog input has a short circuit.	Check the relevant process signal cable.
Signal sequence log 'xxxx' stopped	S1	2	Log in emergency halt. An unexpected error occurred while writing log data, e.g. the hard disk is full.	Create more space on the disk in question, or switch the storage of log files etc. to a disk with more space available
Slave deactivated due to protocol error	S2	2	Errors occurred on the communication to the PROFIBUS slave.	Check the related PROFIBUS device or contact slave manufacturer’s service technician.
Slave was parameterized by another Master	S2	2	The PROFIBUS device was configured from another master. A different master has parameterized the slave.	Check the configuration of the other PROFIBUS master.

Message text	Pr	Mr	Cause of message	Remedy
SSL 'xxxx' stopped, all files in use	S1	1	The signal sequence log 'xxxx' has been halted automatically. The maximum volume of data for this log has been reached, and automatic deletion has not been configured.	Delete or export log data and re-start the log. You can also configure automatic deletion.
SSL 'xxxx' was not printed	S1	1	The print job for the signal sequence log could not be carried out. Presumably the printer driver is not installed or the printer queue is full.	Check your system installation, or check that the printer is on-line.
Station Ethernet overload of interface xxx	S1	1	The communication load on interface xxx is too high. The Ethernet controller was temporarily switched off.	Check the configuration and the associated Ethernet devices.
Station fatal error 'xxxx'	S1	1	A fatal error has occurred on the CPU-module, 'xxxx' contains its ID.	Contact your authorized service engineer.
Station FPGA image error xxx	S1	1	An error has occurred in the FPGA of the controller's CPU.	Contact your authorized service engineer.
Station radio clock failed	S1	1	A radio clock linked to the process station has failed.	Check radio clock and/or connection.
Station reboot: Cold start by program	S1	1	The application program has caused a cold start on the process station.	Normal operation.
Station reboot: Coldstart by firmware	S1	1	Due to a problem, a cold start was triggered on the CPU module.	Contact your authorized service engineer.

Message text	Pr	Mr	Cause of message	Remedy
Station reboot: Coldstart by operator	S1	1	An operator action (in Freelance Engineering) has caused a cold start on the process station.	Normal operation.
Station reboot: Coldstart by reset switch	S1	1	A cold start has been triggered on the CPU-MODULE by the reset button. Reset button pressed for more than 5 seconds.	Normal operation.
Station reboot: Cold start/Safety state	S1	1	After reaching the safety state a cold start on the process station has caused.	Check reason for safety state using the boot cause information dialog.
Station reboot: CPU fault	S1	1	A fatal software error has occurred on the CPU-module.	Contact your authorized service engineer.
Station reboot: Default configuration only	S1	1	No boot configuration is present in the process station. The process station has been initialized since it does not contain a boot configuration. The standard (default) configuration has been reverted to.	Contact your authorized service engineer.
Station reboot: Fatal error	S1	1	A fatal software error has occurred on the CPU-module.	Contact your authorized service engineer.
Station reboot: Firmware update	S1	1	An operator action (in Freelance Engineering) has caused a firmware update on the CPU-module.	Normal operation.

Message text	Pr	Mr	Cause of message	Remedy
Station reboot: Initialization by operator	S1	1	An operator action (in Freelance Engineering) has caused an Initialize on the process station.	Normal operation.
Station reboot: Power fail	S1	1	CPU starts after a power fail.	Check your power supply if necessary.
Station reboot: Recover mode	S1	1	A warm start has been activated on a process station.	Contact your authorized service engineer.
Station reboot: Redundancy boot	S1	1	CPU starts after a redundancy toggle.	
Station reboot: Restore from SD card	S1	1	The controller has been initialized with the data from the SD card.	Normal operation
Station reboot: Warmstart by critical error	S1	1	A critical software error has triggered a warm start on the CPU-module.	Contact your authorized service engineer.
Station reboot: Warmstart by operator	S1	1	An operator action (in Freelance Engineering) has caused a warm start on the CPU-module.	Normal operation.
Station reboot: Warmstart by reset switch	S1	1	A warm start has been triggered on the CPU-module by the reset button. Reset button pressed for less than 5 seconds.	Normal operation.
Station reboot: Watchdog	S1	1	The CPU-module watchdog has triggered a boot.	Contact your authorized service engineer.
Station stopped	S1	1	Station resource has been stopped.	Normal operation, start the resource.

Message text	Pr	Mr	Cause of message	Remedy
Station system time not set	S1	2	The system time of the resource has never been set. The message in Freelance Operations is displayed with a time stamp that is calculated with a system time DT#2099-12-31 00:00:000 and the actual time zone. The controller performs a cold start on power fail.	Set the system time in your plant (Freelance Engineering, Commissioning, Options, Set system time).
Station task break point activated	S2	1	A user task in the station has reached a break point.	In commissioning mode, debugger: deactivate or remove the break point. Allow task to continue running.
Station task ready	S2	1	The user task in question is ready to be started.	Normal operation.
Station task stopped	S2	1	The user task in question has been stopped.	Normal operation.
Station warm start down time > 24 days	S1	1	The CPU-module has been re-started, and has performed a warm start following a power failure. Power down time was higher than 24 days.	Normal operation, check power supply if necessary.
Stop archiving	S1	1	An unexpected error occurred while writing archive data, e.g. the hard disk is full.	Create more space on the disk in question, or switch the storage of log files etc. to a disk with more space available.

Message text	Pr	Mr	Cause of message	Remedy
Sys. time set at 'xxxx'	S1	1	The system time in the process or gateway station has been changed by an operator action (in Freelance Engineering), 'xxxx' contains the original time (local).	Normal operation.
System network connection failure [(IP1/2)]	S1	1	The system bus network connection of the is incorrect.	Check the system bus net connection of the process station.
Task not executable: DT overflow	S1	1	The program of the user task in question has caused a DT arithmetic error.	Correct problem in user program.
Task not executable: DT underflow	S1	1	The program of the user task in question has caused a DT arithmetic error.	Correct problem in user program.
Task not executable: Illegal array index	S1	1	An illegal array index has been calculated in the user program.	Check and correct the user program.
Task not executable: INT divide by 0	S1	1	The program of the user task in question has caused an integer arithmetic error.	Correct problem in user program.
Task not executable: INT FB error	S1	1	The program of the user task in question has caused an arithmetic error within a function block.	Contact your authorized service engineer.
Task not executable: INT overflow	S1	1	The program of the user task in question has caused an integer arithmetic error.	Correct problem in user program.
Task not executable: INT overflow (store)	S1	1	The program of the user task in question has caused an integer overflow on saving.	Correct problem in user program.

Message text	Pr	Mr	Cause of message	Remedy
Task not executable: INT underflow	S1	1	The program of the user task in question has caused an integer arithmetic error.	Correct problem in user program.
Task not executable: Invalid debug command	S1	1	If the resource is halted while a task is at a break point, the task switches to state 'not executable'. The error task is not initiated.	The resource must not be halted whilst one of the tasks is at a break point.
Task not executable: Process image read	S1	1	The program of the user task in question has caused an error on reading in the process values.	The configuration has not been loaded correctly, presumably because of an operator error. Either "Load entire station" or "Load changed objects" and load the objects individually.
Task not executable: Process image write	S1	1	The program of the user task in question has caused an error on outputting the process values.	The configuration has not been loaded correctly, presumably because of an operator error. Either "Load entire station" or "Load changed objects" and load the objects individually.
Task not executable Program execution abort	S1	1	The program in the user task concerned has been interrupted. A task is running in an endless loop.	Correct problem in user program.
Task not executable Program execution error	S1	1	The program of the user task in question has caused a program execution error.	Correct problem in user program.
Task not executable: REAL divide by 0	S1	1	The program of the user task in question has caused a real arithmetic error.	Correct problem in user program.

Message text	Pr	Mr	Cause of message	Remedy
Task not executable: REAL FB error	S1	1	The program of the user task in question has caused an arithmetic error within a function block.	Contact your authorized service engineer.
Task not executable: REAL no valid float	S1	1	The program of the user task in question is attempting to process an illegal real value.	Correct problem in user program.
Task not executable: REAL overflow	S1	1	The program of the user task in question has caused a real arithmetic error.	Correct problem in user program.
Task not executable: REAL underflow	S1	1	The program of the user task in question has caused a real arithmetic error.	Correct problem in user program.
Task not executable: UINT divide by 0	S1	1	The program of the user task in question has caused an integer arithmetic error.	Correct problem in user program.
Temp. comp. chan. error at I: 'xxxx'	S3	2	Possibly wrong measured value caused by inadmissible temperature of the compensation channel.	Check the temperature compensation channel.
Time stamp is off in module DDI01	S2	2	The “Time-stamp” mode is switched off in DDI 01.	To record the sequence of events messages, the “Time stamp” function in DDO 01 must be activated.
Underflow C: 'xxxx'	S3	2	The measuring range has been underrun for the listed channels.	Ensure that values remain within the permissible measuring range.
Underflow I: 'xxxx'	S3	2	The measuring range has been underrun for the listed input channels.	Ensure that values remain within the permissible measuring range.

Message text	Pr	Mr	Cause of message	Remedy
Underflow O: 'xxxx'	S3	2	The measuring range has been underrun for the listed output channels.	Ensure that values remain within the permissible measuring range.
Voltage diff. high at I: 'xxxx'	S3	2	Invalid measured value of the channel caused by too high voltage difference.	Check voltage difference; install equalizing conductors if necessary
Wire break of analog input	S3	2	The process signal cable at the analog input is faulty.	Check the process signal cable.
Wire break of channel 'xxxx'	S3	2	The cable connection for the analog input is faulty.	Check the relevant process signal cable.
Wrong module type plugged [IPx]	S2	2	The block type configured is incompatible with the module plugged in. (IPx = IP address of the redundant process station).	Alter the configuration to match the hardware installed.

Appendix A Glossary

Terms and definitions

Access	Parameters from function blocks and preconfigured displays that either authorize or prevent certain sizes, values or actions for the user.
Acknowledge	Operator action whereby one or more messages is/are acknowledged as seen and understood. Every action performed by the logged-in operator can be logged in the signal sequence log.
Acknowledge button	Button in the message line that enables the most recently received messages in the message line (VA, visual acknowledge) or message list (A, acknowledge) to be acknowledged without having to call up the message list.
Acknowledge level	The acknowledge level determines how events or messages on an operator station have to be acknowledged: 1) incoming and outgoing; 2) incoming only; 3) no acknowledgement.
Actual time	The local time with any daylight saving time shift applied is the current time, that is, the time which the user sees on his or her watch. This time is used when setting the freelance time during commissioning is generally the time that is used on the Freelance user interface; for example timestamps of system and process messages are communicated with the system time and converted to actual time for display in Freelance Operations. See also **Local time**, **System time**, **Daylight saving time**.

Alphanumeric display	A dynamic symbol from the graphics editor for displaying analog values on the operator station.
Archive	An archive is the file in which the data from a trend display or log are stored. Depending on how data are logged, large volumes of data can be generated under certain circumstances.
Archive Browser	Freelance software program for a PC to visualize archives of trends and logs. Additionally archives can be exported as text files (csv format).
Authentication key	The authentication key includes data corresponding to your license rights for the Freelance software packages. To work with the Freelance software in the extent you have ordered, you will need your authentication key during installation. The Authentication key can be downloaded from ABB Software Factory (SOFA).
Auto/Automatic	Operating mode in which processing is carried out automatically through the program's control settings. The operator is not allowed to do any input in automatic mode. For operator input you must change to manual operating mode.
Band end	The band end defines the value for the end of the scale on the Y-axis in the single trend curve. See also **Y-scaling**
Band start	The band start defines the value for the start of the scale on the Y-axis in the single trend curve. See also **Y-scaling**
Block	Summary of several similar entries in a list to perform an action on all selected elements, for example acknowledge of messages or export of data sets.
Block acknowledgement	Acknowledgement of several selected entries in the message list or hints list

Block class
A block class includes the functionality and appearance of the block. This information is defined with the interface, the program and the faceplate. With the installation of freelance software numerous standard block classes are provided. For specific process requirements, new block classes can be configured (user-defined function blocks). For the connection of OPC Servers new OPC block classes can be defined (OPC-FB-CLASS).
A class itself cannot be processed in a process station. For execution, first an instance of the class must be created. See also **Block instance**.

Block instance
A block instance is the executable form of a block class. Different instances are identified by their tag names. Each instance works with values specific to that instance (local variables and parameters). See also **Block class**.

Block type
Identical to the type respectively class of a tag instance. As a name of a block type the short name of the type in the block library is used.

Blocked
SFC operating mode in which a transition blocks the advancement of the program run.

Carry out
Operator action performed on an SFC program whereby all active transitions whose transition criteria have been satisfied activate the steps next in sequence.

Colors
The colors that are not set through the Windows interface can be set individually in Freelance Engineering in the project tree and the program editors. The colors for trends in Freelance Operations can also be selected by the operator.

Control Aspect/Control aspect
The Control Aspect is an animated representation of the program, in which a tag or step or transition of an SFC program has been configured in Freelance Engineering, similar to the display of the program in the commissioning program

Control Builder F (CBF)	Software package for engineering station which enables overall configuration of the user program including the operation and observation level. As from Freelance 2016 replaced by Freelance Engineering.
Control Net	All stations in a project, engineering, process, gateway and operator stations, are linked through the Control Net. The Control Net is based on the Ethernet standard with the TCP/IP transfer protocol and can be redundant.
Control room horn	A control room horn can be configured along with the field horn. This is done by entering a wav file (requiring a sound board) in the local event processing. When an event occurs with the configured priority, this wav file is executed.
Criteria window	Used for displaying the transition criteria and commands of an SFC program. Criteria windows can be configured both for steps (actions) and for transitions (conditions).
Data type	Data types are assigned to variables either directly in the program or through a variable declaration in the variable list. Along with the basic data types such as REAL or BOOL, user-defined data types can also be set up (structured variables).
Daylight saving time	In a Freelance system the Local time can be adjusted to daylight-saving-time automatically. For using Daylight saving time in user applications, a function block is available that converts a variable of data type DT (Date&Time) to daylight-saving-time. See also **Actual time**, **Local time**, **System time**.
Default display	The default display is a display with a special significance for the tag, step or transition. On the operator station this display can be called for a tag with the F11 key; in the context menu this display is shown at the first position.
Default value	Value, predefined from the system.

Demo mode — If Freelance software is operated without a hard key, the application will automatically start in demo mode. In demo mode the software is fully functional and will run for 100 days. At the end of this 100-day period the software is no longer functional.

Diagnostics — A number of diagnostic tools are running during operation, and these make it easier to trace a problem in the event of a malfunction. When an error occurs, a system error message results. There are also diagnostic options available through the diagnostics interface.

DigiVis — Software package for the operator station that enables operation and observation of the process with the aid of numerous standard functions. As from Freelance 2016 replaced by Freelance Operations.

Directory — During installation, directories are set up in advance for the storage of specific Freelance data.

Display — Displays are pre-defined standard displays or can be free configured with the graphics editor. Displays are shown in Freelance Operations to visualize and operate the process. See also **Graphic display**; **Overview display**, **Group display**, **Trend display**, **Sequential function chart display**, **Time scheduler display**, **WEB display**, **Logs**.

Display access — Through display access displays can be allocated to each tag as well as each transition and step of a signal function chart. These displays can then be called up quick and easily on the operation station for a selected tag, transition or step.

Display format — The display format determines the format in which a value of a variable or process signal is displayed in the operation interface.

Display object	Display objects can be simple or complex, static or dynamic symbols that can be created using the graphic editor and have parameters defined. A display object contains information for displaying the graphic symbol on the operator station.
Display selection	An operator action that alters the content of the display area of the operation interface.
Disturbance course log	The disturbance course log is one of the state logs. It is used for logging chronological sequences of selected analog and binary variables.
Disturbance course log acquisition	Function block that records in the process station the values of up to 6 variables from a start point onwards and passes these values to the operator station.
Emergency mode	If the hard key cannot be detected during program start up or during normal operation (hard key is missing or defective) the system will enter the emergency mode. In this mode the software is fully operational for 100 days. During this time you have to exchange the defective hard key.
Enable	For a Signal function chart to run, an Enabled state must be detected. The enable command could be issued automatically by the user program or the operator.
Engineering station	PC or laptop with Microsoft Windows operating system and the software Freelance Engineering. Used by the system operator for configuration, commissioning, and documentation.
Event	An event triggers a message or a control action.
Event log	Event logs are used for logging events such as messages, faults, switching actions and/or operator actions. Logging is performed automatically when the appropriate event occurs.

Extension	All Freelance files are saved in the directory specified during installation; the default name is ""Freelance"". The different types of files can be distinguished from one another by their extensions. For example, .pro, .csv, .arc and so on.
Extended User Management	An effective way to manager user account. User can select either Use Local Account or Use Domain Account to login to the Freelance system via Settings tool.
Faceplate	A faceplate is a graphic display or observation and operation of a tag, adjusted to the block class definition A faceplate is part of the block class. Faceplates for the standard modules are provided with the freelance software; for user-defined blocks own faceplates can be created. See also **Block class**.
Fault message	Fault messages have the priority levels 1 to 3. These messages are used, for example, to signal that a limit value has been exceeded.
Fill pattern	Area attribute of a graphic object or symbol which allows the hatching style of the area to be modified.
Firmware update	Update of the controller firmware. The update allows error corrections and providing of new features.
Flash	Flashing refers to the cyclical pulsing of display objects.
Font type	Text attribute in the graphics editor.
Force	SFC operating mode whereby a transition forces an advancement when the program activates the transition but the transition criterion is not yet satisfied..
Freelance Engineering	Software package for the engineering station which enables overall configuration of the user program including the operation and observation level
Freelance Operations	Software package for the operator station that enables operation and observation of the process with the aid of numerous standard functions.

Freelance system	The sum of all the Freelance components: Freelance Engineering, Freelance Operations, add-on packages, hardware components. * Process station, engineering station, operator station.
Function key	The function keys (F1 - F12) form a standard part of the keyboard, and some of them have standard functions assigned to them.
Graphic display	Additional to the standard displays and logs, free graphic displays can be configured with the graphics editor in Freelance Engineering to observe and operate the process on an operator station. Different static and dynamic graphic objects can be used to create graphical views of the plant, functions and processes.
Graphic object	Elements of the graphics editor to create free graphic displays to visualize and operate the processes in the plant. Examples of static objects are line, rectangle, circle; dynamic objects are bargraph, alphanumeric display, trend window etc.
Group display	A group display is a combination of several faceplates. It provides the user with the opportunity to display related tags in the same display. After a displayed faceplate has been selected, the corresponding tag can then be operated.
Hard disk requirement	The amount of hard disk space needed for a trend archive or a log file is calculated, during the configuration. If it is established during loading the project to the operator station that the free storage capacity on the hard disk is not sufficient, an appropriate message is issued.
Hard disk space	During installation, the Freelance software provides you with information of the disk space. Additional space you need to work with the software. The size of this requirement depends on the scope and contents of your user program, such as the number and scope of trends and archives. Details can be found in the Getting Started manual.

Hard key	Running Freelance software requires a hard key (USB port) and an authentication key. These enable the licensed version of the program to be used along with the licensed options.
Help	The Freelance help system enables operators to quickly call up relevant information onto the screen while they are working with the software.
Hint	The option is provided to configure a hint for the operator for every message of type Fault Message or Switch Message. These hints should be configured to inform the operator of the cause of the message, options for remedying the process anomaly and, where necessary, further operating hints. All hints are saved in the hint list.
Hint field	Display field in the message line showing whether or not there are any available hints relating to a message or event. Through this hint field one reaches a hint list showing any unacknowledged hints.
Hint list	The hint list contains a list of all hints that have arisen and not yet been acknowledged.
Hint message	Hint messages have the level 5. They appear only in the hint list and are purely for the operator's information.
Horn	A field horn or control room horn can be controlled by an event. A horn function is also provided that allows you to attach any control signals you wish to a horn.
Host name	A name identifying the computer. The host name must be unique within the network.
Icon	Windows terminology. Symbol for a program or a link.
Initial step	Every SFC (Sequential Function Chart) program starts with an initial step. A reset command always returns to the initial step.

Interface The term interface refers to the point where two systems meet. The different features of the two systems are made compatible with one another through the interface (e.g. Modbus interface).

Interpolation The trend display and the representation therein between two captured values can appear in three varying forms: with no interpolation (whereby only the data point is shown), as a line connecting two points, or as a staircase.

Limit value Limit values form the basis for generating events. Limit values are thus declared in the operation interface and/or in a log, e.g. when a particular value is exceeded. Particular events are specified depending on the type of limit value. The message is generated with, amongst other attributes, a specific priority and a message text.

Limit value type The limit value type determines the event triggered by the message (HH, LL_XD, DHm...).

Line break Monitoring of an input signal for voltage or current interruption. In general, cable break detection triggers a system message.

Load During the commissioning mode programs or sections of programs that have passed the plausibility check without revealing any errors can be loaded into the according process, gateway or operator station. Therefore the elements or levels are selected in the project tree and the load procedure is started from the menu.

Local time The local time is the system time with the time zone taken into account, but not the daylight saving time. In the process stations the local time is available in the system variable <name>.DateTime.
See also **Actual time**, **System time**, **Daylight saving time**.

Log	Logs are used for documenting events, states and sequences from the process. The data they capture can be saved on the hard disk in the operator station, printed out on the printer or displayed on the monitor.
Log type	Three different types of logs are provided: Signal sequence log (SSL), Operation log (OP), Disturbance course log (DCL), Excel reports (REPORT).
Long text	A text entry up to 30 characters in length for providing a brief description of a function block or preconfigured display.
Manual	Operating mode in which the tag can be operated from the operator station.
Measuring range	The measuring range defines the valid range for a value; measured values within the measuring range have a defined accuracy; at controller blocks the measuring range is used for internal normalization of the control algorithm. Within the faceplates the process values of the controller function blocks are shown with their measuring range. See also **Scale range**.
Measuring range end	The measuring range end is the physical value assigned to the transmitter's end point (e.g. 20 mA = 1000 l/h).
Measuring range start	The measuring range start is the physical value assigned to the transmitter's 0-point (e.g. 0/4 mA = 200 l/h).
Menu line	A screen region in the operation interface. The menu line remains visible at all times. Because of this, actions linked in the background with the menu can be performed in any operating situation.
Message	Process states and events can be configured as messages. When that event occurs a message is then sent to the operator station. Such messages are configured through the function blocks.
Message color	Colors for message display.

Message line The message line is part of the operation interface and is shown above every display on the operator station. The message line allows the operator to view any time the most recently received messages without calling-up the message list.
The kind of the representation of the messages in the message line (list, tags, areas) can be firmly configured or be changed by the operator on the operator station."

Message list In the message list the messages sent from the process stations to the operator station are displayed and managed. These messages may relate either to the Freelance system or to the automated process.
In the message list a message can be selected and/or acknowledged, and the display assigned to a message can also be called up. In this way one can quickly obtain detailed information relating to the selected message.

Message priority Messages are distinguished by different priority levels; priority S1, S2 and S3 are reserved for system messages, 1 to 3 for fault messages, 4 for switch messages and 5 for hint messages.

Message text Additional output text of a message in the message box and in the message list.

Message types In Freelance messages are subdivided into the following message types based on their significance for the process: system errors, fault messages, switch messages, hints and hint messages.

Monitoring time Parameter of an SFC (Signal Function Chart) program. The length of time after which the transitions/advancing criteria that follow a step but have not been satisfied will be reported.

Multi Monitor Enables the operation of up to four monitors on a Freelance Operations workstation. The displays to be displayed on the monitors can be selected.

Network board	Plug-in Ethernet card for a PC through which connection to the Control Net is affected.
Normal	Operating mode in the Sequential Function Chart in which a transition or step is processed normally. This means that the transition is neither blocked nor forced and steps are not switched permanently on or off.
Offset mode	This operating mode is used to determine which offset value is being used in the time scheduler.
Offset value	Value added to the time scheduler's set point.
Operate and observe (man machine interface)	A general term describing the process-control approach in an industrial process.
Operating mode	Status (on, off, manual, automatic) of the tags in the process station, respectively enabling particular operator actions or commands from the user program.
Operating system	Basic software in a resource. In the process stations the operating system (firmware) enables the communication with other process stations and enables the calculation of the user programs. Further functions of the operating system are program management, test routines etc.
Operation log	Cyclical, manual or event-related logging of up to 200 variables within a configurable text.
Operator	The person who holds responsibility at any given point in time for controlling process events through the control system.
Operator action	An operator action is an action on the part of the operator through which a process state or process value is changed from the operator station.
Operator interface	The operator interface is the sum of all the display objects and operating objects at the operator station.

Operator station	An operator station is based on a PC with a Windows operating system and the software Freelance Operations. Used for observation and operation and alarm messages, trends, archives and logs.
Options	Operating mode in SFC programs whereby the progression through the following steps is controlled through actions on the part of the operator.
Overview display	Preconfigured display for favorites of displays and/or logs.
Parameter	Parameters are configurable attributes effecting the processing and display of function blocks, displays and logs.
Permanent	Scheduler operating mode whereby all sections of the set curve are run through systematically.
Permanent off	SFC operating mode whereby a step is switched off permanently. Activating it has no effect.
Permanent on	SFC operating mode whereby a step is switched on permanently. The step is not necessarily active but will nonetheless be kept in the processing sequence.
Primary	The currently-active CPU module or the active controller of a redundant process station is named as the primary. See also **Seconday**.
Print job	The output of documentation is always controlled by a so-called print job, i.e. there must always be a job selected before printing. The content of the print task is defined in this job.
Printer	Printers can be connected to the operator and to the engineering station. Different printer types can be used depending on the requirements; for example color printer for hardcopies, line printer for message logs.

Priority levels	Messages received from the process stations may have differing levels of importance in terms of effect on the smooth operation of the process. The Freelance system provides six different priority levels for messages. S1, S2, S3 = System messages, 1 to 3 = Fault messages, 4 = Switch messages and 5 = Hint messages.
Process message	"Process messages inform the user about disturbances and specific status changes in the Freelance system. A distinction is made between system messages, fault messages, switch messages, hints and hint messages. The message types are further subdivided according to their importance for the process and according to the priority levels.
Process station	The process station contains the CPU module, which performs the processing of the configured programs.
Project	The configuration of a system is created and stored with the software and hardware parts in a project.
Redundancy connection	The physical connection of the two redundant partner that is used for the synchronization of the redundant data.
Redundancy link	Via the redundancy link, the synchronization of the redundancy partner, Primary and Secondary, is carried out.
Redundancy toggle	A redundancy toggle takes place when on the active controller (Primary) detected a problem or the toggle has been actively triggered, for example, by an operator action on Prim/Sec-switch of the controller. The previous Secondary is the new Primary and takes over the further execution of the programs. A redundancy toggle is bumpless, all states of the user programs remain unchanged.
Redundant process station	A process station that is constructed and configured redundantly. A redundant process station can be built only with dedicated controller types.

Refresh cycle	General term for the update time of data; for I/O signals of the refresh cycle describes the data exchange rate between the I/O module and the CPU, for fieldbus communication the data exchange rate between two devices.
Repeat time	The time at which an SFC program is restarted.
Report printer	The report printer is the printer connected to the operating station. A maximum of two printers can be connected to one operator station.
Reset	Control action on a function block or SFC program to reset the counter in an internal register or reset the SFC program to its initial step. Resetting of a process station via the reset button of the controllers triggers a warm- or cold start of the process station.
Restart time	The restart time is the point in time at which the SFC is to be started. Unlike repeat time, restart time represents a single point in time for starting the SFC.
Ring memory	Fixed-size memory area which is overwritten after a specified length of time.
Scale end	Defines the scale end for values of a tag.
Scale range	With the scale range the conversion of a process value is determined to a different value range. Signals of different sources must be scaled to a common area in order to compare them with each other. Within the faceplates the process values of the according function blocks are shown with their scale range. See also **Measuring range**.
Scale start	Defines the scale start for values of a tag.
Secondary	The currently-passive CPU module or the passive controller of a redundant process station is named as the secondary. See also **Primary**.

Security Lock	Part of the User Management. It enables access right settings for specific user groups on the operator stations and also for configuration and commissioning on the engineering station to be configured.
Selection	Operating technique from the operation interface. Selection is used to activate displays or to select tags for operation.
Sequential function chart display	Standard display that allows a program sequence set up using the Sequential Function Chart to be operated on a Freelance operator station.
Short term archive	When a trend display is selected, the short-term archive for the individual signals is displayed first. The short-term archive holds 200 values, i.e. max. 6 x 200 values per trend display. For older values the system will then automatically return to access the archive file.
Short text	A text entry up to 12 characters in length as a brief description of a function block or preconfigured display.
Signal sequence log	Configurable logging of system errors, fault messages, switch messages, operator hints and operator actions.
Signal sequence log 1	Logging of system errors, fault messages, switch messages, operator hints and operator actions with continuous printing.
Signal sequence log N	Logging of system errors, fault messages, switch messages, operator hints and operator actions, recording these in a log file.
Standard display	Along with the free graphic displays created with the graphics editor there are also several standard displays available; to display these in Freelance Operations you only need to configure a tag and a few parameters. The standard displays in Freelance are the system display, the overview display, group displays, trend displays, SFC displays, time scheduler display, WEB display and logs. Additionally for each tag a faceplate is available without any configuration.

Standard value	Same as default value.
Start time	The start time is the time at which the SFC program is to be/was started for the first time.
State	See **Operating mode**.
State log	The function of state logs is to record process states cyclically. This includes the cyclical logging of the state of a tag or the logging of sequences in the process.
Step	An element of the SFC controlling actions in conjunction with a transition. In Freelance a string of FBD and/or IL programs continues to be processed until the next transition is satisfied.
Step list	List of all the steps in an SFC program.
Step name	Free-form text with up to 8 characters; displayed and documented in the graphic object of a step in an SFC program).
Subnet mask	Masking in the main network for a possible lower-level network.
Substitute value	Configurable fixed default value which is, in case of overrun or underrun of a process signal, used for further calculation instead of the real value.
Switch message	Switch messages have the priority level 4. Messages of this type are used to report switch events, e.g. "Valve open" or "Valve closed".
System message	System messages have the highest priority level and are subdivided into three message groups S1 to S3. These messages cannot be configured or changed by the user. System messages are used to indicate fault states of the system (hardware) itself.

System time	Current time on the stations, used for internal transfer of time stamps. For time synchronization of the stations of a project, the system time is used. System time is equal to Greenwich Mean Time GMT (UTC). See also **Actual time**, **Local time**, **Daylight saving time**.
Tag	A tag is an instance of a preconfigured function block. A tag name must be assigned to each configured function block. All the tags in a project are listed in the tag list.
Tag type	Brief description of the function block in the function library. See also **Block class**.
Taskbar	Windows taskbar that is used to call the Windows start menu.
Time scheduler	With a time scheduler, analog values defined as time-dependent are output; these values can be transferred to other functions, e.g. to a controller as a setpoint input.
Time scheduler display	The time scheduler display displays the time scheduler's state and enables it to be controlled by the operator. This display consists of a trend region for tracking set points and process values, a state field and the associated faceplate.
Time synchronization	All Freelance stations are equipped with a real-time clock. When the system is running, the clock times must correspond throughout the system, so that for example entries can be made in logs and trends in the correct time sequence. For this purpose, the system time on all stations via the Ethernet bus is synchronized. For the PCs in the Freelance system time synchronization can be enabled or disabled individually. If the time synchronization for a Freelance Operations station is disabled, trends cannot be displayed correctly.

Transition	An element of the Sequential Function Chart that activates the following step (alternative situation) or steps (parallel situation). Within a transition in Freelance, an FBD or IL program will continue to be processed until the transition criterion is satisfied.
Transition criteria	Condition that must be satisfied in order for a step to activate subsequent steps. See also **Transition**.
Trend	The function of a trend is to provide a graphic representation of values using a time axis. In Freelance this is done by capturing values in the process station and transferring them to the operator station in blocks; alternatively directly in the operator station variables can be collected and visualized as trends.
Trend data acquisition	Function block that captures the signal values of the linked variables and transfers them in blocks to the operator station.
Trend display	The trend display is used to display values graphically using a time axis. A maximum of 6 trends can be shown in one trend display.
Trend server	The Trend server is used for the acquisition of variables. The Trend server makes these variables available for the trend displays in the operator stations.
User Management	The entry for user account management. It includes Security Lock and Extended User Management.
Value	Numeric value of a variable that must be entered in a specific format depending on data type.
Value region	General term for the allowed values of a variable. In the description of graphical user interfaces also part of a representation or display where values are shown, for example the trend display of Freelance Operations.

Visual acknowledgement	Only the messages in the message line are acknowledged. The message itself remains in the message list and must also be acknowledged there.
Waiting time	The waiting time TWA is the minimum duration of time the SFC program will remain in a step.
WEB display	After calling a WEB display on the operator station, the local WEB browser is launched and the configured WEB site is activated.
Y scaling	With the Y-scaling the range of a variable is specified that is displayed in a trend display. The limits of this range - the band start and band end - are configurable and can be modified by the user on an operator station. See also **Band start**, **Band end**.

Index

www.abb.com /freelance
www.abb.com/controlsystems

3BDD011932-111 A