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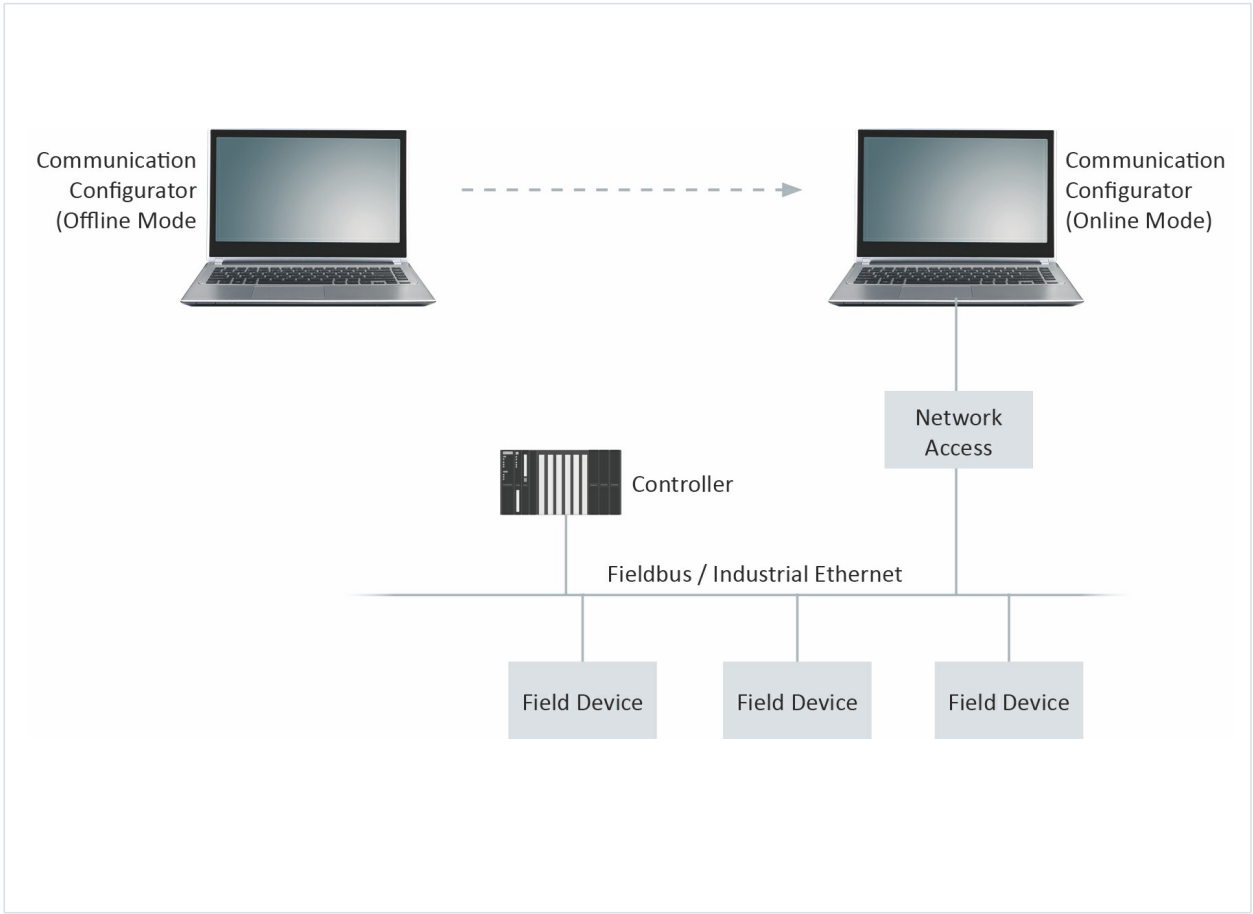
**User Guide**

# Communication Configuration Tool

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# 1 Introduction

## 1.1 About the Communication Configuration Tool

The Communication Configuration Tool is a universal Configuration Software for Industrial Ethernet and Fieldbus Networks. It allows for easy configuration and commissioning of PROFINET and FOUNDATION Fieldbus networks and is designed for working with Softing products such as Softing Industrial Automation's PROFINET Controller stack or Softing FOUNDATION Fieldbus stacks.

Several functionalities are implemented bus-specifically. You can or read that in the heading indicating the respective bus system or you find bus-specific links in the related content marked with the corresponding bus system logo:
for FOUNDATION fieldbus and for PROFINET.

## 1.2 Scope of delivery

The Communication Configuration Tool comprises the following components:

| Component | Description | Installation directory |
|---|---|---|
| Ethernet driver "Softing Industrial Ethernet Driver" | Provides direct access to the connected Ethernet.<br>The driver can support multiple Ethernet cards.<br>The node name after installation is NodeX. X takes values from 0 up. The actual value depends on the number of Ethernet cards installed in the computer. | *<System32>\drivers* |
| PROFINET Stack | This library provides access to PROFINET functionality via an interface. If the stack is only used as part of the Communication Configuration Tool, no explicit license is required. | *<Program Files>\Common Files \Softing\PROFINET\Stack\V1.76* |
| PROFINET CIT | This library provides functions for network access, for the management of GSD files, for the generation of binary project information, and for downloading this information to the PROFINET Controller. | *<Program Files>\Common Files \Softing\PNIO-CIT* |
| FF CIT | This library provides functions for network access, for the management of device description files, for the generation of binary project information, and for downloading this information to the FF H1 network via a Softing FF and Softing mobiLink. | *<Program Files>\Common Files \Softing\FF-CIT* |
| Configurator | The files contained in this folder provide the user interface for the Communication Configuration Tool. | *<Program Files>\Softing\Conf\bin* |

## 1.3 Components required for FF H1 devices

The following components are required to connect to a FOUNDATION fieldbus H1 device:

- Softing FFusb Interface (order number DUL-KK-020302). This device contains the interface, the drivers required and the USB cable to connect to a PC.

- Softing mobiLink (order number DBA-KM-020410). This device contains the interface, the drivers required and the USB cable to connect to a PC.

- Power hub. We recommend ordering the Softing Fieldbus Lab kit (order number APL-KL-020601). It includes a Relcom F11 labkit, cables, connectors and a power supply.

**Note**

Make sure the corresponding USB driver for the FFusb has been installed correctly from the Setup CD-ROM.


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## 1.4 Product history

| Product version | Modifications compared to previous version |
|---|---|
| Initial version | none |
| 1.11 | ▪ Support of DAPs in slots other than 0<br>▪ Support of device-specific realtime classes<br>▪ Support of Assembly ID conformance" |
| 2.00 | Supports the configuration of FOUNDATION™ fieldbus H1 via Softing FFusb |
| 2.10 | ▪ New templates functionality for FOUNDATION Fieldbus Templates view (FOUNDATION fieldbus only)[70]<br>▪ New tab Software Download in Online Maintenance view (FOUNDATION fieldbus)[36] for firmware update of FOUNDATION fieldbus devices.<br>▪ Enhanced Trace settings for FOUNDATION Fieldbus in Common Settings[113].<br>▪ New FF Settings[114] tab in Common settings to load and update FOUNDATION Fieldbus dictionaries. |
| 2.20 | ▪ FF-HSE functionality implemented<br>▪ Support operating system Windows 10 |
| 2.21 | • Modbus Mapping adapted to needs of FG200<br>• Project Export to PDF |
| 2.22 | • Support of epGatePN Controller<br>• Support for GSDML files up to version 2.34<br>• Adaption of station name of physical controller via download |
| 2.23 | ▪ Support of configuration of FOUNDATION™ fieldbus H1 via Softing mobiLink |

## 1.5 Licensing

Apart from the license agreement accepted on installation no separate licensing is required for the Communication Configuration Tool for

- PROFINET.
- accessing FOUNDATION fieldbus H1 via FF-USB, FG-110 or FG-200.

Accessing FOUNDATION fieldbus H1 via mobiLink needs seperate licensing described within the mobiLink documentation.

The required functionality of the PROFINET Controller Stack is licensed through the Communication Configuration Tool.

For open source licensing refer to http://opensource.softing.com/IA/ComConf/V1.

## 1.6 Supported operating systems

This version of the Communication Configuration Tool supports the following operating systems:

| Operating System | Product version | Bit system |
|---|---|---|
| Windows 7 | Professional | 32 and 64 |
| | Enterprise | 32 and 64 |
| | Ultimate | 32 and 64 |
| Windows 8 | Pro | 32 and 64 |
| | Enterprise | 32 and 64 |
| Windows 10 | Pro | 32 and 64 |
| | Enterprise | 32 and 64 |

## 1.7 Configuring the firewall

Please make sure that the Communication Configuration Tool is not blocked by the firewall.

The first time the application demands access to the network a windows security alert will be prompted. Please select the networks you want to allow for Communication Configuration Tool and click on **Allow access** to add a rule to allow it through Windows Firewall.

## 1.8 Reference to trademarks

- FOUNDATION Fieldbus is a registered trademark of the FieldComm Group (see https://www.fieldcommgroup.org/)
- PROFINET is a trademark of PROFIBUS Nutzerorganisation e.V. (http://www.profibus.com/)

## 1.9 Document history

| Document version | Modifications compared to previous version |
|---|---|
| Initial version | none |
| 1.11 | New product release 1.11 |
| 2.00 | New product release 2.00 allowing configuration of FOUNDATION fieldbus H1 devices, see also Product history 9. |
| 2.10 | New product release 2.10 allowing to use templates for FOUNDATION fieldbus, see also Product history 9. |
| 2.20 | New product release 2.20 supporting FF-HSE functionality and Windows 10 support, see also Product history 9. |
| 2.21 | Minor changes including update of Chapters 6.12 133 and 6.13 135. |
| 2.22 | New product release 2.22 supporting new controller epGatePN, see also Product history 9. |
| 2.23 | The following text and screenshots have updated or added:<br>▪ Components required for FF H1 devices 8<br>▪ Network Access Profiles 98<br>▪ Segment Management functionality 97<br>▪ New Project window 110 |


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## 1.10 About this document

**Read this document before starting**

For damages due to improper connection, implementation or operation Softing refuses any liability according to our existing guarantee obligations.

This document describes in detail how to use the Communication Configuration Tool.

It starts with an Introduction to PROFINET 12. This chapter also explains how the different PROFINET concepts are represented in the Communication Configuration Tool. This chapter is followed by an Introduction to FOUNDATION fieldbus 17.

The next two chapters provide a description of the Graphical user interface 20 and an overview of the Menu items 116. The Tutorials 120 chapter explains how to perform various tasks using the available functions and features. We recommend reading this chapter before using the Communication Configuration Tool.

At the end of the document, a list of Frequently asked questions 136 is provided.

## 1.11 Conventions used

The following conventions are used throughout Softing customer documentation:

| | |
|---|---|
| Keys, buttons, menu items, commands and other elements involving user interaction are set in bold font and menu sequences are separated by an arrow | Open **Start → Control Panel → Programs** |
| Buttons from the user interface are enclosed in brackets and set to bold typeface | Press **[Start]** to start the application |
| Coding samples, file extracts and screen output is set in Courier font type | `MaxDlsapAddressSupported=23` |
| File names and directories are written in italic | Device description files are located in *C:\<product name>\delivery\software\Device Description files* |

**CAUTION**

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**Note**

This symbol is used to call attention to notable information that should be followed during installation, use, or servicing of this device.

**Hint**

This symbol is used when providing you with helpful user hints.

# 2 Introduction to PROFINET

## 2.1 Organization and specifications

The different aspects of a PROFINET system (communication protocol, device description, profiles, installation guidelines, etc.) are defined in different specifications. PROFINET specifications are created by the respective workgroups established by PROFINET International (PI). PI members can download the specifications from the website www.profinet.com. PI has about 1,400 members worldwide. The majority of specifications have been submitted to the applicable international standardization bodies. The table below shows the PROFINET specifications status of March 2012.

| Specification | International Standard | Topic |
|---|---|---|
| PN IO V 2.3 | IEC 61158, Ed. 4 | Digital data communications for measurement and control - Fieldbus for use in industrial control systems |
| RT/IRT | IEC 61784-2 | Digital data communications for measurement and control. Profile sets – Part 2 |
| PN CBA V 2.2 | IEC 61158, Ed. 4 | Digital data communications for measurement and control - Fieldbus for use in industrial control systems |
| GSDML V 2.34 | ISO 15745 | Industrial automation systems and integration -- Open systems application integration framework |
| PN Security | IEC 62443 | Security Aspects of Distributed Industrial Computer Systems |
| | IEC 61784-4 | Digital data communications for measurement and control. Profile sets – Part 4 |
| PROFIsafe V2.5, PROFIdrive V4.1 | IEC 61784-3 | Digital data communications for measurement and control. Profile sets – Part 3 |
| PROFINET Cabling and Inter-connection | IEC 61918 | Digital data communications for measurement and control – Profiles covering installation practice for fieldbus communications media within and between the Automation Islands |
| | IEC 61784-5 | Digital data communications for measurement and control. Profile sets – Part 5 |

## 2.2 System model

The use of PROFINET requires 100 MBit/s full duplex, switched Ethernet. The switch functionality can be implemented as part of an external device (switch) or as part of the automation device. The use of these two implementation types allows the support of different topologies, including star, line, tree and ring topologies. A ring topology is a line topology that has been closed to form a ring in order to support media redundancy.

The PROFINET specification distinguishes three different device classes: controller, device and supervisor. A number of (1 … n) controllers exchanges data cyclically and acyclically with a number of devices (1 … m). A supervisor can be integrated in the system in addition to the controller. For example, a supervisor can be used for commissioning (as part of an engineering tool) or for the parameterization of devices.


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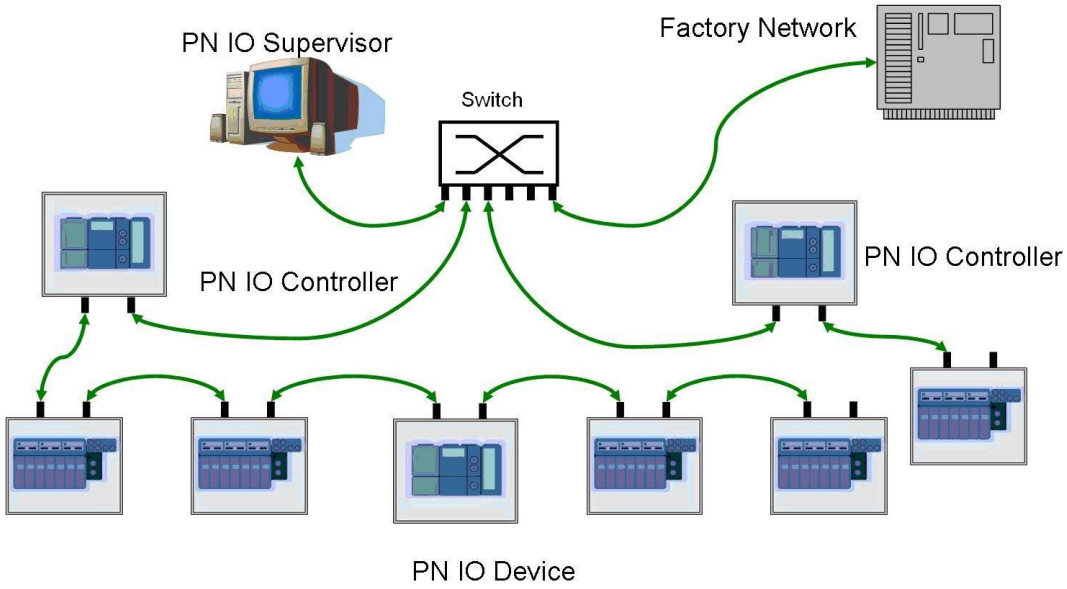
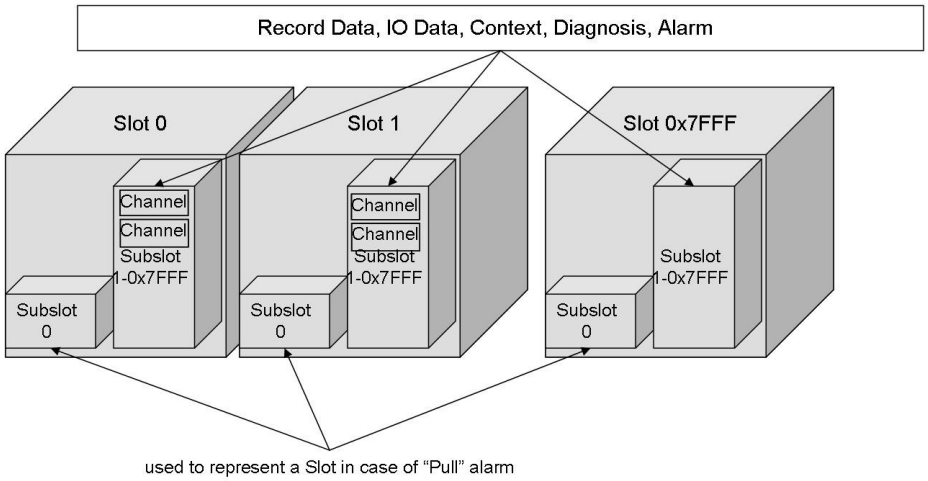



## 2.3 Device model

PROFINET devices are based on a modular device model, in which modules can be plugged into slots. If a device has only virtual modules and virtual slots that cannot be plugged by the user, this device is referred to as a compact device.

In addition to the modules that establish a connection to inputs and outputs, there is another, special module type: the Device Access Point (DAP). The DAP is used for modeling the communication interface of the device. A device family can include more than one DAP. This allows the description of different interfaces (copper, fiber optic, 1 port, 2 ports, etc.) of the device family.

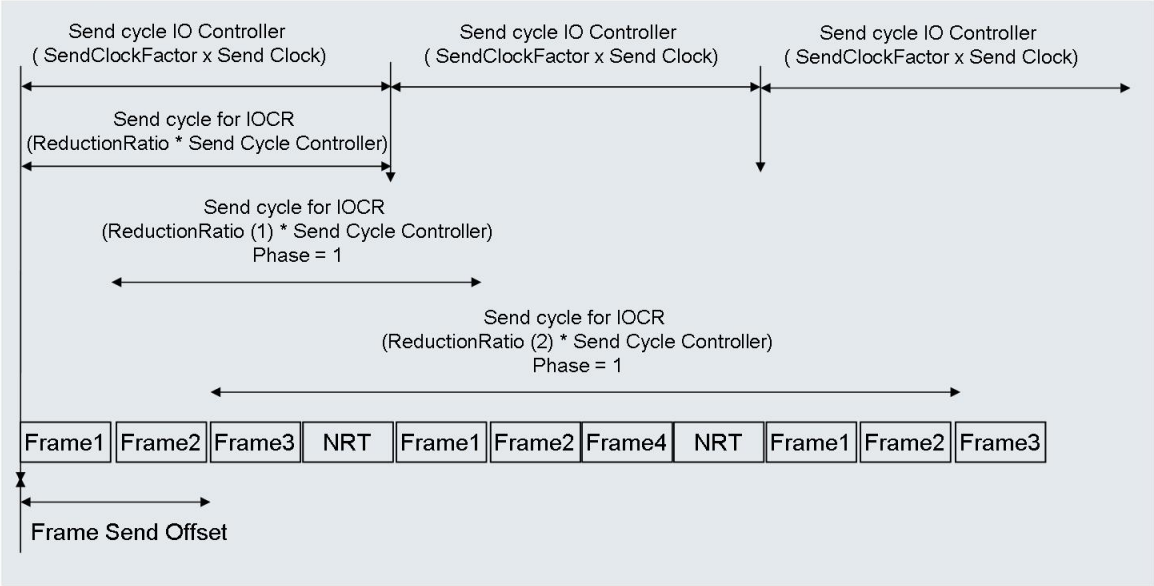
Slots/modules are further subdivided into subslots/submodules. This is currently always a virtual subdivision. There are no devices in the market today that have pluggable submodules. The submodule 0 plays a special role. It represents the slot/module in the respective alarm messages. The submodule 0 cannot contain any IO data, records or diagnostic information. All other submodules provide access to IO data, records or diagnostic information.



## 2.4 I/O data exchange

IO data is exchanged cyclically in PROFINET. Different cycles are possible within a PROFINET system. The transmission cycle of the controller is used as the calculation basis for the entire scheduling. The transmission cycle is a property of the controller and describes the controller's performance. Every controller must support a transmission cycle of 1 ms. Other cycles, which may be shorter or longer, can be additionally supported. The ReductionRatio value is used to define the specific cycles for the exchange of inputs and outputs. All parameters for the scheduling of IO data are specified during commissioning and transmitted to the controller, which distributes these parameters to the devices at the beginning of the data exchange.

- Time basis SendClock = 31,25 µs
- Time basis FrameSendOffset = 1 ns




## 2.5 Acyclic data exchange

Alarms are exchanged acyclically. They can be transmitted and acknowledged by controllers as well as by devices. Read and write access to records is also executed acyclically. A special PROFINET protocol above UDP/IP is used for this purpose.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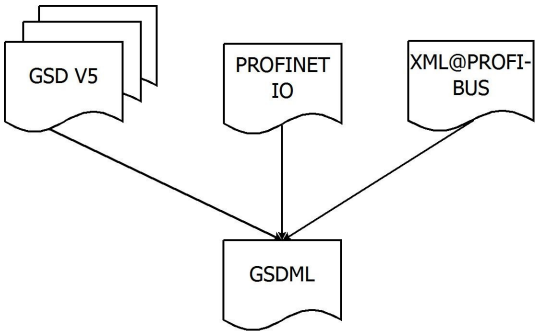
## 2.6 Device description

GSDML is used for describing the properties of a PROFINET device.

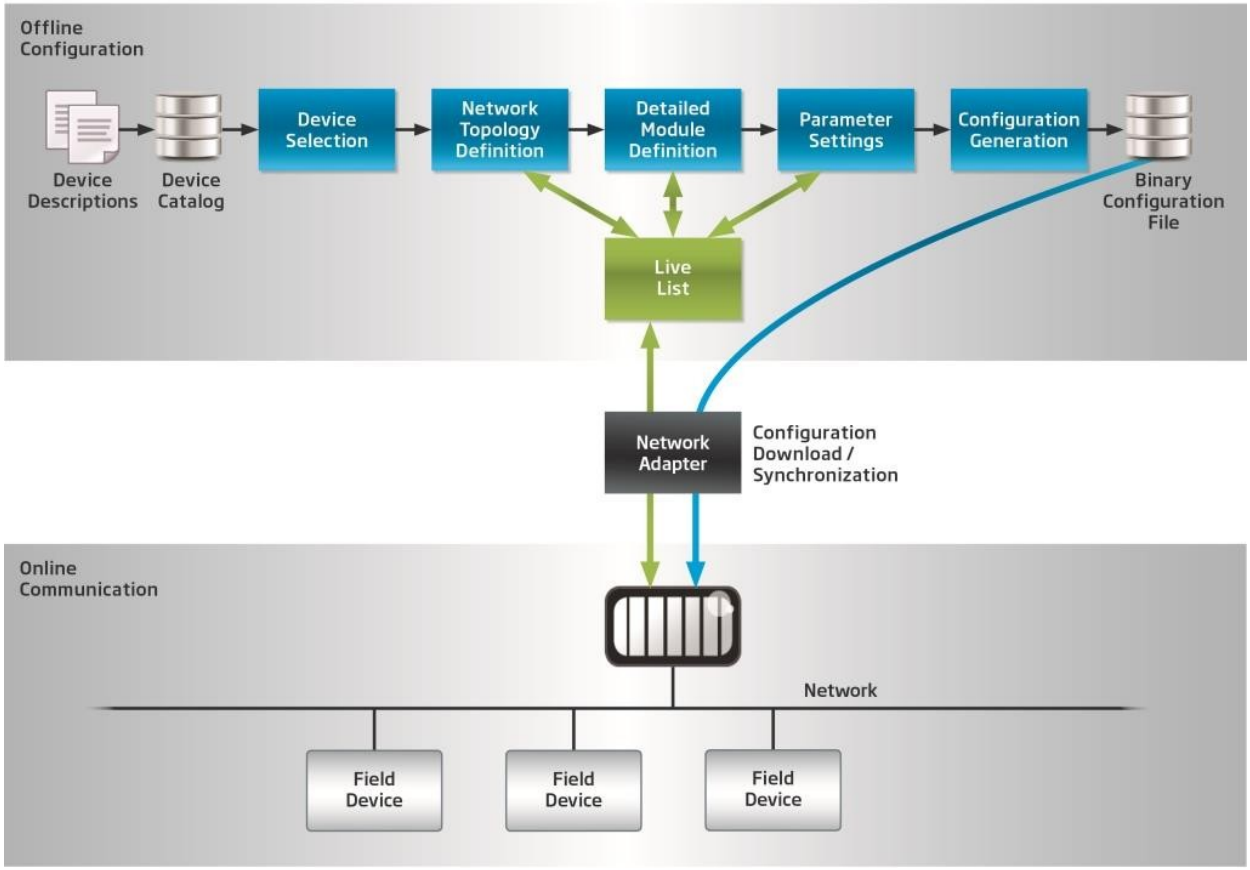
GSDML stands for Generic Device Description Markup Language and is based on XML. GSDML is the result of many years of experience with the description of device properties in the PROFIBUS environment. But GSDML also describes extensions that have been introduced with PROFINET (subslots, different communication interfaces, etc.). XML is used by other PI workgroups as well. A style guide has been created to prevent inconsistencies. The GSDML specification is based on all three sources.




A useful tool for viewing and checking GSDML files is the PROFINET XML Viewer, which PI members can download from the PI website.

## 2.7 PROFINET mapping in the Communication Configuration Tool

The Communication Configuration Tool runs on PCs with Windows 7 operating system. The Communication Configuration Tool can be used in offline or online mode.




In the Communication Configuration Tool, the devices that are part of the communication application, as well as their properties can be defined. On completion of the configuration, a binary result file is created. The PROFINET controller uses the binary file to exchange data with the PROFINET devices according to the definitions made.

It is also possible to perform the entire configuration process in offline mode.

However, at least for the assignment of device names, the Communication Configuration Tool has to communicate with the device, and thus has to be online. The online mode also allows scanning for existing devices and transferring the configuration to the remote controller.

Device descriptions (GSDML files) can be imported into a type catalog. Imported descriptions can also be deleted from the catalog. The device types from the type catalog are inserted in a topology view and instantiated in the process. Logical connections can be created between the devices in the topology view.

If the Communication Configuration Tool is used in online mode, it offers the possibility to create a live list of the detected devices. The live list can then be matched to the topology view.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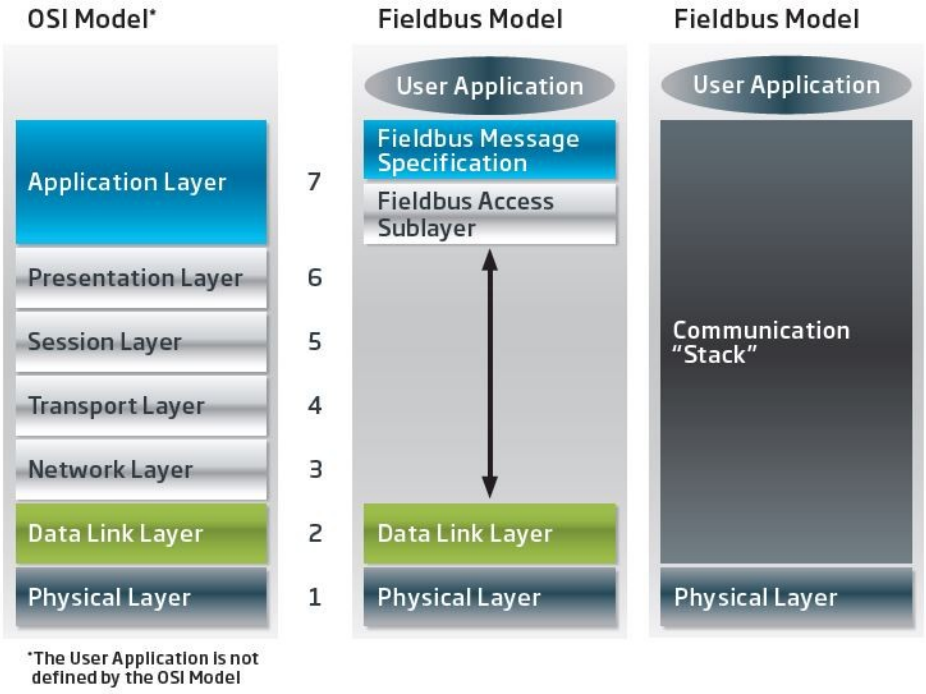
# 3 Introduction to FOUNDATION fieldbus

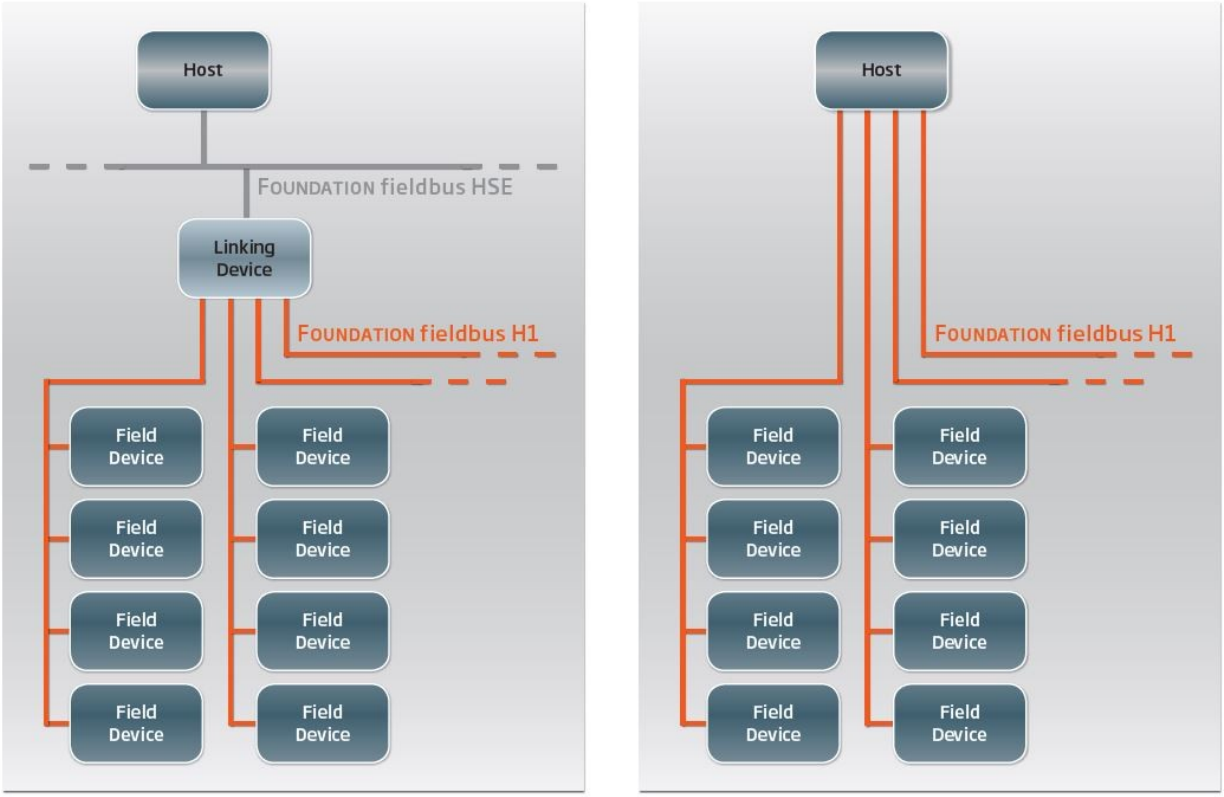
Once the first fieldbus standards had become available, it soon turned out that these specifications did not cover the specific requirements to be met by a fieldbus used in process automation. Thus in 1992, this situation led to the start of two independent initiatives for defining a fieldbus standard for use in hazardous environments, one being the Interoperable System Project (ISP) while the other, the WorldFIP project, was the result of a merger of the French and North American Flux Information Processus (FIP, earlier also known as Factory Instrumentation Protocol) organizations. When major end-users like Chevron or Exxon demanded not two but just one solution, the two initiatives merged in 1994 to form the Fieldbus Foundation. Using the results of both organizations, the Fieldbus Foundation developed the FOUNDATION fieldbus standard. In 1995 an initial implementation of this standard was started.

The FOUNDATION fieldbus standard defines an all-digital, serial, two-way communications system between hosts and remote I/O field devices (sensors and actuators). It implements the OSI layers 1 (Physical Layer), 2 (Data Link Layer) and 7 (Application Layer).

Following a comparison of OSI Layer Model and FOUNDATION fieldbus H1 Layer Model. The FF H1 model comprises the Physical Layer, the Data Link Layer, the Fieldbus Access Sublayer and the Fieldbus Message Specification. The latter three are implemented within the communication stack. The individual FF H1 layers refer to the Physical Layer, the Data Link Layer and the Application Layer of the OSI Model. (Source: Fieldbus Foundation)



FOUNDATION fieldbus is available in two implementations, addressing different needs within the process automation environment. The FOUNDATION fieldbus H1 protocol today is generally used for the connection to field devices. It runs at a data transfer rate of 31.25Kbit/s and performs the data transfer based on Manchester Coded Bus Powered (MBP) which is capable of supplying power to the individual field devices via the twisted-pair bus wire. As a consequence, the wiring overhead can be reduced significantly. MBP communication requires only 8Bits for encoding a character. FF H1 is suitable for use in hazardous and potentially explosive areas (Ex zones 0 and 1). Each FF H1 segment supports a length of 1,900m and allows connection of up to 32 field devices, depending on the specific environment. These limits can be extended using bridges. The FOUNDATION fieldbus High Speed Ethernet (HSE) implementation is additionally standardized. It supports a transfer rate of 100Mbit/s and can be used for connecting host systems like Distributed Control Systems (DCS) and linking devices via standard Ethernet cabling. While FF HSE in general also allows to connect field devices, this functionality is not used so far in field devices available on the market. Thus, two FOUNDATION fieldbus topologies are used, as shown below. The supported FF topologies include the connection of a host system to FF H1 field devices either via FF HSE and a Linking Device or directly via FF H1 segments:




The capabilities of individual FF field devices are described by Device Description (DD) files. They not only provide information needed for a host system to understand the meaning of the field devices' data, but also a user interface for functions such as calibration and diagnostics. The interoperability of devices from various manufacturers is thus ensured. Optional Enhanced Device Description (EDD) files can be used to extend the description of the features supported by an individual FOUNDATION fieldbus field device.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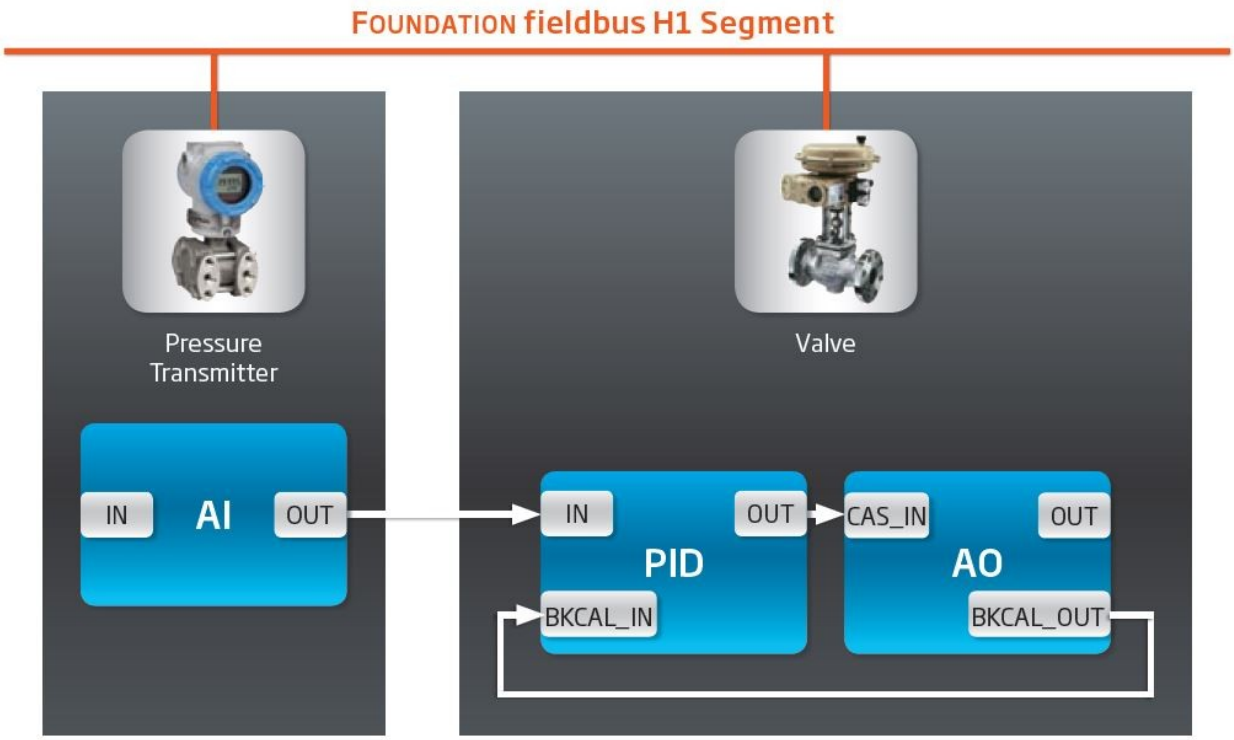
FF defines functions and parameters for process control devices, such as transmitters, actuators, valves, and analyzers. These functions and parameters are used to adapt the devices to the respective application and process conditions. The functions are based on Function Blocks, and the associated parameters are classified as input, output, and internal parameters. FOUNDATION fieldbus also determines how the various services of the communication protocol are used. This means, for example, that process data that is exchanged cyclically is based on a standard format for all devices. In addition to the measured value and/or manipulated set point value, this format also features a status supplying information about the quality of the value and possible limit violations. It thereby provides the foundation for harmonized applications, simplified engineering, device exchangeability and increased reliability by means of standardized diagnostic information.

There are two main features FOUNDATION fieldbus communication excels in: First, the complete communication is based on a detailed communication schedule, including the calculation of all individual values within Function Blocks as well as the distribution of these values within the fieldbus. The overall schedule timing within the fieldbus is performed by the Link Master. This role can be performed not only by the host system, but by any device offering Link Active Scheduler functionality. Thus, a deterministic communication is reached when using FOUNDATION fieldbus. The second FF advantage is the support of Control in the Field, which allows performing closed loop calculations in a decentralized way without requiring a controller. This functionality is based on the distributed execution of Function Blocks available within the individual field devices rather than a centralized execution in the host system, and thus results in a faster distribution of calculated values via the fieldbus. An example illustrating Control in the Field as performed by two field devices is shown in the following figure:




The FF H1 communication schedule as well as the Control in the Field functionality are defined as part of the FOUNDATION fieldbus configuration.

# 4 Graphical user interface

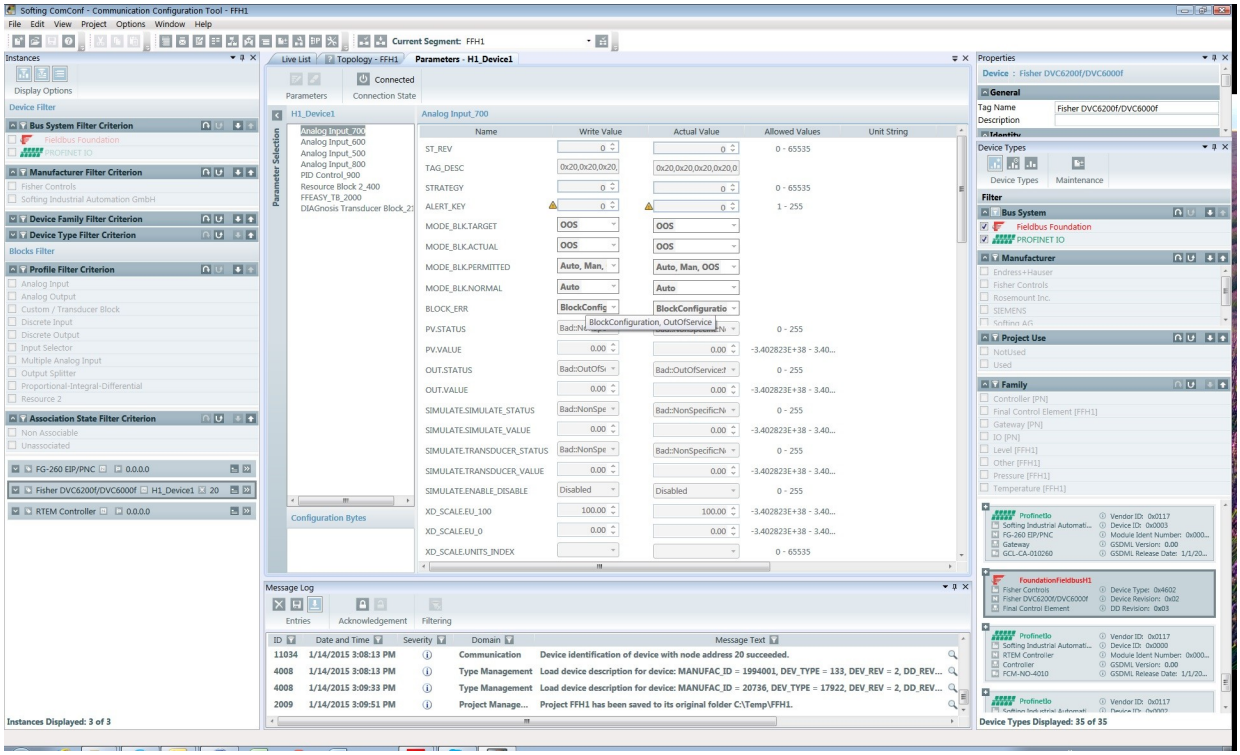
## 4.1 General functionality

### 4.1.1 Main window functionality

When the Communication Configuration Tool is started, the main window appears. All the GUI elements are provided within this window. The only exceptions are pop-up windows and floating windows, which can be placed and resized independently of the main window.

Various views are available for displaying different function areas. Any number of views can be displayed.

You can dock views in any corner, show them in the central area, or convert them to floating windows. Views can also be hidden.



The figure above shows an example of selected views. The Topology[44], Live List[26] and Instances[60] views are provided as tabs. On the right-hand side, the main window displays the Device Type Catalog[66] on top and the Properties view[79] below. These two views refer to the instance currently selected in the Topology view. The window at the bottom left shows the Message Log[77].

The central area of the main window is the window space that is not taken up by docked views and toolbars.

If more than one view is open in the central area, the views are provided as tabs. Each view is shown in a separate tab.

You can add and remove views in the central area and switch between different views in the central area.

Two layouts are available for the main window:

- Factory default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- Custom layout

You can reset the window layout to the factory default at any time. To do so, select Menu **Window → Reset Layout**. The current layout will then be overwritten, regardless of whether a project has been loaded.

There are two versions of the factory default:

1. A project is open:

   The factory default comprises the list of open views and indicates the position and status of each view. The position of the docking area is also stored

2. No project is open:

   The factory default basically has the same layout as for an open project, with the following differences:

   - The Properties views and the Topology views are not open.
   - The Device Type view on the right-hand side of the main window covers the full height.

### 4.1.2 Main window buttons

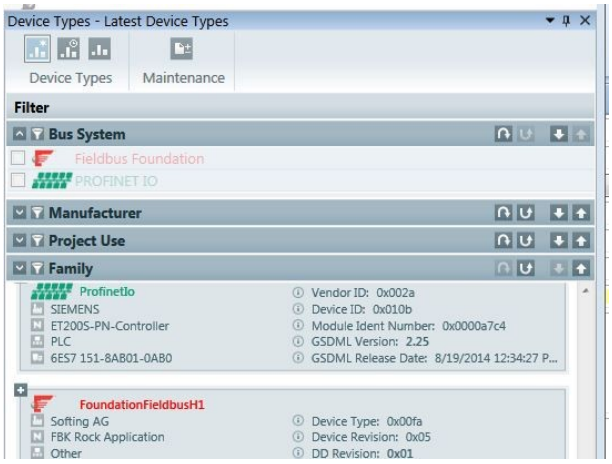
| Button | Name | Effect |
|---|---|---|
| | New Project | Opens the dialog box for creating a new project (refer to New Project pop-up window)[110]. |
| | Open Project | Displays the dialog box for opening an existing project (refer to Open Project pop-up window)[111]. |
| | Save Project | Saves the currently active project. |
| | Show Online Manual | Displays the online manual with the Contents tab open. |
| | Delete | Deletes the selected item and places it in the clipboard. |
| | Copy | Copies the selected item to the clipboard. |
| | Paste | Pastes the item from the clipboard into the currently active view. |
| | Device Types | Opens the view for selecting the device types, or moves the focus to this view if already open. |
| | Message Log | Opens the view displaying the message log, or moves the focus to this view if already open. |
| | Properties | Opens the view displaying the properties of the selected item, or moves the focus to this view if already open. |
| | Show Live List | Opens the Live List view, or moves the focus to this view if already open. |
| | Show Current Topology | Opens the view displaying the current topology, or moves the focus to this view if already open. |
| | Show Current Function Block Application | FOUNDATION fieldbus only<br>Opens the view displaying the currently active function block application. |

| | | |
|---|---|---|
| | Show Instances | Opens the view displaying information about the instances, or moves the focus to this view if already open. An instance is a device that is shown in the Topology view and has been derived from a device type. |
| | Type Catalog Maintenance | Opens the pop-up window[69] for editing the device type catalog. |
| | Segments | Opens the pop-up window[97] for segment management. |
| | Network Access Profiles | Opens the pop-up window[98] for editing the network access profiles. |
| | Settings | Opens the pop-up window[113] for editing program settings. |
| | Build Current Segment | Builds the current segment. The results are displayed in the Message Log. |
| | Download Current Segment | Downloads the configuration information of the selected segment to the target platform. |
| | Build All Segments | Builds all segments. The results are displayed in the Message Log. |

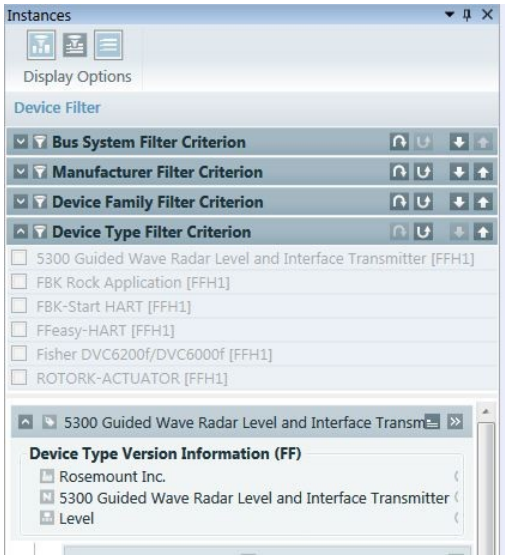
### 4.1.3 Filtering (precedence filter)

In different views we use a so-called "precedence filter". This filter offers various options for filtering. The figure below shows two filtering examples: **Device Types** in Device Types view and **Display Options** in Instances view:

**Device Types filtering in device types view**




**Device Filter in instances view**





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### Filter criteria

The filter exposes various filter criteria like Bus System, Manufacturer, Family, Project Use etc. The filter criteria can be expanded or collapsed with the expand button. In the figure above the Bus System criteria is expanded showing all filter options. In the example above for the Bus System criteria it shows the filter options Fieldbus Foundation and PROFINET IO. All other filter criteria are collapsed thereby hiding all filter options. The instances view shows the device type filter criteria.

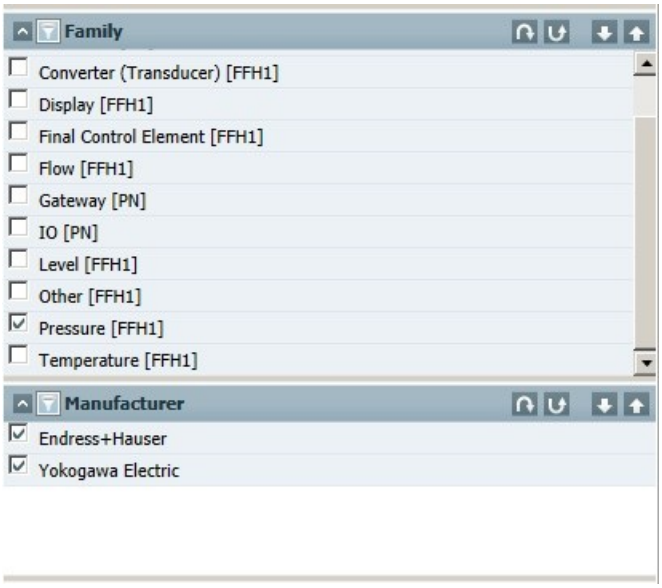
The order of the filter criteria can be changed thereby defining a precedence of criteria. The precedence is the order in which the filters are applied. The precedence is defined by the position of the filter criteria in the filter. Thus in the figure above the Bus System criteria has a higher precedence than the Manufacturer criteria, and the Manufacturer criteria has a higher precedence than the Family criteria. Hence the filter is applied with Bus System first, then Manufacturer, then Family. The position and thereby the precedence of the criteria can be changed with the button to move the position of the selected criteria down or to move it up with the button .

### Filter options

Each Filter criteria has a list of filter options. The figure below shows an example for the options for the Filter criterion **Manufacturer**:

### Activate/deactivate filter options

The filter options can be activated by checking the check boxes near to the corresponding filter option. This is only possible if the filter criterion itself is activated via the button . If deactivated , the filter options are disabled and cannot be selected. The set of filter options presented for each filter criterion depends on the device descriptions being imported AND the active filters having a higher precedence. For instance you give the filter criterion "Family" a higher precedence by moving it up and activate the filter and set for instance the Family criterion filter option "Pressure". Then the list of filter options for the Manufacturer filter criterion will be reduced to the list of manufacturers that have pressure device types. This is shown in the figure below:




The filter result will be the logical AND combination of all active ( ) filter criteria in the order defined by the precedence. In the example above the filter result will show all pressure device types of the manufacturers Endress+Hauser and Yokogawa Electric.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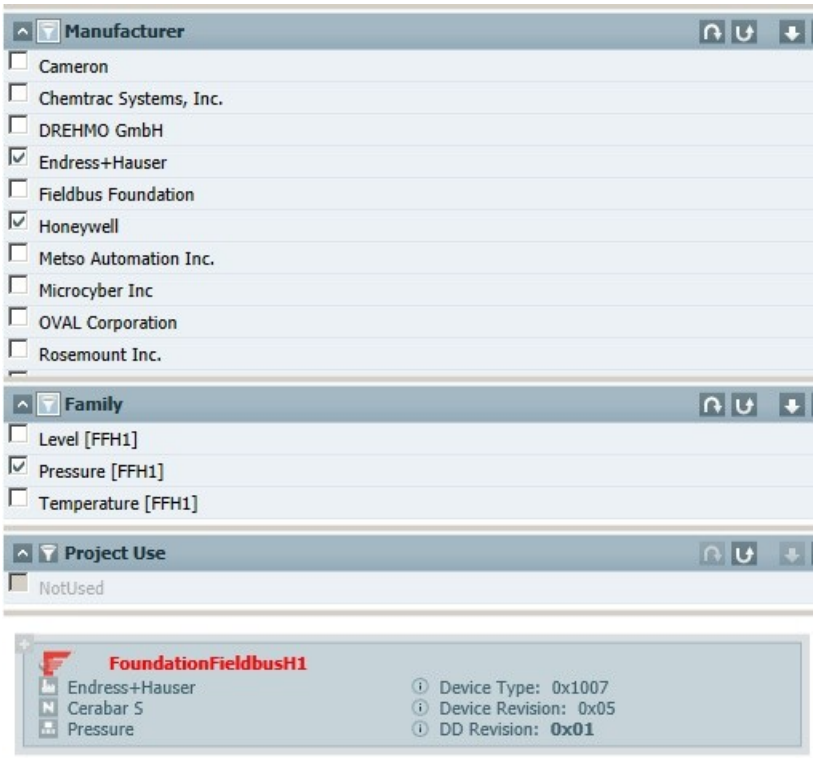
Filter criteria can not only be deactivated by the button. A different means to achieve this is the and buttons. However they do a little more. The button deactivates the currently selected filter criteria and all filter criteria with a lower precedence (below). Similarly the button deactivates the currently selected filter criteria plus all filter criteria with a higher precedence (above). With the deactivation the actual filter options setting is retained. Thus if the filter is activated again the last set filter options are restored. The following figure illustrates the functionality:




In the example shown with figure above the filter criteria Manufacturer and Family are activated. With the Manufacturer criteria two Manufacturer options are selected and with the Family the option Pressure is selected. Hence the filter result shows all device types of the selected manufacturers that belong to the device type family "Pressure". In this case it is only one device type. If is applied for the filter criteria Family, the filter criteria Family and Project Use are deactivated. The filter options for each of the filter criterion will be disabled. The filter result will then show all device types of the selected Manufacturers.

### 4.1.4 Configuring a project

A project consists of one or more segments (see also Segment Management) 96 and the segments consist of a number of devices (refer to Instances view 60 and to Device types view 65).

To configure the devices of a segment you have to

- configure the topology of the segment,
- configure the function block application (FOUNDATION fieldbus only),
- configure parameters and
- check and download the configuration of the segment. The configuration data is then checked for consistency and written to the devices.

| | FOUNDATION fieldbus | PROFINET |
|---|---|---|
| Topology | Topology view (FOUNDATION Fieldbus) 47 | Topology view (PROFINET) 47 |
| Function Block Application | Function block application view (FOUNDATION fieldbus only) 48 | n/a |
| Parameters | Edit configuration parameters (FOUNDATION fieldbus) 106 | Edit configuration parameters (PROFINET) 108 |
| Download | Project menu 117 - Download (current) segment | Project menu 117 - Download (current) segment |

## 4.2 Live list view

Use the live list view to find out

- which devices are part of a network,
- which device type is used,
- whether device descriptions have already been loaded or
- whether a device is already operational or not.

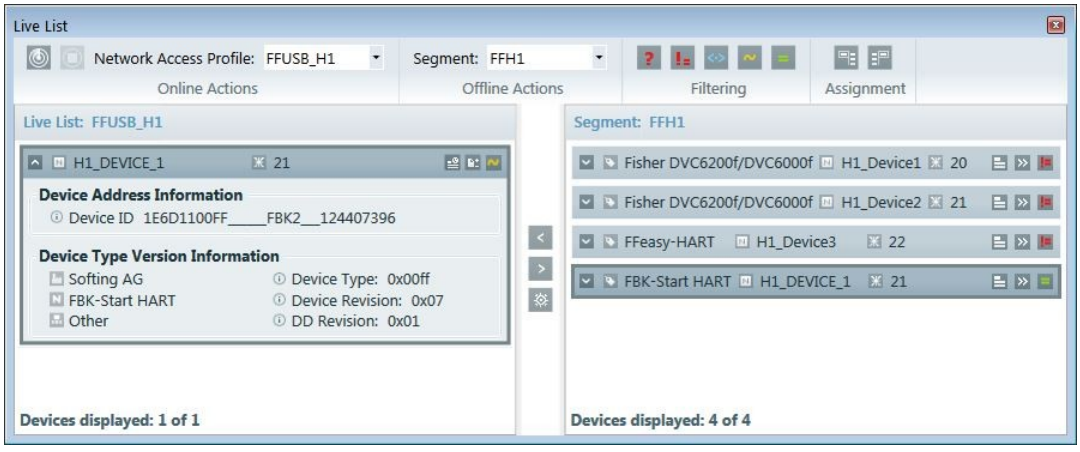
To do so,

1. select a defined network access profile 98, then
2. start scanning ( ).
3. The live list view now displays the devices found in a device scan. You can use the expand icon to display the device details, filter for devices or assign devices to each other.

For more detailed information on the live list functionalities related to the different bus systems refer to

Live list view (FOUNDATION fieldbus ) 27 or to

Live list view (PROFINET ) 29.





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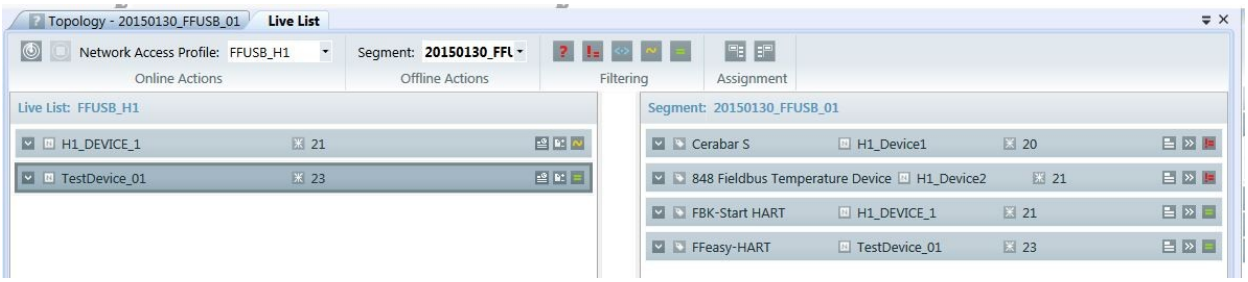
- Devices from the live list and the topology can be matched, which means that live list devices can be assigned to instances from the Topology view (configured devices), and instances from the Topology view can be assigned to live list devices. The Live list view buttons 31 section contains an overview. A more detailed assignment description is also provided in the Tutorials 126 section.
- The live list devices and the configured devices (Segment) can be filtered. This is particularly useful if there are many devices. You can find a detailed description on filtering in Device types filtering 67.
- The scan feature is also available if no project is open.
- When a project is active, the instances shown in the Topology view can be displayed. As a project may include multiple segments, the desired segment has to be selected.
- The set of segments that can be selected depends on the bus type of the network access profile (NAP). Thus segments which do not have the same bus type as the NAP are not presented for selection.

### 4.2.1 Live list view (FOUNDATION fieldbus)

A live list view with bus system FOUNDATION fieldbus may look as follows:




The left pane in the figure above shows the physical devices detected on the network. The right pane shows the configured devices of the project for a specific segment.

The presentation of a physical device is shown with the figure below.
If you use the expand icon (▼), the following device information is displayed:

| Title bar / Header | Primary address information. |
|---|---|
| N | PD-Tag of the physical FF device. |
| * | Node address of the physical FF device. |
| | Edit device parameters 105. |
| | Button to open online maintenance view 36. Allows to set address information to the physical FF device. |

| | |
|---|---|
| | Matching state visualization, refer to Live list view buttons[31] - Filtering. |
| | Number of device types resp. device description(s) found for the physical FF device (CFF, DD). |
| **2nd line** | **Device Address Information** |
| | Device-Id of the physical FF device. |
| **3rd line** | **Device Type Version Information** |
| | Manufacturer of the device. |
| | Device type name (read from the corresponding device description). |
| | Device type family (Temperature, Pressure, Level ...) |
| | Device description information: Device Type, Device Revision, DD Revision. |

Presentation of a configured device in the Segment pane (right pane) of the live list view:

| **Title bar / Header** | **Primary address information.** |
|---|---|
| | PD-Tag of the configured FF device. |
| | Node address of the configured FF device. |
| | Edit configuration parameters[106]. |
| | Navigates to the configured FF device in the topology view. |
| | Matching state visualization, refer to Live list view buttons[31] - Filtering. |
| **2nd line** | **Device type version information** |
| | Manufacturer of the device. |
| | Device type name (read from the corresponding device description). |
| | Device type family (Temperature, Pressure, Level ...) |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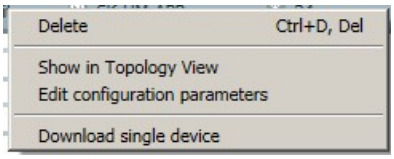
| | |
|---|---|
| ⓘ | Device description information: Device Type, Device Revision, DD Revision. |

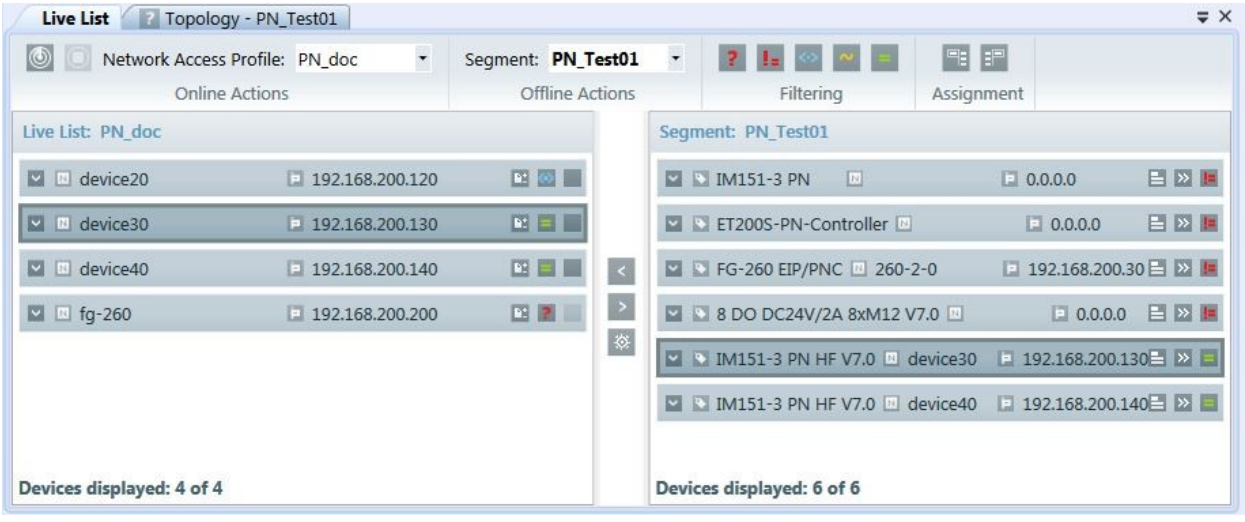
The presentation of the configured device provides also a context menu for certain operations detailed below:




| Context menu item | Description |
|---|---|
| Delete | Deletes the selected configured device. |
| Show in topology view | Navigates to the configured FF device in the topology view. |
| Edit configuration parameters | Edit configuration parameters 106. |
| Download single device | Download the configuration data of a single device. The major use case is device replacement.<br>Preconditions:<br>- The current segment has to be built prior to this operation (Menu item: Project -> Build Current Segment).<br>- Matching state of the device indicates an unique match = . |

### 4.2.2 Live list view (PROFINET)

A live list view with bus system PROFINET may look as follows:



The left pane in the figure above shows the physical devices detected on the network. The right pane shows the configured devices of the project for a specific segment.

If you use the expand icon (), the following device information is displayed:

| **Title bar / Header** | **Primary address information.** |
|---|---|
| | PROFINET device name. |
| | IP address of PROFINET device. |
| | Button to open online maintenance view[42]. Allows to set address information, conduct software / firmware download to the physical PROFINET device. |
| | Matching state visualization, refer to Live list view buttons[31] - Filtering. |
| | Device type associations. |
| **2nd line** | **Device Address Information** |
| | Device-Id of the physical PROFINET device such as Subnet Mask and Default Gateway. |
| **3rd line** | **Device Type Version Information** |
| | Device ID, Vendor ID, Module Ident Number, GSDML Version, GSDML Release Date, Device Type Name |
| **4th line** | **Additional Information** |
| | MAC Address and Device Role |

Presentation of a configured device in the Segment pane (right pane) of the live list view: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| **Title bar / Header** | **Primary address information** |
|---|---|
| | Tag name of the PROFINET device. |
| | PROFINET device name. |
| | IP address of PROFINET device. |
| | Button to edit configuration parameters, refer to Edit configuration parameters (PROFINET)[108]. |
| | Navigate to the configured PROFINET device in the topology view. |
| | Matching state visualization, refer to Live list view buttons[31] - Filtering. |
| **2nd line** | **Device Address Information** |
| | Device-Id of the physical PROFINET device such as Subnet Mask and Default Gateway. |
| **3rd line** | **Device Type Version Information** |
| | Device ID, Vendor ID, Module Ident Number, GSDML Version, GSDML Release Date, Device Type Name |

## 4.2.3 Live list view buttons

### 4.2.3.1 Live list scanning

| Button | Name | Effect |
|---|---|---|
| | Start scanning | Precondition: a network access profile has been selected.<br>Performs a scan for devices over the selected network connection. The devices found are displayed. The button is disabled if a network scan is pending or no network access profile (NAP) is selected. |
| | Stop scanning | Allows to stop a network scan. This button is only enabled if a network scan is running. |

#### 4.2.3.2 Filter and matching

| **Filter and matching state**; the criteria can be combined. | | |
|---|---|---|
| | Type unknown | Displays only the devices found of type unknown. This means that there is no type for this device in the type catalog. The appropriate device description file has either not been imported or the properties of the found device differ from the corresponding entry in the type catalog. For example, the instance created in the Topology view and the found device may differ in the Module ID of the DAP. |
| | Not assignable | Displays those instances that cannot be assigned to any device found. |
| | Uniquely assigned | Displays only the devices uniquely assigned. In this case, all the properties of the found device match those of an instance created in the Topology view. |
| | Ambiguously assigned | Displays all instances that cannot be uniquely assigned to a found device. |
| | Assignable | Displays all assignable devices. |

### Live list view buttons – Live list view matching

The buttons displayed rely on the matching between a configured device and a physical device. Matching criteria differ between the segment types.

Matching states are recalculated if

- configured device is added to topology of selected segment.
- configured device is removed from topology of selected segment.
- identifying device address information (for bus type PN: Station name) of a configured station is modified.
- a live list scan has been initiated.
- device type association of a live list device is modified.
- identifying device address information (for bus type PN: Station name) of a live list device is modified.

The following matching states exist:

### Unique Match

- The device matches exactly one device on the other side and there is no interfering device (see yellow ~ symbol).
- A device is said to match a station on the other side if station type and address information are identical. If the device address information in a specific bus system consists of more than one piece of information, all pieces of information have to be identical to make the devices match.
- The address information in bus system PROFINET is the station name.
- The address information in bus system FF/HSE consists of PD-Tag and IP address.


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- The address information in bus system FF-H1 consists of PD-Tag and node address.

### Ambiguous and/or Disturbed Match

#### Ambiguous match

The device matches more than one device on the other side (see green = symbol for a definition of what matching means).

#### Disturbed match

The device matches at least one device on the other side (see green = symbol for a definition of what matching means). However, there is at least one additional device interfering with matching. A device is said to interfere with matching if one of the following applies:

- The device is on the same side and one or more (possibly all) pieces of addressing information are identical with the matching device pair. The device type of the interfering device doesn't matter in this scenario.
- The device is on the other side, has the same device type as the matching device pair and some but not all pieces of addressing information are identical with the matching device pair. Note that if all pieces of addressing information were identical, the device would be a matching device and give reason for an ambiguous match rather than a disturbed match.
- The device is on the other side, has a different device type and one or more (possibly all) pieces of addressing information are identical with the matching device pair.

**Note**

Note that both ambiguous and disturbed match may be in effect at the same time.

### Assignable

The device does not match any device on the other side (see green = symbol for a definition of what matching means). However, it is assignable to one or more devices on the other side.

A device is said to be assignable to a device on the other side if device types are identical but at least one piece of addressing information is not.

**Note**

Note the intentional exclusion of devices whose addressing information is completely identical. This way, the set of matching devices and the set of assignable devices does not intersect..

### Not Assignable

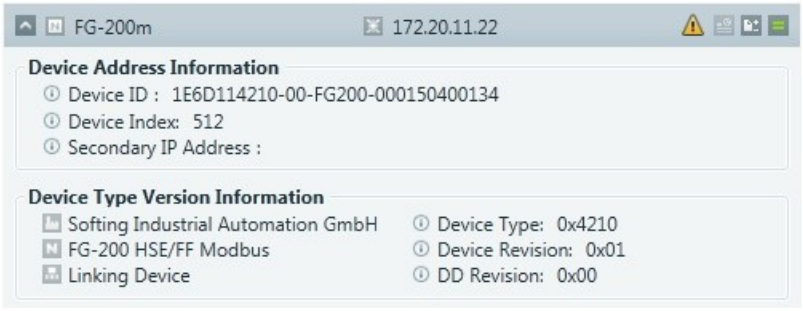
The device does not match any device on the other side nor is it assignable.

Effectively, this means, none of the devices on the other side has the identical device type.

For an FF-HSE segment with a FG-110 or FG-200, the H1 devices can only match if the gateway above also matches. The matching state of the link between is not relevant.

### Indication of matching between redundant and non-redundant gateways

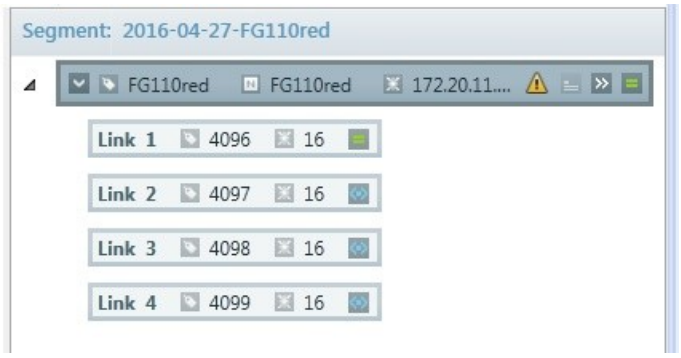
Left pane:




If the secondary IP address is missing, a ⚠ is shown and the tool tip displays: "The redundant linking device is missing in live list". This can happen if

- the secondary is powered off,
- the secondary has no Ethernet connection,
- the redundancy link is missing,
- synchronization between primary and secondary has not been finished yet.

Right pane:




There is a non-redundant linking device configured, but the physical device is redundant.

#### 4.2.3.3 Assignment

| Assignment | | |
|---|---|---|
| | Live List Assign Assistant | Displays all devices of the same device type from the live list which can be assigned. |
| | Topology Assign Assistant | Displays all devices of the same device type from the topology which can be assigned. |
| | Assign live list device to configured device | Assigns a physical device detected with a network scan to a configured device of the project. Specific properties of the physical device are copied to the configured device.<br>The button is enabled if the following conditions are fulfilled: |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| Assignment | | |
|---|---|---|
| | | ▪ Superordinate device if available has to match uniquely<br>▪ Superordinate hierarchical structure if available has to match<br>▪ Matching state of selected physical device and selected configured device show assignable states<br>See Filter and matching[32] for more information.<br>In the following the properties are listed that will be assigned for each type of device:<br>**FF H1 Device:**<br>▪ PD-Tag<br>▪ Node Address<br><br>**FF HSE Device:**<br>▪ PD-Tag<br>▪ H1 Links (Link Id and Node Address)<br><br>**PN Station:**<br>▪ Station Name<br>▪ IP Settings (IP Address, Subnet Mask, Default Gateway)<br>(Matching state[32] indicates or ). Disabled otherwise. |
| | Assign configured device to live list device | Assigns a configured device of the project to a physical FF device detected on the network. Bus system specific services are invoked to assign information of the configured device to the physical device.<br><br>The button is enabled if the physical device and the configured device are of the same device type (Matching state indicates or ). Disabled otherwise.<br>For FF devices the following properties are assigned:<br>- PD-Tag<br>- Node address |
| | Create configured device from selected live list device | Creates configured device(s) within the topology of the selected segment of the project.<br>The button is enabled if the following conditions are fulfilled:<br>▪ Physical device is selected |

| Assignment | | |
|---|---|---|
| | | ▪ Type information of selected device is available<br>▪ Device type corresponding to type information is available in type catalog<br>In case of device(s) that have subordinate devices the complete hierarchical structure will be created. If the type information of a subordinate device is not available or the corresponding device type is not available in the type catalog this device will not be created.<br><br>The button is disabled if either no physical device is selected or the selected device has no type . |

### 4.2.4 Online Maintenance view

The online maintenance view allows to perform maintenance operations with devices detected on the network with a network scan.

1. Select a device in the live list.
2. Click to open the Online Maintenance view.

   The view is specific with regards to the underlying bus system (PROFINET or FOUNDATION fieldbus):

   Online Maintenance view (FOUNDATION fieldbus)[36]

   Online Maintenance view (PROFINET)[42]

#### 4.2.4.1 Online Maintenance view (FOUNDATION fieldbus)

The view is split in two parts:

- The upper part representing the header of the view contains information identifying the device that cannot be changed. For maintenance operations that take much time a rotating circle is shown in the right part to indicate that the operation is ongoing.
- The lower part contains a tabbed view that offers the user the possibility to execute several maintenance operations. The available maintenance operations differ for H1 and HSE devices.

The figure below shows the Online Maintenance View for an H1 device:


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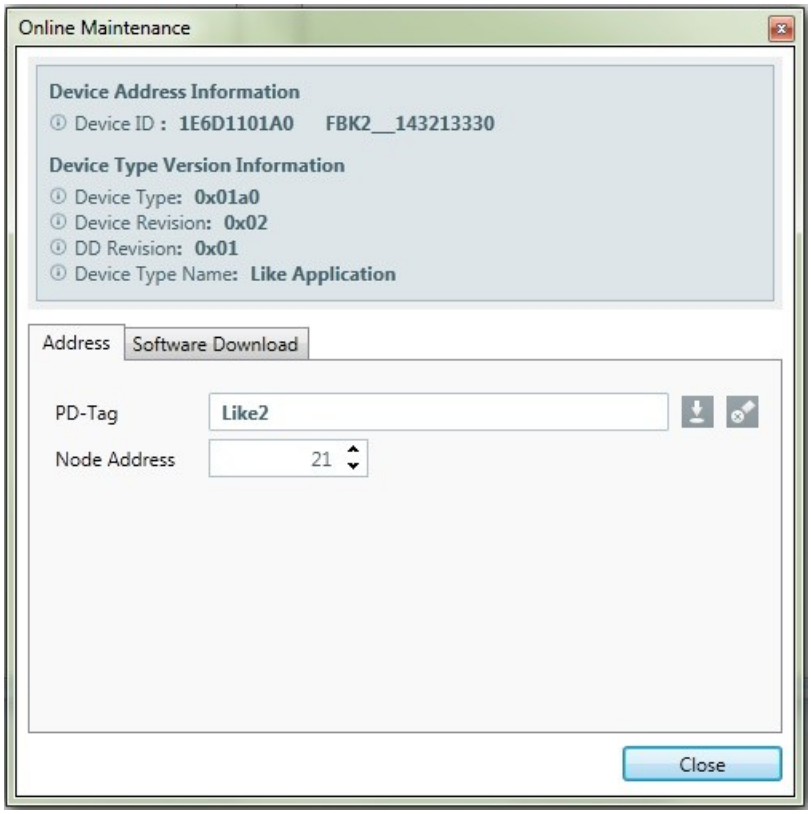


The header of the view is identical for H1 and HSE devices and shows the device address information and device type version information as explained in the table below.

| | | |
|---|---|---|
| ⓘ | Device ID | Unique Device ID of the device.<br>H1<br>For H1 devices it contains the manufacturer ID and a serial number provided by the vendor of the device.<br>HSE<br>For HSE devices it contains the manufacturer ID, device family and a serial number provided by the device vendor. |
| ⓘ | Device Type | see Device types view 65. |
| ⓘ | Device Revision | see Device types view 65. |
| ⓘ | DD Revision | see Device types view 65. |
| N | Device type name | see Device types view 65. |

The tabbed view offers different maintenance operations arranged in different tabs. The available maintenance operations differ for H1 and HSE devices.

### Address tab (H1 device)

This tab allows the user to set and clear the address information of an H1 device. The address information of an H1 device is comprised of the PD-Tag and the node address.

### Validations

PD-Tag and node address are validated when the information is changed. The following validations apply:

| | | |
|---|---|---|
| 1. | PD-Tag | Must not be empty. |
| 2. | PD-Tag | Maximum length of tag is 32 characters. |
| 3. | PD-Tag | The characters of the tag must comply with the ISO 646 character set. |
| 4. | Node address | The node address must be in one of the ranges 16-247 and 252-255. |
| 5. | Node address | It is recommended that the node address is NOT within the range of unpolled node addresses. Otherwise after assignment the device will not appear in the live list any more. |

### Buttons

| | |
|---|---|
| | Set the address information of the H1 device to the entered PD-Tag and node address. The button is enabled if the information entered is valid.<br> **Note**<br>If you witness time-out issues setting the address information, consider reducing the active node poll range for the link master. This can be achieved by setting the active NAPs First unpolled node address and Last unpolled node address properties. |
| | Clear the address information of the H1 device. The H1 device will reappear on the network with an empty PD-Tag and with one of the node addresses within the default address range 248-251. |

The figure below shows the Online Maintenance View for a linking device (HSE device):


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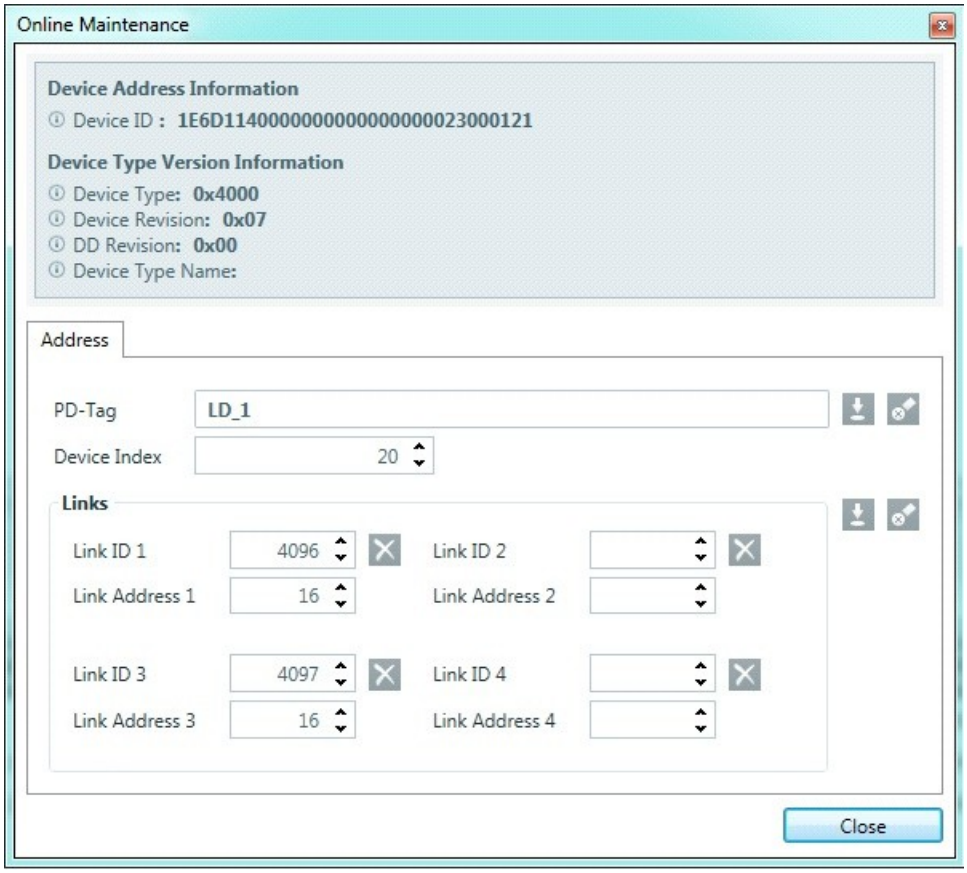


### Address tab (HSE device)

This tab allows the user to set and clear the address information of the HSE device. The address information of an HSE device is comprised of the PD-Tag and the device index.

### Validations

PD-Tag and device index are validated when the information is changed. The following validations apply:

| | | |
|---|---|---|
| 1. | PD-Tag | Shall not be empty. |
| 2. | PD-Tag | Maximum length of tag is 32 characters. |
| 3. | PD-Tag | The characters of the tag must comply with the ISO 646 character set. |
| 4. | Device Index | The device index must not be 0. |

### Buttons

| | |
|---|---|
| | Set the address information of the HSE device to the entered PD-Tag and device index. The button is enabled if the entered information is valid. |
| | Clear the address information of the HSE device and all available links. The HSE device will have an empty PD-Tag and a device index of 0. The link id and node address of the links will be cleared. |

For linking devices the address tab additionally shows the available links and allows the user to set and clear their address information. The address information of a link is comprised of the link id and the node address. There must not be a conflict between the node address of the link and the node address of any H1 device connected to that link.

To clear a single link, the link id and node address have to be cleared. This can be done by manually clearing the fields or by using the corresponding button next to the link. Setting the address information of all available links will clear links that have no values defined.

### Validations

Link id and node address of all available links are validated when the information is changed. The following validations apply:

| | | |
|---|---|---|
| 1. | Link id | Must be greater than 4096. |
| 2. | Link id | The link id must be unique over all links of the linking device. |
| 3. | Link id | Must be in the range from 16 to 19. |

### Buttons

| | |
|---|---|
| | Adapts the address information of the linking device links to the entered values. This button is enabled if the entered information is valid. |
| | Clears the address information of the linking device links. The links will have an empty link id and node address. |
| | Clears the link id and node address of the corresponding link. |

### Software Download tab

Here you can update the software (firmware) of a device. This tab does not appear if your device does not support this feature:


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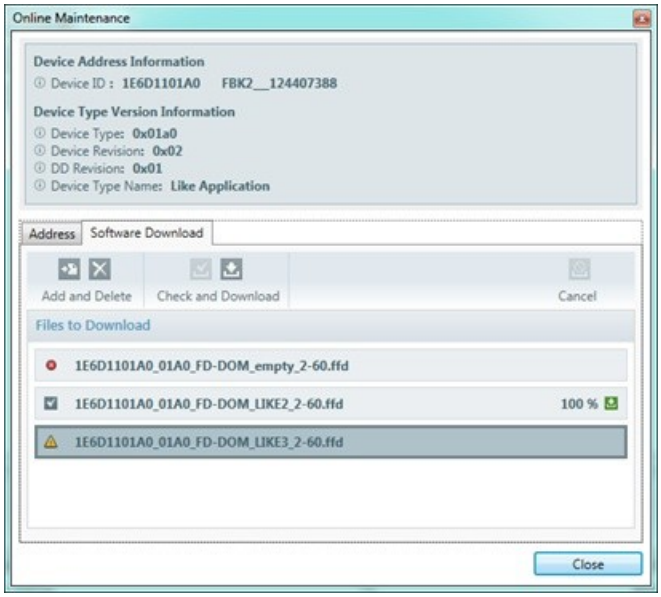
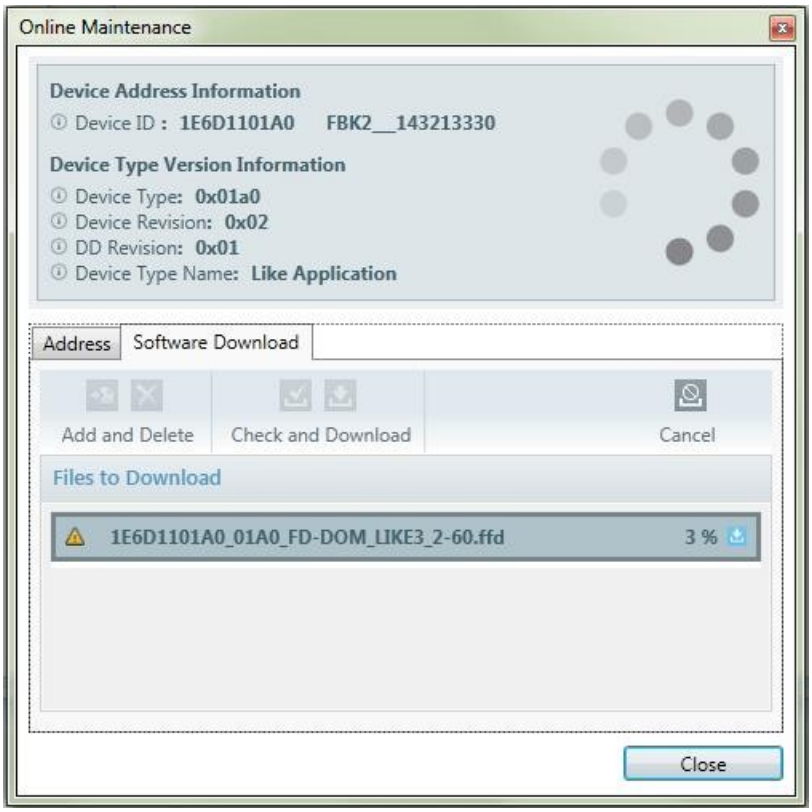



**Buttons**

| | |
|---|---|
| | Adds the file name of the binary image to be downloaded. If the device supports multi-domain download, you can select more than one device. |
| | Deletes a file name. |
| | Checks the selected domains to be downloaded to ensure that it can be downloaded to the device. |
| | Downloads the selected domains. |
| | Cancels the download. |

### Download process




### Meaning of the file name associated icons:

The in front of the file name shows that the file has been checked and can be loaded.

The in front of the file name shows that the file has been checked but can be loaded. It informs the user that after the download the device type will change and an import of the device type information might become necessary.

The in front of the file name shows that the file has been checked but cannot be loaded.

The download arrow shows that the file is being loaded; the number indicates the current download percentage value.

#### 4.2.4.2 Online Maintenance view (PROFINET)

The view is split in two parts:

- The upper part shows information that cannot be changed. Most of the information is taken from the GSDML file of the device. The MAC Address has been gathered during the network scan.
- The lower part contains information available in two tabs:
  - The **Address** tab includes the device's name, the IP Address, the Subnet Mask and the Default Gateway. By clicking the appropriate button the information is sent to the device.
  - The **Miscellaneous** tab allows to interact with the device for relating a real device to the device in the Live List (Blink:) and to reset the device to factory settings. Consider, that this reset is only applied to data accessible through default PROFINET functions. The device name is reset or the IP address is reset.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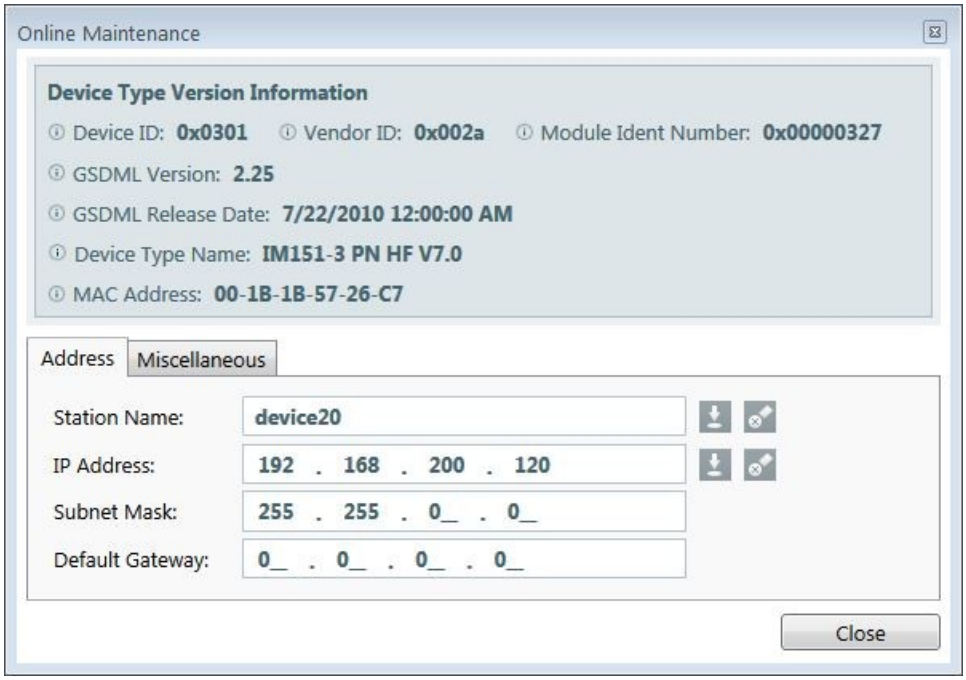



### Address tab - validations

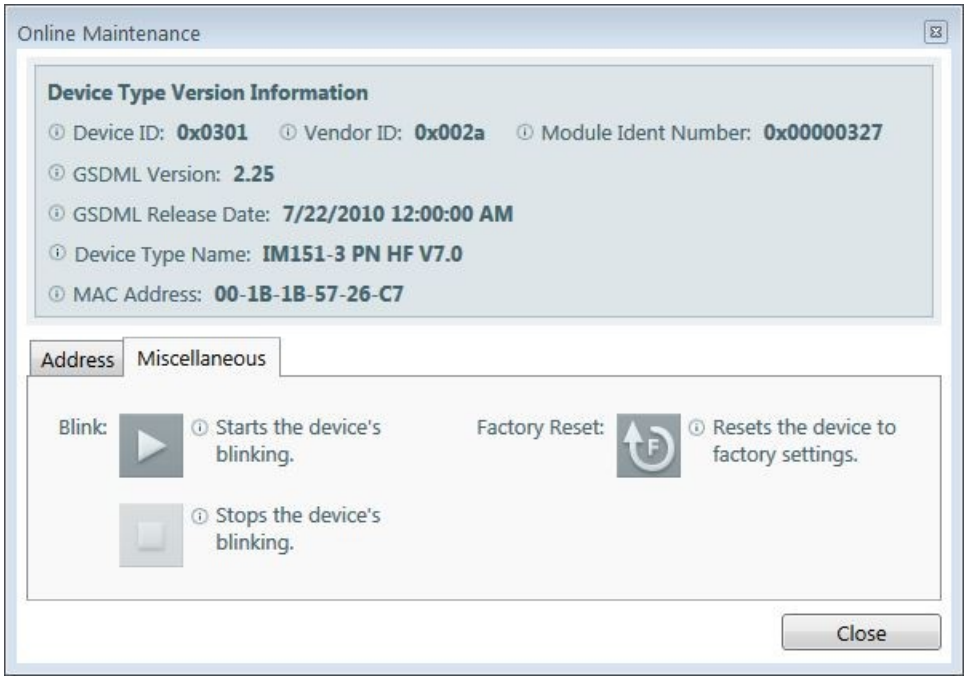
| | |
|---|---|
| Device name | It is verified that the entered name is conform to the PROFINET specification. |
| IP Address | Empty blocks are not allowed (192.168.200. is not allowed).<br>Values greater than 255 are not allowed.<br>**Hint**<br>If you are using a gateway, make sure the default gateway address and the station's IP address are in the same subnet. |

**Note**

If the values for default gateway are set to zero or if the default gateway address is identical to the station's IP address, then there is no gateway used or existing.

### Address tab - buttons

| | |
|---|---|
| | This button is enabled if the entered information is valid. By pressing the button the data is sent to the device. |
| | By pressing this button the data of the variable in the device is deleted, i.e. the Device Name is set to an empty string and the IP Address is set to 0.0.0.0. |
| **[Close]** | The view is closed. |




### Miscellaneous tab - buttons

| | |
|---|---|
| | PROFINET specification requires that a PROFINET device implements a defined visual device detection feature. It must be possible to influence an element of the device that this device can be uniquely located. In most of the cases the Network LED are used for this purpose. They are switched on and off ("blink").<br>Click **[Start]** to invoke this functionality. |
| | **[Stop]** terminates the above described functionality. |
| | By clicking this button a set of device variables is reset to their factory settings. These variables include device name and IP address. |

## 4.3 Topology view

Precondition: A project is opened.

### Add a device to the Topology view

To add a device to the view, drag and drop the device into the Topology window or click the **+** button in the top left corner of the selected device. The devices are instantiated in the process.

### Create connections between devices in the Topology view

Create connections between the inserted instances. To do so, select an instance in the Topology view. On selection, an arrow appears in the top right corner of the instance:

Click this arrow with the mouse. When the mouse pointer changes to a longer arrow, press the left mouse button and drag the arrow to another instance.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### Display context menu

For bus-specific topology view functionality refer to

Topology view (FOUNDATION Fieldbus)[47]

Topology view (PROFINET)[47]

Select an instance and click the right mouse button to display the context menu. The following actions are available:

| Menu Item | Keyboard shortcut | Action |
|---|---|---|
| Cut | Ctrl + X | Cuts the selected device. |
| Copy | Ctrl + C | Copies the selected device. |
| Delete | Ctrl + D, Del | Deletes the selected device. |
| Configure Modules | | PROFINET only<br>Displays the window for specifying the modules for the selected device. |
| Edit Configuration Parameters | | Displays the window for editing the configuration parameter values for the selected device. |
| Edit Device Parameters | | FOUNDATION fieldbus only<br>Displays the window for editing the device parameter values for the selected device. |
| Show Port Descriptors | | PROFINET only<br>In PROFINET, the model of the entire communication interface is defined using Device Access Points (DAP). A communication interface may have one or more Ethernet ports. A port can be assigned a descriptor. This property is used for topology scans. To enter a descriptor for the port, the Show Port Descriptor option must be enabled. The entry of the descriptor is optional in the current version of the Communication Configuration Tool. |
| Hide Port Descriptors | | PROFINET only<br>The port descriptor is hidden again. |

**Note**

A project can contain multiple Topology views.

### View device properties

1. Select the device instance.
2. Then select **View** → **Properties** from the menu or press **Alt+Enter**.
3. Property values are shown in the respective fields. They have been read from the device description file or have been entered by the user.

The Topology view is used to define the communication devices and the logical structure of the network.

### Device information

Devices provide various controls that can be clicked for direct access to functions and information.

| Icon | Meaning |
|---|---|
| | Displays the Edit parameters[105] window for editing parameter values. |
| | Tag Name<br>The text displayed next to this button is the tag name used for internal project management.<br>The setting can be edited in the Properties view[79]. |
| | PROFINET - Device Name<br>The text displayed next to this button is the device name used by the controller to assign an IP address to the device.<br>FOUNDATION fieldbus - PD-Tag<br>The text displayed next to this button is the PD-Tag of the FOUNDATION fieldbus device.<br>The setting can be edited in the Properties view[79]. |
| | PROFINET only - Configure modules:<br>Displays the window[103] for specifying the modules for the selected instance. |
| | FOUNDATION fieldbus only:<br>Node address. |

**Note**

A project can contain multiple Topology views.


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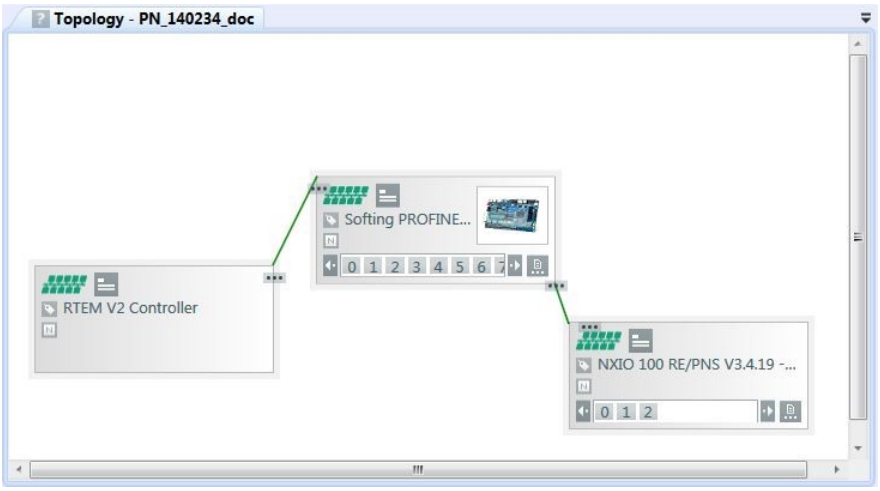
### 4.3.1 Topology view (FOUNDATION Fieldbus)

With bus system Foundation fieldbus the appearance of devices within the Topology view is as shown below:

For common functionality refer to Topology view 44.

### 4.3.2 Topology view (PROFINET)

With bus system PROFINET the appearance of devices within the Topology view is as shown below:




**Note**

For every segment consisting of controller and devices, a separate Topology view is used.

### 4.3.3 Topology status icons (PROFINET only)

Status icons are displayed in the topology view directly to the left of the topology view name and indicate, whether a topology is valid and/or has been checked:

The status icons indicate the following:

| Icon | Meaning |
|---|---|
| | The configuration is valid and code has been generated. |
| | The configuration is valid but no code has been generated. |
| | The configuration has not been checked since the last change. |
| | The configuration is not valid. |

## 4.4 Project Explorer view

Use the project explorer

- to show the topology as a tree and
- to create and delete configured devices.

To do so,

1. drag and drop a device type from Device Types View and add an instance of this type to topology.
2. Drag and drop within the project explorer. Copy with **Ctrl** + drag/drop.
3. Copy/paste with **Ctrl+C**/**Ctrl+V**.
4. Copy/Paste/Delete via context menu.
5. Drag/Drop between project explorer view and topology view is not possible.

**Note**

Within the project explorer, you can only move and create devices belonging to the selected bus type. Creating a H1 device under a link will implicitly connect the device to that link in topology.

## 4.5 Function block application view

Precondition: current segment or selected segment is of bus system FOUNDATION fieldbus.

The function block application view allows to create function block applications representing control loops. A control loop is thereby realized by a set of function blocks connected via FF publisher/subscriber connections. A typical control loop consists of

- an Analog Input (AI) block getting a process value like a level or a temperature,
- a Proportional Integral Derivative (PID) block for the actual control task and
- an Analog Output block (AO) controlling for instance the position of a valve.

For more specific details about this topic we recommend referring to the specific literature.

From the menu select **View → Current Function Block Application** or **View → Function Block Application.**

The function block application view will appear as shown below: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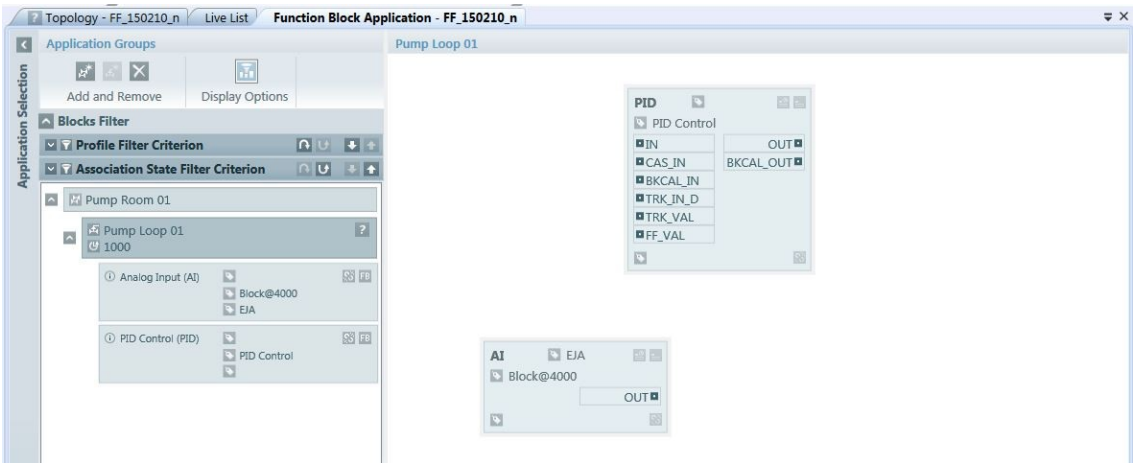


The Header of the view shows "Function block application" and the corresponding FF segment this Function block application view belongs to. The left pane of the view shows the management part of the view. With this pane you create new function block applications. You can organize the function block applications in groups. Within each group function block applications can be added or removed. A group can reflect an assets area of your plant.

The right pane shows the used function blocks and connections within the currently selected function block application. Hence if the Pump-01-Control-Loop function block application is selected in the figure above it will show the function blocks (FB) and connections of Pump-01-Control-Loop.

### 4.5.1 Function block application view buttons and status icons

The buttons of the function block application view are listed with the following table:

| Button | Meaning |
|---|---|
| **Add and Remove** | |
| | Creates a new function block application group. The group can act as asset area of your plant. |
| | Creates a new function block application. A function block application group has to be selected within the Function block application groups view. Otherwise the button will be disabled. |
| | Deletes the selected item. This can be either a function block application or a function block application group with all its function block applications. |
| **Display Options** | |
| | Hides or displays the function block filter and removes or activates the applied filter settings. |

### 4.5.2 Function block application view shortcut keys

The following table shows the keyboard shortcut keys used within function block application view:

| | |
|---|---|
| **CTRL+C** | Copies the currently selected function block application group with all its function block applications or a selected function block application into the clipboard. |
| **CTRL+V** | Pastes a copied function block application group or function block application. To paste a copied function block application select a function block application group first. |
| **Del** | Deletes the selected function block application group or function block application. |

### 4.5.3 Function block properties in property view

With the function block application and the function block application group there are specific properties that can be edited using property view:

#### Application group

| **General** | |
|---|---|
| Tag Name | Name of the function block application group. No restrictions apply. |
| Description | Description of the function block application group. No restrictions apply. |

#### Function Block Application

| **General** | |
|---|---|
| Tag Name | Name of the function block application group. No restrictions apply. |
| Description | Description of the function block application group. No restrictions apply. |
| **Schedule** | |
| Cycle Time (ms) | Cycle time of the function block application. Unit is millisecond (ms).<br>**Note**<br>The value has to be an integer factor of the macro cycle 84 time defined in the segment 79! |

#### Block

| **General** | |
|---|---|
| Tag Name | Name of the function block application group. No restrictions apply. |
| Description | Description of the function block application group. No restrictions apply. |
| **Identity** | |
| Block Tag | Unique identification of the block within the segment.<br>Restrictions: It has to comply with ISO 646. Its maximum length is 32 characters. |
| **Type** | |
| Label | Type name of the block. |


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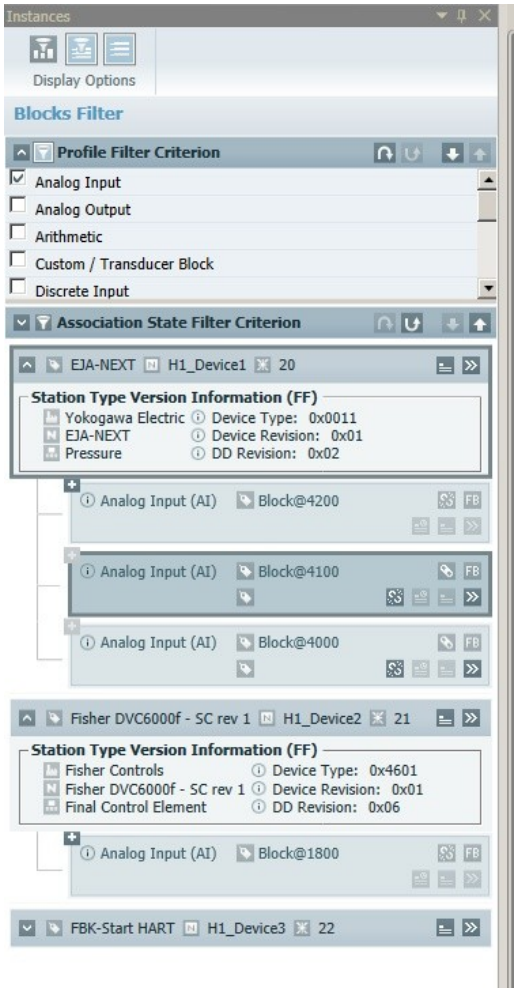
| General | |
|---|---|
| Profile Name | Profile name of the block. |
| Profile Revision | Profile revision of this block |
| **Address** | |
| Device Tag Name | Tag name of the device hosting this function block. |
| Index | Block start index used to address the block in the device |

## 4.5.4 Use function blocks

### 4.5.4.1 Add function blocks to the function block application

With the Function block application view opened and a specific function block application selected function blocks can be added to the application. Use the Instance view to add function blocks to a function block application.

1. From the menu select **View → Instances** or click .
2. Select the device you want to use. See figure below.
3. Make sure that the blocks of the device that you are using are displayed. If this is not the case, toggle the button (Show / hide blocks from devices).
4. If you want to display only blocks of a certain profile (e.g. AI blocks or PID blocks), apply a block filter ( ) within the instance view.
5. Each block is displayed as child of the corresponding device.
6. Use the button to add the corresponding block to the Function block application.
7. Alternatively select the block item within the instance view and drag&drop it to the Function block application diagram.




Instance view is used to add function blocks to the Function block application in the Function block application view. In the figure above two AI blocks have already been added to the function block application.

The diagram of the Function block application view shows the used function blocks.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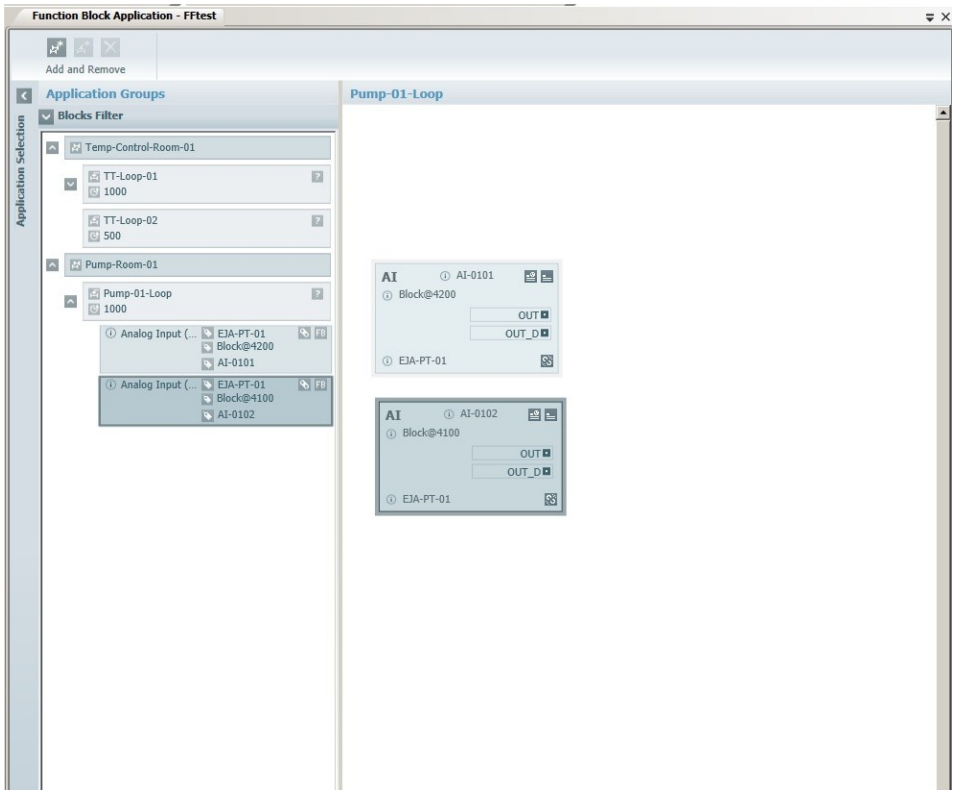


The function blocks added to the function block application "Pump-01-Control-Loop" appear on the diagram with the following information:

- The input and output parameters of the block (e.g. OUT).
- The profile information of the block (e.g. AI).
- The Tag name of the device the block belongs to (in the figure above EJA-PT-01).
- Block tag of the block (AI-0101 in the figure above).
- Tag name of the block (Block@4200 in the figure above).

### 4.5.4.2 Function block association

If a function block (FB) is added to a function block application, a so-called used function block is created and an association (link) to the function block of the device is also created. This means that this function block of the device shall be used for the application.

Within instance view the association state of an FB of a device is also shown with the following icons:

FB is associated: It is used within a function block application.

FB is not associated: It can be used within a function block application.

#### 4.5.4.2.1 Remove association

**Remove in Instance View**

1. With instance view opened make sure that the blocks of the device that you are using are displayed. If this is not the case, toggle the button (Show / hide blocks from devices).
2. If you want to display only blocks of a certain profile (e.g. AI blocks or PID blocks), apply a block filter ( ) within the instance view.
3. Select an associated FB. An associated FB shows the icon .
4. Click to remove the association.
5. The corresponding used FB in the function block application will no longer have the association to the specific FB of the device. Hence another FB of the same type but a different device can be associated.

**Remove in Function block application view**

1. Select an associated FB in the diagram editor of the function block application.
2. Click to remove the association.
3. The corresponding FB of the device in the instance view will no longer have the association to the used FB of the function block application. Hence another FB of the same type but a different device can be associated.

Removing the association can be helpful if you want to use a FB of another device but do not want to remove the whole used FB from the application. Reassociation can then be done with instance view and drag & drop onto the used function block in the diagram.

#### 4.5.4.2.2 Establish association

If an association has been removed (see Remove association 54), it can be re-established using a drag & drop operation together with instance view and Function block application view:

1. With instance view opened make sure that the blocks of the device that you are using are displayed. If this is not the case, toggle the button (Show / hide blocks from devices).
2. If you want to display only blocks of a certain profile (e.g. AI blocks or PID blocks), apply a block filter ( ) within the instance view.
3. Select an unassociated FB. An unassociated FB shows the indication icon:
4. Drag the selected FB from the instance view to a used FB of the same type within the diagram editor of the Function block application view.
5. Within the diagram editor of the function block application view drop the FB at the location of the used FB. If types match, the association will be established.

After the association is established, the used function block will show the tag name of the device the block is associated to. This means a block of the same type of this device is allocated for the function block application. Additionally the button to unassociate is enabled.


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#### 4.5.4.3 Operations with a used function block in the function block application

Used function block shown with the diagram editor of the function block application have a set of buttons for specific operations:

| | |
|---|---|
| | Opens a window allowing you to edit the configuration parameter[106] set of the block. It is used for configuration purposes and is persisted and downloaded to the device with the download operation. |
| | Opens a window allowing you to edit the device parameters[105]. You can read block parameters from the device and write block parameters to the device. The button is disabled if the used FB is not associated. |
| | Unassociates a used FB from its "linked" block of a device. See section Function block association[53]. The button is disabled if the used FB is not associated. |

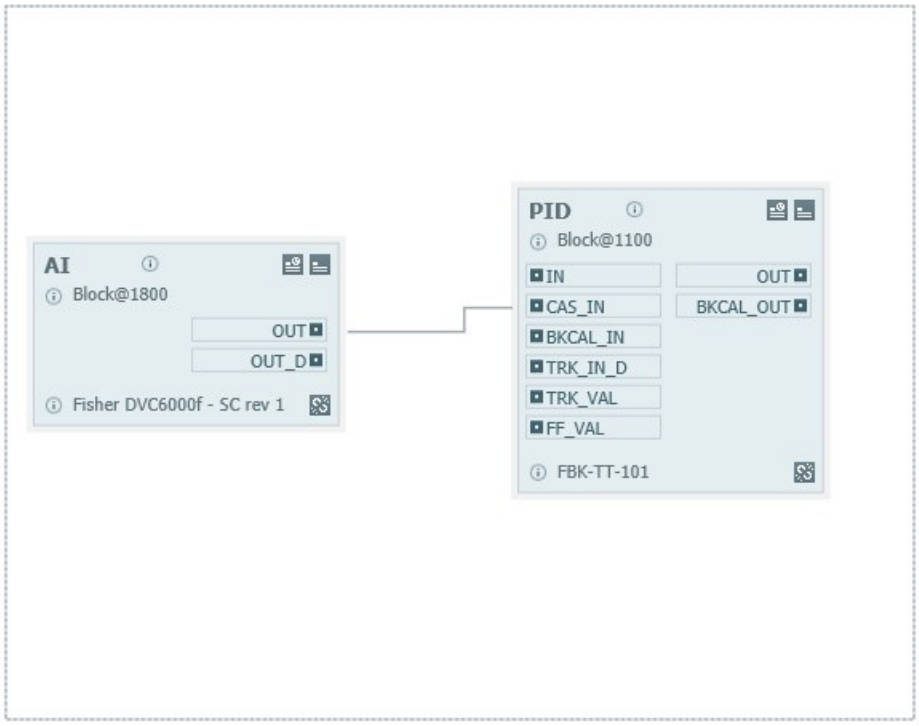
#### 4.5.4.4 Locate a used function block in the function block application

If a function flock (FB) is used in the function block application, the instance view further provides a means to show the FB in the function block application. Via the button you can navigate from the instance view to the used FB in the function block application view.

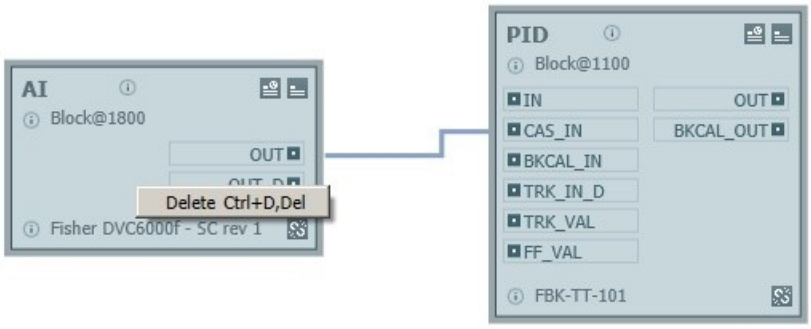
#### 4.5.4.5 Remove a used function block from the function block application

Within the diagram editor of the function block application select the used function block(s) you want to remove. The function blocks will be highlighted. Multi selection is possible:

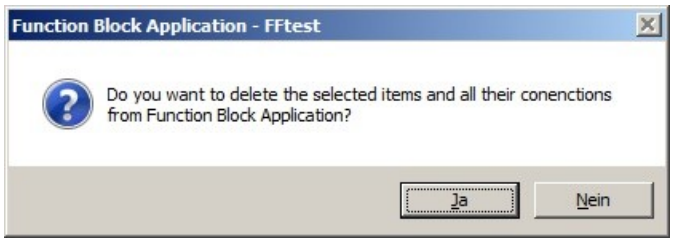
1. Press the **Ctrl** button and select the used function block to remove.
2. Drag a bounding box (sometimes called a "rubber band") around the used FBs in the diagram area and release the left mouse button. This will multi-select the used FBs "in" the bounding box. To start drag a bounding box press the left mouse-button and move the mouse to create the bounding box (see figure below):




3. Right-click to open the context menu:




4. The figure shows the bounding box prior to release of the left mouse-button. All objects in the bounding box are selected if the left mouse-button is released.
5. Select the context menu item **Delete** or press the **Del** key. All selected used FBs and connections between them are deleted.
6. A query will appear asking you whether to delete the selected items or not:




7. Click **[Yes]** to delete the selected items.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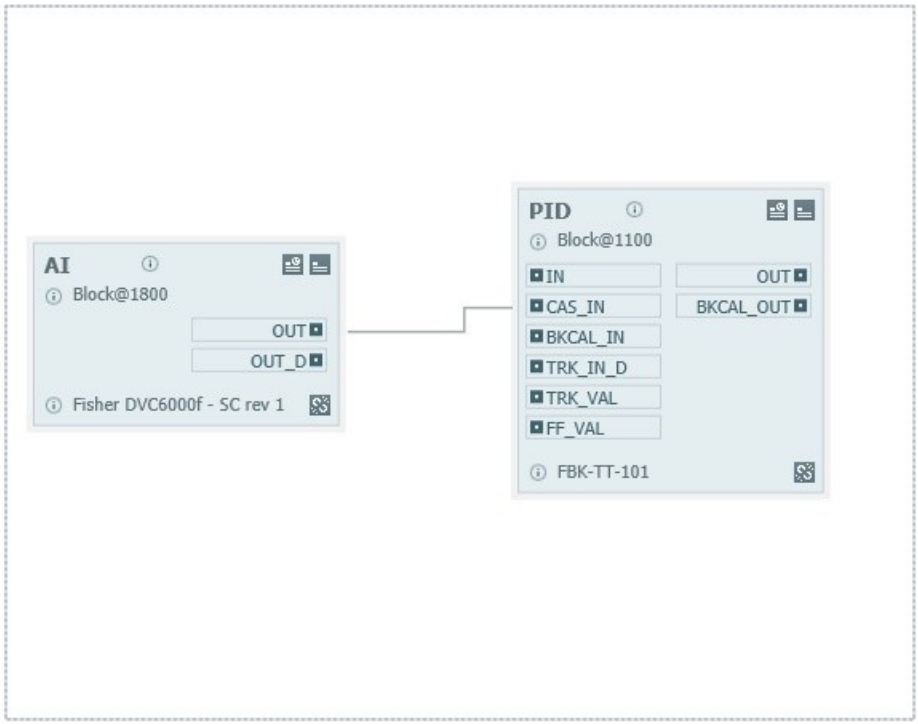
**Hint**

To suppress confirmation messages refer to Settings window 113.

#### 4.5.4.6 Multiple selection in the diagram editor

Within the diagram editor of the function block application multiple used FBs and connections can be selected. This is useful for rearranging the function block application by moving the selected items or removing multiple selected items (see Remove a used Function Block from the function block application 55 ).

Multiple selection can be achieved by creating a bounding box (sometimes called a "rubber band") around the items to select. To start dragging a bounding box press the left mouse-button and move the mouse to create the bounding box (see figure below). Multiple selection will then be applied if the left mouse-button is released.




The figure above shows the bounding box prior to release of the left mouse-button. All objects in the bounding box are selected if the left mouse-button is released.

### 4.5.5 Connections

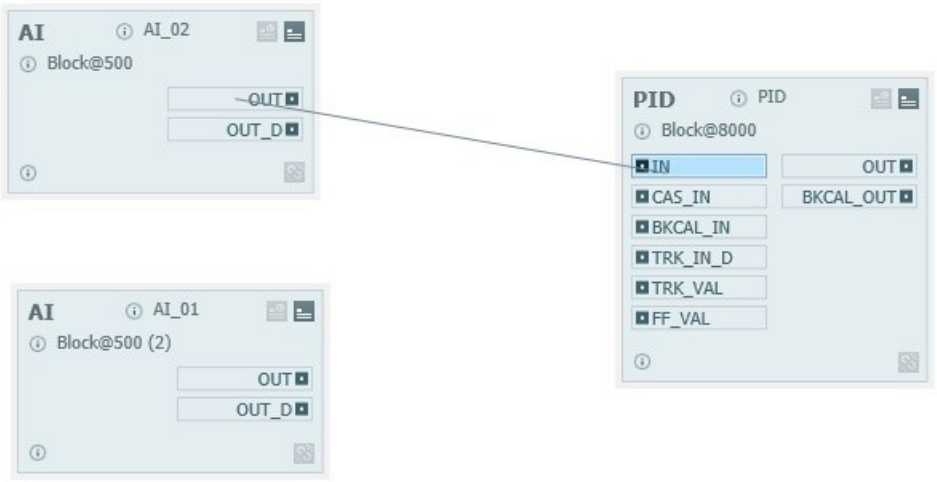
Connections can be established between parameters of used function blocks on the Function block application diagram. The connections correspond to Publisher / Subscriber communication relationships between function blocks in the application.

#### 4.5.5.1 Establish a connection

1. Select **View → Function Block Application → <Function Block Application Name>** from the menu.
2. Within Function block application view select the Function block application you want to edit. Selection is done on the left pane in the tree view of application groups and function block applications. The left pane will show the diagram editor of the function block application view.

3. Add function blocks as desired to the function block application (see section Add Function blocks to the Function block application 51).
4. Select a parameter (OUTPUT / INPUT) of the block using the left mouse-button. The corresponding parameter will be highlighted (see the figure below).

5. From the middle of the highlighted rectangle (see figure above) drag a line (keep left mouse-button pressed) to a parameter of another function block. The other parameter will be highlighted in blue color if it's possible to establish a connection. See figure below:




6. The parameter will be highlighted as shown above if the following validations are true:
   a. Data types must match.
   b. If the current parameter is an INPUT parameter, the corresponding parameter of the other block must be an OUTPUT parameter.
   c. If the current parameter is an OUTPUT parameter, the corresponding parameter of the other block must be an INPUT parameter.
   d. If the current parameter is an INPUT parameter, the parameter shall not have a connection already established to another OUTPUT parameter.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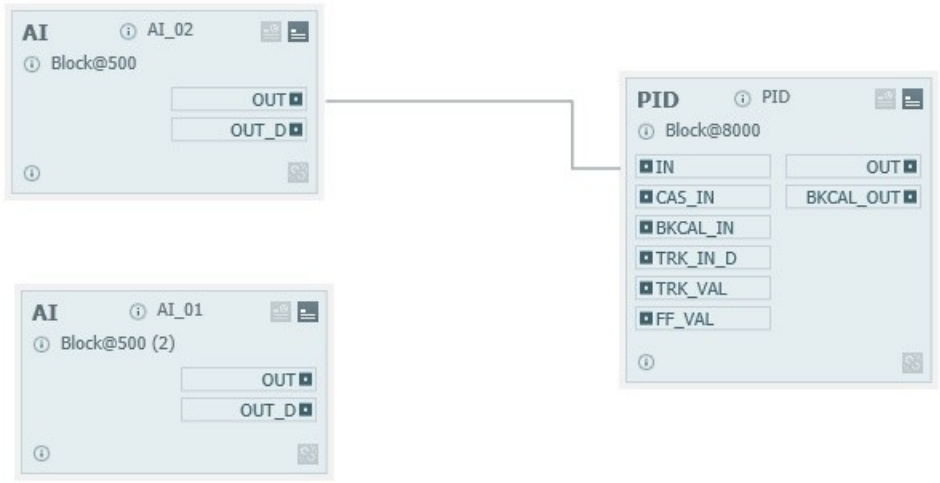
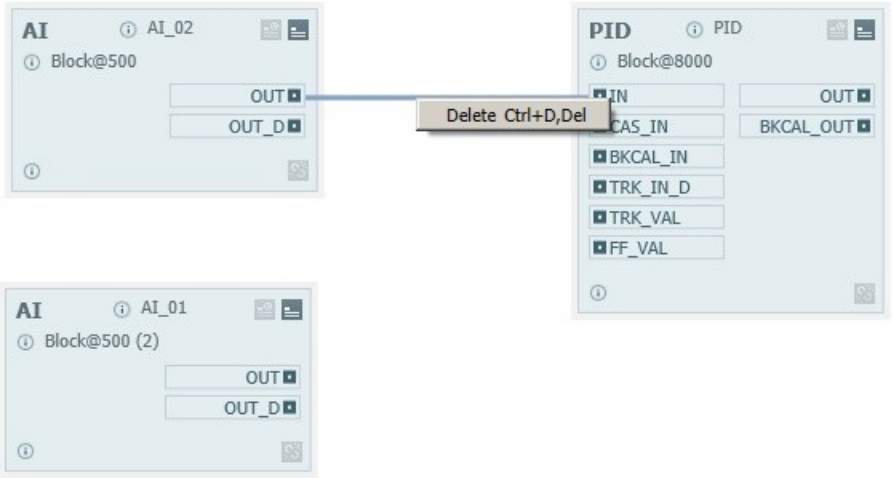
7. Release the left mouse-button over a parameter that is highlighted as shown with the figure above. The connection will be established. See the figure below:




### 4.5.5.2 Remove a connection

1. Within the diagram editor of the function block application select the connection you want to remove. The connection will be highlighted.
2. Press the right mouse-button. A context menu will appear:




3. Select the context menu item **Delete**.
4. Alternatively to the context menu you can also press the **Del** key.

#### 4.5.5.3 Connection properties

### Data Type

When connecting two or more function blocks to each other, you can move the mouse over the connection to display the **Data Type**. The following types are shown: Float, Discrete and BitString.

### Connector color

Standard connector color is black. When having an invalid applicable state, the connector will appear in red color.

## 4.6 Instances view

The Instances view provides an overview of the devices defined in the Topology view. Available filters depend on the bus system and allow filtering (see Filtering (precedence filter) 22 and Device types filtering 67 for more information). For each device, a number of key properties are displayed. These properties cannot be edited.

Click **View** → **Instances** or press **Ctrl+Shift+I** to open the instances view.

The following icons are used for all bus systems:

| Icon | Name | Effect |
|---|---|---|
| | Collapse region | Hides the available details for a block or a device. |
| | Expand region | Displays the available details for a block or a device. |
| | Tag Name | Project-specific name of the entity; in this case, the name of an instance. |
| | Navigate To Topology View | Switches to the Topology view 44 to which the instances are assigned. |

For information on bus-specific icons and functionalities in the instances view refer to

Instances view (FOUNDATION fieldbus 61 ) 61 or to

Instances view (PROFINET 65 ) 65.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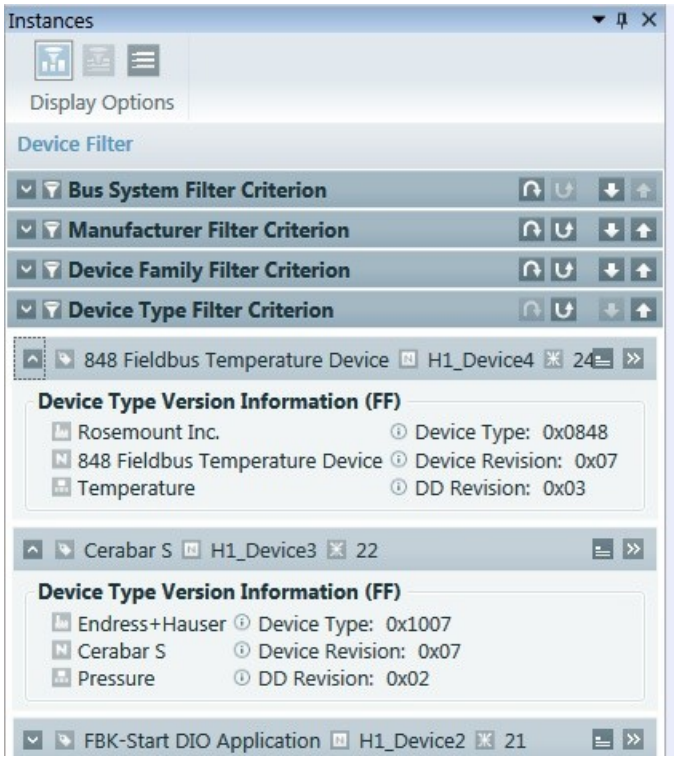
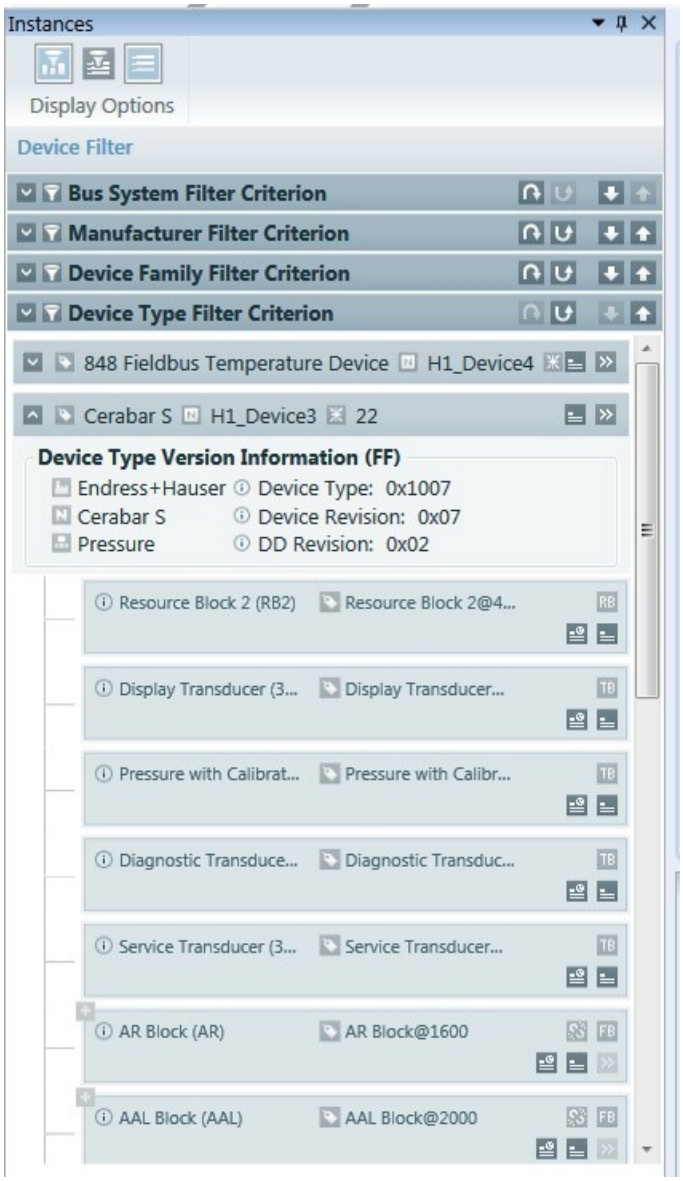
### 4.6.1 Instances view (FOUNDATION Fieldbus)

With a FOUNDATION fieldbus device the following data including resource, transducer and function blocks is shown:

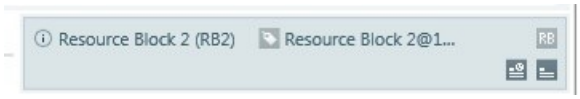



| | |
|---|---|
| | Tag name of the device. |
| | PD – Tag of the FF device. |
| | Node address of the FF device. |
| | Edit configuration parameters106. |
| | Show in Topology view – opens the Topology view44 and displays the selected device. |
| | Manufacturer name - see Device types view65. |
| | Device name - see Device types view65. |
| | Device family name - Device types view65. |
| | Device Type – see Device types view65. |
| | Device Revision – see Device types view65. |
| | DD Revision – see Device types view65. |




Blocks are presented as "children" of the FF device. The button ▾ on the device header can be used to collapse / expand the device details AND the block instances. Blocks contain the following icons and buttons:

### Resource Block (RB)




| | |
|---|---|
| ⓘ | Shows the label of the block as been read from the FF DD and in parentheses the short profile name (RB2 for Resource block 2, RB for Resource block). |
| 🏷 | Shows the tag name of the block. Project-specific name of the entity; here a block instance. The project specific name does not show any restrictions with regards to character set or length. |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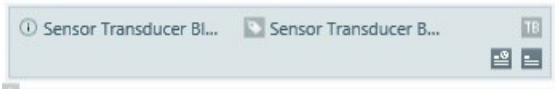
| | |
|---|---|
| | Shows the configured block tag of the block instance. The block tag has restrictions with regards to character set and length as defined by FF specifications. |
| RB | Indicates that this is a resource block. |
| | Allows to edit configuration parameters[106] of this resource block. |
| | Allows to edit device parameters[105] of this resource block. |

### Transducer Block (TB)




| | |
|---|---|
| | Shows the label of the block as been read from the FF DD and in parentheses the profile number (). |
| | Shows the tag name of the block. Project-specific name of the entity; here a block instance. The project specific name does not show any restrictions with regards to character set or length. |
| | Shows the configured block tag of the block instance. The block tag has restrictions with regards to character set and length as defined by FF specifications. |
| TB | Indicates that this is a transducer block. |
| | Edit configuration parameters[106] of this transducer block. |
| | Edit device parameters[105] of this transducer block. |

### Function Block (FB)

| | |
|---|---|
| | Shows the label of the block as been read from the FF DD and in parentheses the short profile name (IS for Input Selector). |
| | Shows the tag name of the block. Project-specific name of the entity; here a block instance. The project specific name does not show any restrictions with regards to character set or length. |
| | Shows the configured block tag of the block instance. The block tag has restrictions with regards to character set and length as defined by FF specifications. The block tag is only shown and can be configured if the block is in associated state. |
| / | Association State:<br>Unassociated |

| | |
|---|---|
| | Filters for blocks that are unassociated. This means that the block can be used in a function block application.<br>Associated<br>Filters for blocks that are associated. This means that the block is already used in a function block application and cannot be used in the same or another function block application. |
| FB | Indicates a function block. |
| | Opens a window allowing to edit (configuration) project parameters[106] of this function block. The button is only shown and can be used if the block is in associated state. |
| | Opens a window allowing to edit device parameters[105] of this function block. |

### Filter display options (blocks filter)

Filter display options allow filtering for devices and blocks and enable showing or hiding blocks:

Show device filter and apply existing filter / Hide device filter and remove the applied filter

Show Blocks filter and apply existing filter / Blocks filter is disabled since the blocks are not displayed with devices

Show Blocks in Devices / Hide Blocks in Devices

### Profile filter criterion

| | |
|---|---|
| Profile | Filter criteria to filter for the profile of the block such as Analog Input, Analog Output … etc.<br>The set of profiles shown as filter options depends on the types of devices in the project. For instance, if you have instantiated one FF device in the segment where the type information defines a Resource block, a Transducer Block, and only one Analog Input Block, you would see the following filter options:<br>- Resource or Resource 2<br>- Transducer Block<br>- Standard Function Blocks (e.g. Analog Input etc.)<br>- Customized Function Blocks.<br>**Note**<br>Transducer blocks and Customized Function Blocks are summarized with one filter option each. |

### Association status (see also Function block association[53])

The following association statuses allow for filtering as follows: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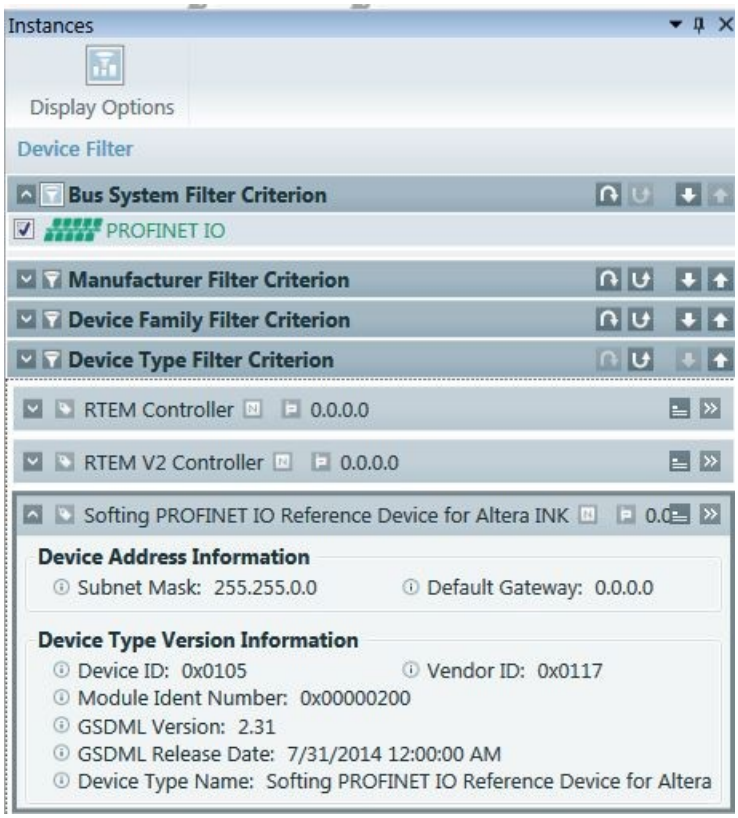
| Status | Filtering for |
|---|---|
| Non Associable | Filters for blocks that cannot be associated. This means that the block cannot be used in a function block application. This is true for resource blocks and for transducer blocks. |
| Unassociated | Filters for blocks that are not associated. This means that the block can be used in a function block application. |
| Associated | Filters for blocks that are associated. This means that the block is already used in a function block application and cannot be used in the same or another function block application. |

For detailed information on filtering refer to Filtering (precedence filter) 22.

The Blocks filter works the same as the filtering in device types view (refer to Filtering (precedence filter) 22).

### 4.6.2 Instances view (PROFINET)

With a PROFINET device the following data is presented in instances view:




#### Display Options

Display options allows filtering for devices:

Show device filter and apply existing filter / Hide device filter and remove the applied filter

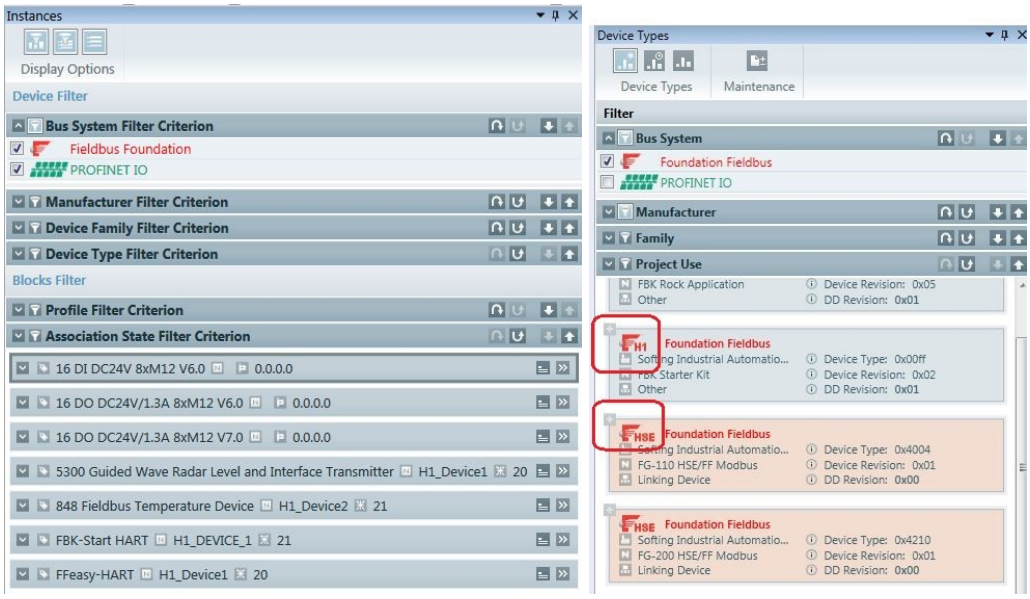
## 4.7 Device types view

### 4.7.1 Device types view functionality

This view shows all the devices that are available in the Configurator 's type catalog. The relevant device descriptions have to be imported first. This is done using the Type Catalog Maintenance view 68.

The devices are grouped into the following categories:

- Bus System: Currently, PROFINET and FOUNDATION fieldbus systems (HSE and H1) are supported.
- Manufacturer: The manufacturers listed here depend on the imported device description files.
- Device Type Family: The entries given here depend on the used bus system and on the imported device description files (Gateway, ...).




**Note**

Device types will only be displayed if either the relevant manufacturer or all manufacturers are selected and the filter criteria is not deactivated. See also Filtering (precedence filter) 22.

The categories can be used for filtering. They are weighted in the order they appear. The order can be changed. When a new project is created, the following order is used for filtering: Bus System - Manufacturer - Device Type Family.

### 4.7.2 Device types view buttons

| Button | Name | Effect |
|---|---|---|
| | All Device Types | Displays all device types contained in the catalog. This means that information from all the device description files in the catalog is available. The list can be narrowed down by using the filters described below. |
| | Most Recently Used Device Types | Displays only the device types of which instances have been created in the Topology view. |
| | Latest Device Types | Depending on the supported fieldbus it is possible to have multiple revisions of the same device type being imported. Then the Latest Device types set shows only the latest revision of the device type being imported. |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| Button | Name | Effect |
|---|---|---|
| | Launch Type Catalog Maintenance View | Displays the dialog box[68] for editing the type catalog. |
| | Collapse region | Hides the available details for a section. |
| | Expand region | Displays the available details for a section. |
| | Apply Defined Filter Criteria | Activates or deactivates the filter. This means the filter options are retained but the filter is deactivated. |
| | Reset all filters below | Deactivates the currently selected filter criteria and all filter criteria with a lower precedence (below). |
| | Reset all filters above | Resets settings of all criteria located above to default settings. Maximum are four different filter criteria. |
| / | Move this filter down / Move this filter up | The position and thereby the precedence of the criteria can be changed with the button to move the position of the selected criteria down or to move it up with the button . |

### 4.7.3 Device types filtering

The device type view allows to filter for device types sorted by bus system, manufacturer, project use and family:

The currently selected filter criteria and filter options are retained for each individual device type used:

**Latest device types**

Depending on the supported fieldbus it is possible to have multiple revisions of the same device type being imported. Then the Latest device types set shows only the latest revision of the device type being imported.

**Most recently used device types**

Shows all device types that have been used most recently with a project.

**All device types**

Shows all device types used with a project.

**Expand / Collapse**

Expands or collapses the selected filter criteria entries

**Move criterion up or down**

Moves the position of the selected criterion down or up.

Deactivates the currently selected filter criteria and all filter criteria with a lower precedence (below).

Deactivates the currently selected filter criteria plus all filter criteria with a higher precedence (above).

Opens the Type Catalog Maintenance view 68.

For more information on filtering refer to Filtering (precedence filter) 22.

## 4.8 Type Catalog Maintenance view


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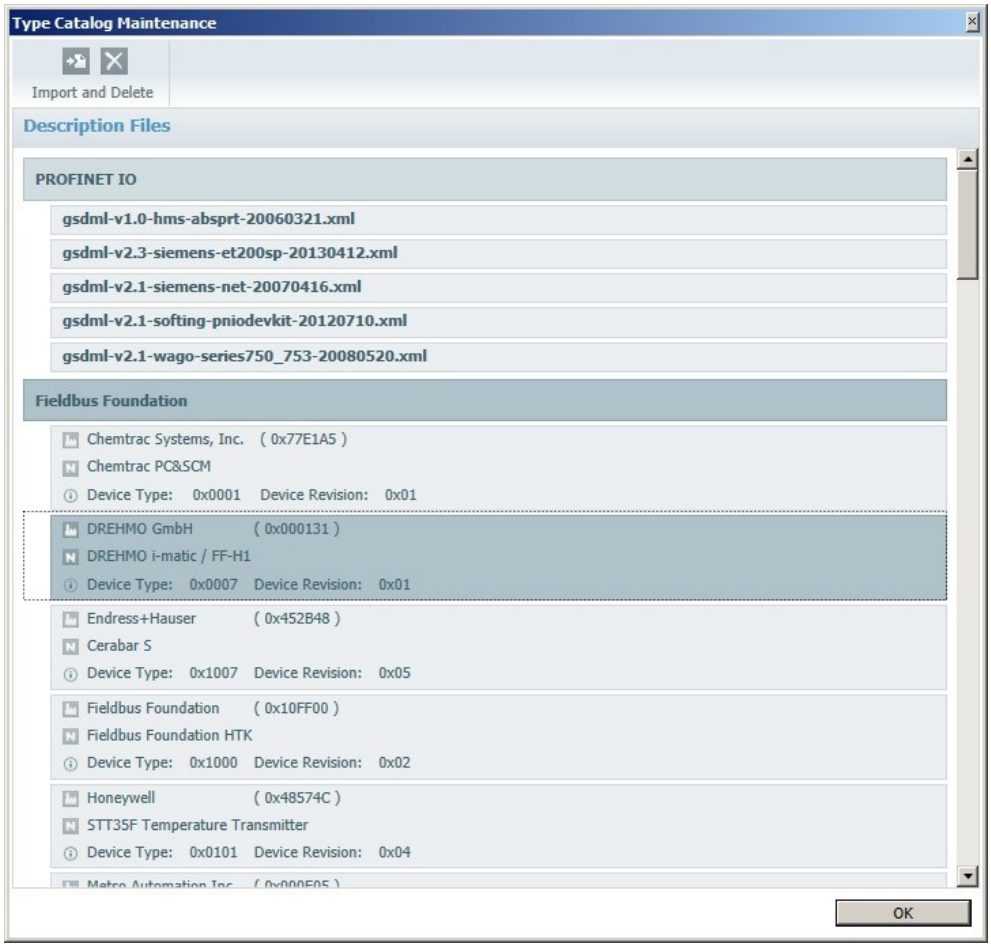
### 4.8.1 Type Catalog Maintenance view functionality

This view can be accessed in two ways:

- Click the Launch Type Catalog Maintenance View button in the Device Types view[66].
- Select the View menu[116] and click **Type Catalog Maintenance**.




This window allows importing and deleting device description files. This feature is used to extend the type catalog.

- Click **[Import]** to display a dialog box allowing you to browse for the required device description file.
- Click **[Import]** within this dialog box to import the selected file. Information on the import result is added to the Message Log.
- When the import is complete, additional files can be selected or the dialog box can be closed. The imported device description files are displayed.
- Click **[Delete]** to delete imported description files. A device description file can only be deleted if it is not used in the currently open project. Click **[OK]** to close the view. The Device Types view now provides new manufacturers, device types and device instances, depending on the performed maintenance actions.

If newly added files cannot be displayed due to filter settings[67] defined in the Device Types view, this is indicated in the information at the bottom of the view.

### 4.8.2 Type Catalog Maintenance buttons

| Button | Name | Effect |
|---|---|---|
| | Import | Imports the device description file specified in the dialog box into the catalog. Device description files up to version 2.3 can be imported. |
| | Remove | Removes the selected device description files from the catalog. A confirmation message appears before final deletion. To suppress confirmation messages refer to Settings window 113. |

## 4.9 Templates view (FOUNDATION fieldbus only)

Templates are used to store and reuse a set of parameters assigned to a device type.

The templates view allows to add new templates and to edit existing templates. A template wizard supports this functionality. Select **View → Template** to open the view. The first time an empty window is opened.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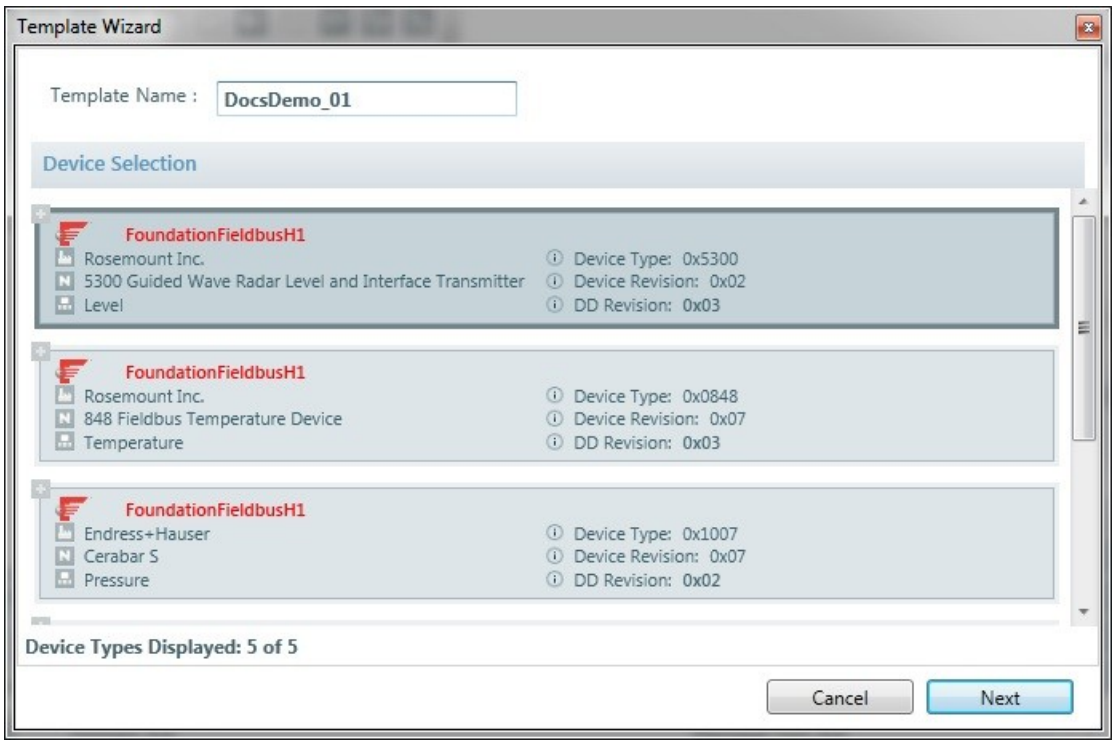
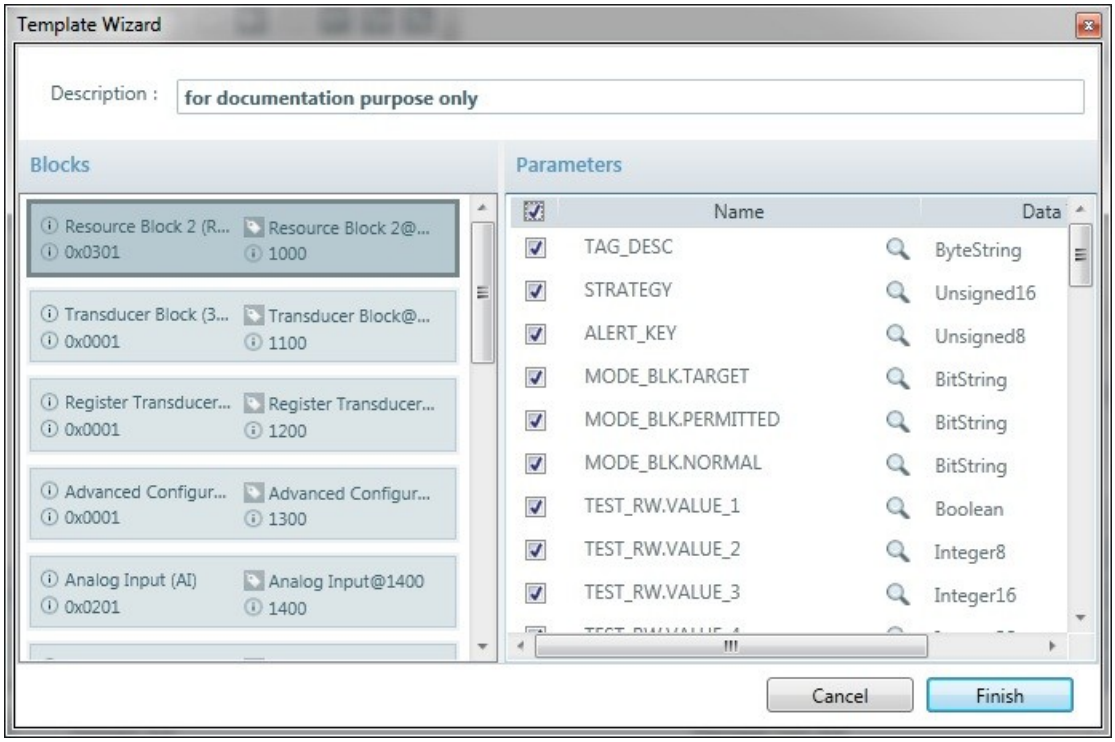
### 4.9.1 Templates view functionality

#### Add a new template

1. Click **View → Templates**. Then click to start the template wizard.
2. The template wizard is opened.
3. Select the desired device. Enter a template name. If you leave the field empty, the system will assign a unique default name:




4. Click **[Next]**. The parameter dialog is opened:




5. Select the block. Then switch to the parameters list to include the required parameters in the template:
   a. Select all parameters by clicking left beside **Name** or
   b. select single parameters by activating the respective check box.
6. To remove or exclude a parameter leave the check box empty (deactivated).
7. Repeat this action for any block you want to add.
8. Click **[Finish]** to complete the template wizard.

### Edit a template

1. Select a template, then click to start the template wizard. The parameter dialog is opened.
2. Modify the information as described above in **Add a new template**.
3. Click **[Finish]** to complete your modifications.

### Configure the values of a template

Select the block for which you want to configure the values. The values can be entered the same way as in the parameter view.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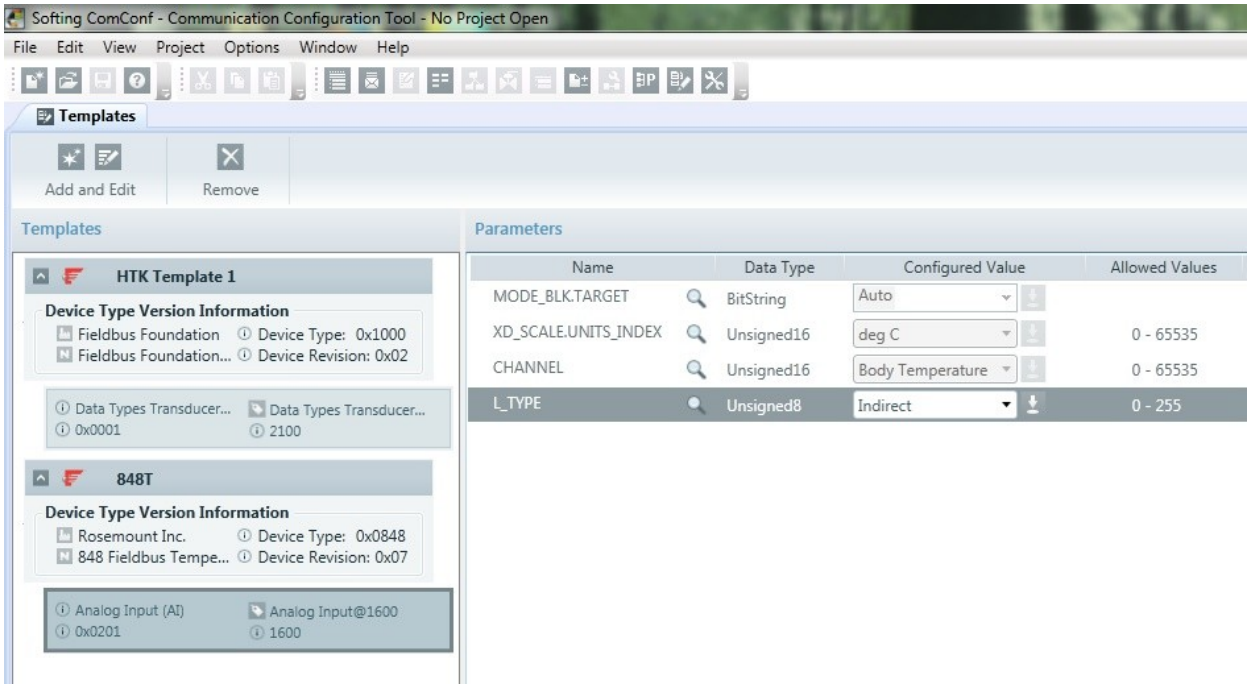
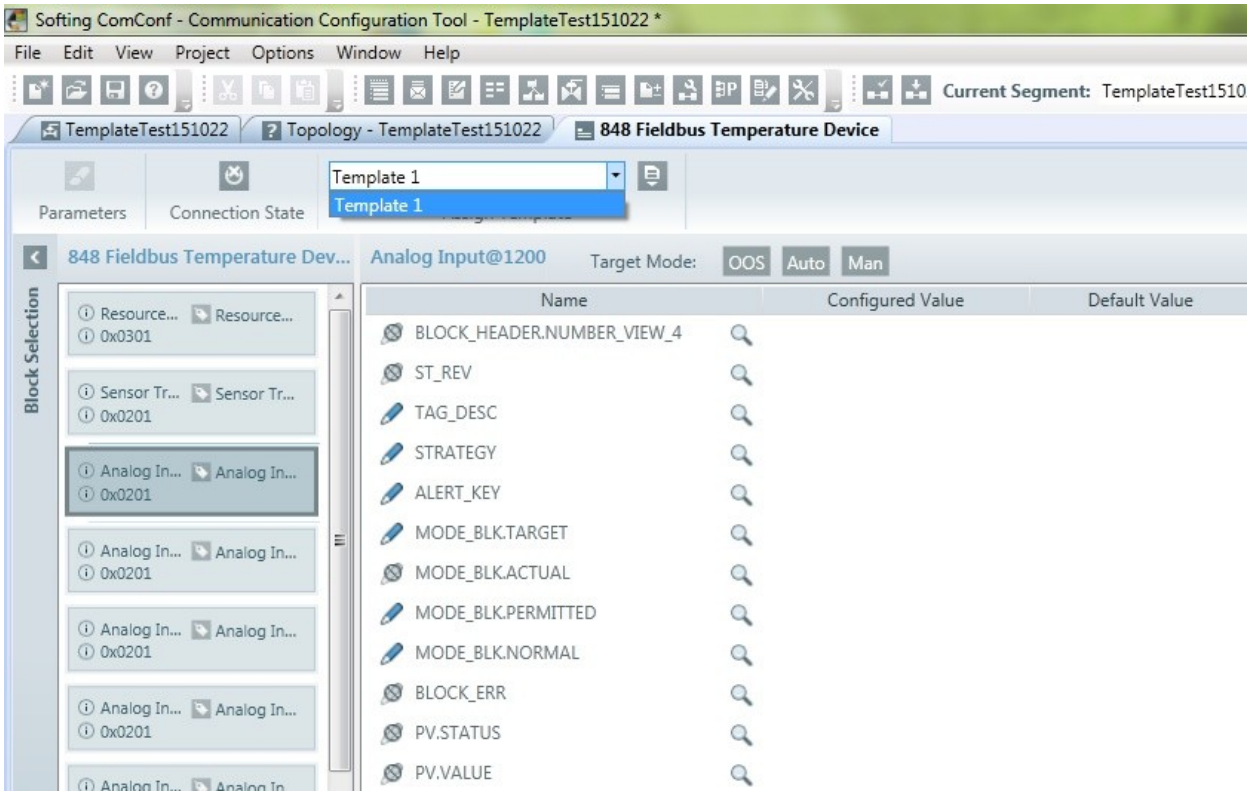



### Change name or description in Properties view

1. Open **Properties** view from main menu with **View** → **Properties** or press **Alt+Enter**.
2. **Properties** view allows to change the template name and the description of a selected template (Templates properties in templates view 77).

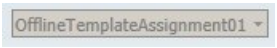
### Assign a template to a specific device

Open the online or offline parameter view.




Within the combo box you can select one of the templates created for this device type. Use the button right beside to assign the values of the template to the parameter values of the device.

User interface elements for template assignment:

| | |
|---|---|
|  | Provides the list of available templates for assignment to the device. The element is disabled if a template assignment is currently pending. |
| | Starts the template assignment. The element is disabled if a template assignment is currently pending or if no template is available for template assignment. |
| | Progress element shown during a template assignment. Disappears after completion of the operation. |
| Message Log View | During a pending template assignment, informational messages and errors are sent to the message log view. |

Template assignment is available for configuration data in offline mode as well as for online mode. In online mode template assignment will write all template parameter values to the corresponding parameters of the device. Implicit MODE handling will ensure the parameters can be written.

In offline mode the template parameter values will be written to the configuration data of the device. It may happen that the user has already configured parameter values with the configuration data of the device but then decides to assign a template to the device. If an already configured parameter value is encountered during template assignment and the value is distinct from the value of the corresponding template parameter a Template Assignment Overwrite Query will appear as shown below: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With this query you have four options:

- Overwrite the currently configured parameter value with the value of the template.
- Skip the currently processed parameter and thereby leave the already configured value.
- Overwrite all parameters having a configured value with the corresponding values of the template.
- Skip all remaining parameters having a configured value that is distinct from the corresponding template parameter value and thereby leaving the already configured values.

### 4.9.2 Templates view buttons and elements

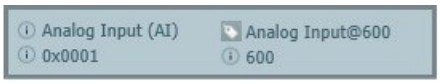
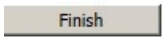
| Button | Name | Effect |
|---|---|---|
| | Add template | Opens the corresponding dialog. |
| | Edit template | Edits a selected template. |
| | Copy template | Creates a copy of an already existing template. |
| | Remove | Removes the selected template. |

Displayed in the left window pane:

- Template name,
- device type, the template is linked to with device type information,
- blocks used for the template with block type information:

#### User interface elements for template definition

| | |
|---|---|
| | Allows to modify the name of the template. |
| | Allows to modify the description of the template. |

| | |
|---|---|
| | You can also change the description with property view. |
|  | Select the corresponding block to start with the selection of the block parameters for the template. |
| | Click to activate the parameter for this template. Leave the check box empty to remove the parameter from the template. |
|  | Finish the parameter selection for the template. All selected (checked) parameters are added to the template. Template parameters which have been selected previously and are now deselected will be removed from the template. |
| | The parameter selection is canceled. The template is not modified. |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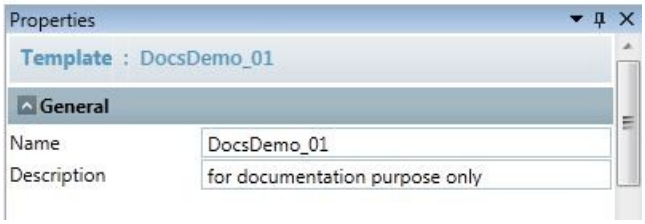
### 4.9.3 Templates properties in templates view

1. Select **View** → **Templates**, then select a template.
2. Click **View** → **Properties** from main menu or press **Alt+Enter**. The following properties view appears:

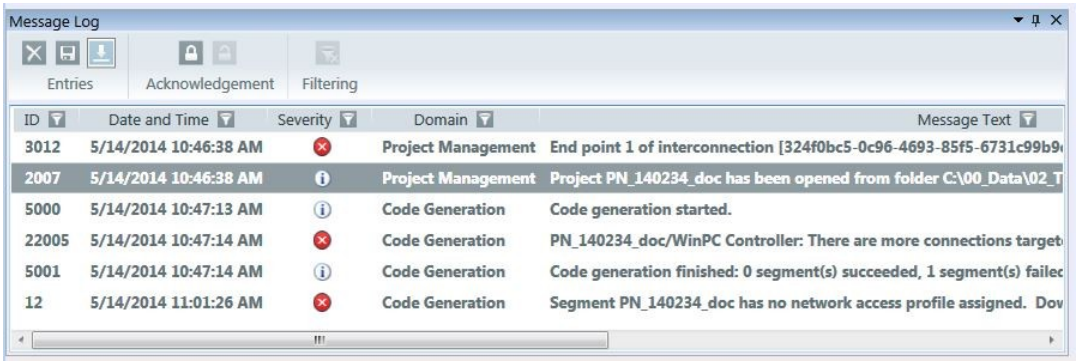



3. This dialog allows to modify the template name and the template description.

## 4.10 Message log view

### 4.10.1 Message log view functionality

The Message Log window provides information on the results of the actions performed. It shows whether an action was successful, failed or generated a warning. The entries are displayed in chronological order, which means that the most recent entry appears at the bottom of the list.

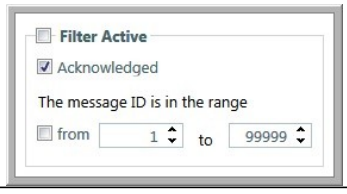


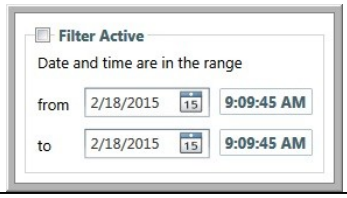
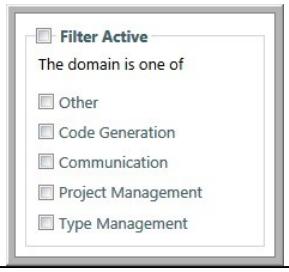
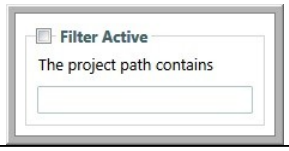
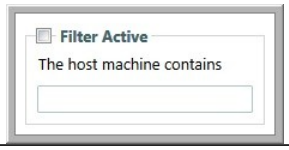

#### Sorting message log entries

The sort order of the message log entries can be changed by clicking a column header. For example, the entries can be sorted in ascending or descending order by the ID or the time of entry. Other columns are sorted in alphabetical order. In the Severity column, the entries can be sorted by priority in ascending or descending order. Only one sort criterion can be used at a time.

#### Filtering within message log entries

1. Make sure the filter is activated (refer to Filtering (precedence filter)[22] for more information).
2. Then right-click with the mouse on the respective caption entry to open the related filter dialog:

| Filter criterion | Dialog | Meaning |
|---|---|---|
| ID |   | Specify a filter for message ID range and define whether IDs are acknowledged or not. |

| Filter criterion | Dialog | Meaning |
|---|---|---|
| Date and Time |  | Specify a filter for date and time range to display only those messages that have been generated in the specified range. |
| Severity | | Specify one or more severity types such as<br>Error<br>Information<br>Warning<br>to display only those messages which contain the specified message. |
| Domain |  | Specify one or more domain types. |
| Message Text | | Specify a part of a message text, e.g. "connection" to filter for messages that contain the term "connection". |
| Project Name | | Specify a project name or a part of it, e.g. "FF" to filter for project names that contain the characters "FF". |
| Project Path |  | Specify a project path or a part of it, e.g. "*custom*" to filter for project paths that contain the characters "*custom*". |
| Host Machine |  | Specify a host machine name or a part of it, e.g. "1234" to filter for host machine names that contain the numbers "1234". |

### 4.10.2 Message log view buttons

| Button | Name | Effect |
|---|---|---|
| | Delete all message entries | Deletes all messages |
| | Delete all selected message entries | Deletes one or more selected messages. |
| | Save messages to file | Saves all messages to a file. You can specify the name and location for the file. The file is saved in CSV format. This format cannot be changed. |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| Button | Name | Effect |
|---|---|---|
| | Force the Message Log list to scroll to the newly added element at the end of the list | Lists all messages in reverse chronological order. Use this button to scroll to the most recent entry at the bottom of the list. |
| | Acknowledge all selected unacknowledged entries | Displays all unacknowledged messages in bold. Acknowledged messages are displayed in normal type. It is possible to acknowledge multiple messages in a single step. |
| | Unacknowledge selected acknowledged entries | Undoes the change from bold to normal type. |
| | Remove filters | Clears all filters defined in the columns. |

For sorting message log entries refer to Sorting Message log entries 77.

For filtering refer to Filtering (precedence filter) 22.

## 4.11 Properties view

Properties are focus-related, i.e. if you select a device in the topology view and then select **View → Properties** from the menu, you will display the properties of that selected device. If you do not select any device, the segment properties will be displayed.

You can find detailed information in:

Segment properties view (FOUNDATION fieldbus) 80

Device properties view (FOUNDATION Fieldbus) 87

Function block properties in property view 50

Templates properties in templates view 77

Segment properties view (PROFINET) 86

Controller and device properties view (PROFINET) 93

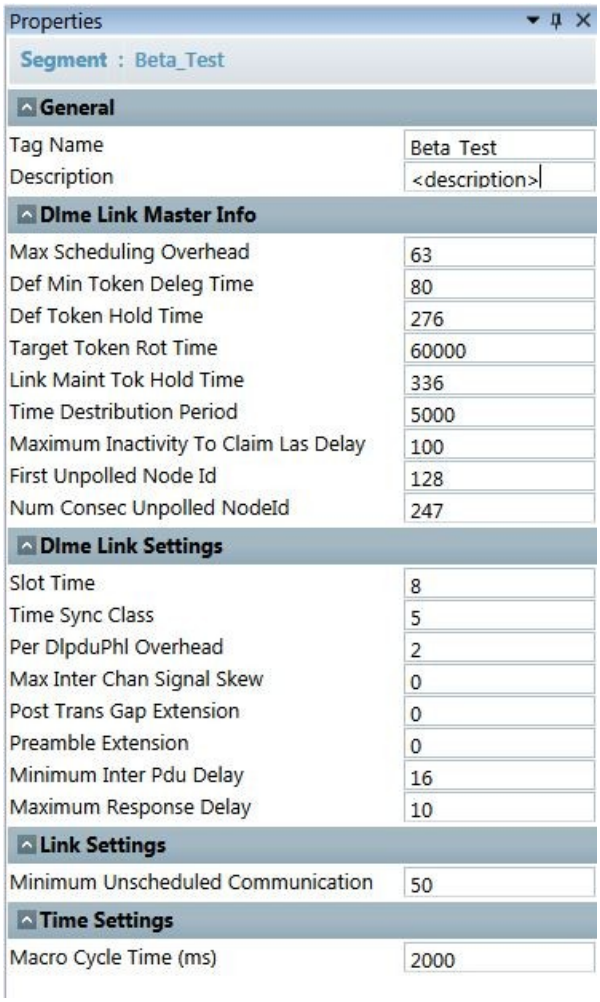
**Note**

Project properties 115 are displayed with **Project → Project Properties** from the menu. This dialog allows changing Project Name and Project Description.

### 4.11.1 Segment properties view

#### 4.11.1.1 Segment properties view (FOUNDATION fieldbus - FF H1)

1. Open the Topology view.
2. Make sure that no device is selected.
3. Then select **View → Properties** from the menu or press **Alt+Enter.**
4. The following window is opened:




5. It contains the following values:

| Property | Description | Range | Default |
|---|---|---|---|
| **General** | | | |
| Tag Name | Unique name within the project. | | segment name from project |
| Description | Comment describing the device in more detail within the context of the project. | | empty |
| **Dlme Link Master Info** | | | |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| Property | Description | Range | Default |
|---|---|---|---|
| Max Scheduling Overhead | This parameter specifies the maximum scheduling overhead permitted to an LAS DLE by the existing link schedule. The parameters unit is the transmission duration of one octet. This overhead is included in the time allocated for each scheduled activity. It is used only during schedule construction and determination of whether a DLE can serve as LAS for an existing schedule or not. An H1 devices capable value of V(MSO) will be checked with the configured value in the LAS domain during download of the domain. | 0 - 63 | 63.<br>Max. value of the capabilities of the H1 link and all BLM capable H1 devices on the link shall be configured. |
| Def Min Token Deleg Time | As the accuracy of the LAS schedule has the highest priority, the remaining time for granting the token might be less than Def Token Hold Time. In this case the token can be granted only when the remaining time is higher than Def Min Token Deleg Time. The parameter is specified in octet durations. | 2 - 32767 | 80 |
| Def Token Hold Time | Determines how long a device can hold a token, i.e. how much time the device can use for acyclic bus traffic (Client/Server connections, SM services and alarms/ events. | 276 - 65000 | 276 |
| Target Token Rot Time | This parameter specifies the target time in which all devices have been given the token for acyclic data transfer. If the actual token rotation time is higher than the configured value for Target Token Rot Time, the LAS will increase the token priority. So a value of Target Token Rot Time that is too small could cause that no client/server or SM service can be transmitted as these are using the lowest priority. | 1 - 60000 | 60000 |
| Link Maint Tok Hold Time | This parameter specifies the time that the LAS uses within a token rotation for link maintenance which is probing for new node addresses and sending LAS status frames. | 292 - 65000 | 336 |
| Time Distribution Period | Time Distribution PDU's will be sent on the bus in 95% or less of that time period. The parameter is specified in milliseconds. | 10 - 55000 | 5000 |
| Maximum Inactivity To Claim Las Delay | This parameter specifies the internal delay time a Link Master device needs from the detection of the failure of a LAS to the time the Link Master sends a ClaimLAS request. When configuring the link, the minimum value for this parameter is determined by the highest value of all Link Master devices in the link. | 1 - 4095 | 100 |

| Property | Description | Range | Default |
|---|---|---|---|
| First Unpolled Node Id | The node address of the first node that will not be polled by the LAS of the link. | FUN >= 20 AND FUN + NUN - 1 <= 247. | 248 |
| Num Consec Unpolled NodeId | Range of consecutive node addresses that are not polled by the LAS of the link. | FUN >= 20 AND FUN + NUN - 1 <= 247. | 0 |
| **Dlme Link settings** | | | |
| Slot Time | Device capability how fast the device can reply upon receipt of a PDU. This capability is measured in Max Response Delay Slot Times, V(MRD) V(ST). Both parameters are specified in octet durations. The attributes SlotTime and Max Response Delay should be set such that the device represents the maximum response delay in octets of the device. The capability can be obtained from the devices CFF file. When configuring a H1 Link the maximum value of the product Slot Time Max Response Delay of all devices residing on that link should be the minimum value for the Link configuration. This is to assure that all devices participate on the bus. | 1 - 4095 | 8<br>Support for a value less than the default is recommended. |
| Time Sync Class | This parameter defines the quality of the clock accuracy of a device. Thus it also defines the periods for time synchronization because a device with a more inaccurate clock should be synchronized more often. The maximum value a device is capable to support is described in the device's CFF file. When configuring a link, the maximum value should be set according to the minimum value of the used devices. | | 5 |
| Per DlpduPhl Overhead | The parameter defines the physical layer induced delay between the end of the last octet of one data link frame as it appears on the link, and the beginning of the first octet of any other data link frame as it appears on the link. | 2 - 63 | 2 |
| Max Inter Chan Signal Skew | Devices receiving data via several ports from the same H1 link have to consider a maximum time shift (signal skew) of 5 bit transmission times. This parameter allows the maximum permissible time shift for the H1 link to be increased by 0-7 4-bit transmission times. The value range is (0-7) * 4* tBit. tBit is the bit transmission time. | 0 - 7 | 0 |


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| Property | Description | Range | Default |
|---|---|---|---|
| Post Trans Gap Extension | After every transmission, a gap of 4 bit transmission times is inserted. This parameter allows the gap to be increased by a further 0-7 4-bit transmission times. The value range is (0-7) * 4* tBit. tBit is the bit transmission time. Increasing this value leads to an increase in Per DlpduPhl Overhead. | 0 - 7 | 0 |
| Preamble Extension | Each frame on the H1 link starts with a preamble octet which is used by the receiving nodes (Devices) to synchronize to the signal clock. The number of preamble(s) can be extended when setting this parameter. The default value is 0. Networks including digital repeaters may require larger values. | 0 - 7 | 0 |
| Minimum Inter Pdu Delay | This parameter specifies the minimum interval between two frames on the H1 link. The minimum value of Minimum Inter Pdu Delay which a device is able to support is described in the CFF file of a device. When configuring the H1 link, the minimum value that can be used for Minimum Inter Pdu Delay is the maximum of the values from the CFF files of the used devices. | Max. value of the capabilities of the H1 link and all H1 devices on the link shall be configured. | |
| Maximum Response Delay | Device capability how fast the device can reply upon receipt of a PDU. This capability is measured in Maximum Response Delay Slot Times, V(MRD) V(ST). Both parameters are specified in octet durations. The attributes Maximum Response Delay and Slot Time should be set such that the device represents the maximum response delay in octets of the device. The capability can be obtained from the devices CFF file. When configuring a H1 Link the maximum value of the product Slot Time u Maximum Response Delay of all devices residing on that link should be the minimum value for the Link configuration. This is to assure that all devices participate on the bus. | 1 - 11 | 10 |
| **Link settings** | | | |

| Property | Description | Range | Default |
|---|---|---|---|
| Minimum Unscheduled Communication | Unscheduled communication time is needed for alarms, events and asynchronous read/ write access via client/server communication. It can be set for each H1 link via the Minimum Unscheduled Communication attribute. The actual time value for unscheduled communication $T_{uc}$ is calculated from the Macro Cycle Time and the schedule. If the calculated $T_{uc}$ in % of the Macro Cycle Time is less than the configured value of Minimum Unscheduled Communication, the error message "The current unscheduled communication time $T_{uc}$ % is less than the configured value Minimum Unscheduled Communication %" is issued. The algorithm used takes into account that each unscheduled communication needs a minimal time slot, dependent on the configured bus parameters. | | |
| **Time settings** | | | |
| Macro Cycle Time (ms) | Cycle time of the link in 1/32 ms. During code generation, this value is checked against the generated schedule under consideration of bl4ff:Minimum Unscheduled Communication. | | |


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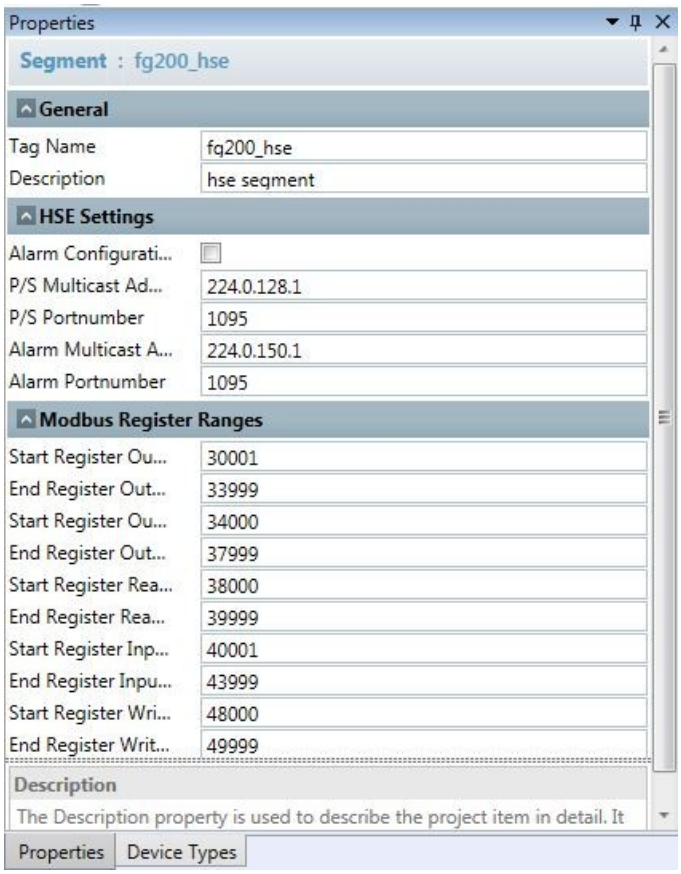
#### 4.11.1.2 Segment properties view (FOUNDATION fieldbus - FF HSE)

1. Open the Topology view.
2. Make sure that no device is selected.
3. Then select **View → Properties** from the menu or press **Alt+Enter.**
4. The following window is opened:



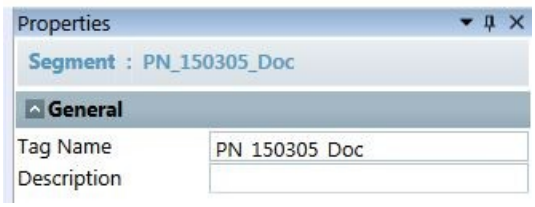

5. It contains the following values:

| Property | Description |
|---|---|
| **General** | |
| Tag Name | Unique name within the project. |
| Description | Comment describing the device in more detail within the context of the project. |
| **HSE Settings** | |
| Alarm Configuration | Enable or disable alarm configuration (via alarm report messages). |
| P/S Multicast Address | Multicast Address used for Publisher/Subscriber connections. |
| P/S Port Number | UDP Port number used for Publisher/Subscriber connections. |
| Alarm Multicast Address | Multicast Address used for alarm distribution. |

| Property | Description |
|---|---|
| Alarm Port Number | UDP Port number used for Alarm distribution. |
| **Modbus Register Range** | |
| Start Register Value Of Output Parameters | Lowest Modbus input register number assigned to the value of FF output parameters. |
| End Register Value Of Output Parameters | Highest Modbus input register number assigned to the value of FF output parameters. |
| Start Register Status Of Output Parameters | Lowest Modbus input register number assigned to the status of FF output parameters. |
| End Register Status Of Output Parameters | Highest Modbus input register number assigned to the status of FF output parameters. |
| Start Register Value Of Input Parameters | Lowest Modbus holding register number assigned to the value of FF input parameters. |
| End Register Value Of Input Parameters | Highest Modbus holding register number assigned to the value of FF input parameters. |
| Start Register Status Of Input Parameters | Lowest Modbus holding register number assigned to the status of FF input parameters. |
| End Register Status Of Input Parameters | Highest Modbus holding register number assigned to the status of FF input parameters. |
| Start Register Value Of Readonly Contained Parameters | Lowest Modbus input register number assigned to the value of FF read-only contained parameters. |
| End Register Value Of Readonly Contained Parameters | Highest Modbus input register number assigned to the value of FF read-only contained parameters. |
| Start Register Value Of Writeable Contained Parameters | Lowest Modbus holding register number assigned to the value of FF read/write contained parameters. |
| End Register Value Of Writeable Contained Parameters | Highest Modbus holding register number assigned to the value of FF read/write contained parameters. |

#### 4.11.1.3 Segment properties view (PROFINET)

1. Open the Topology view.
2. Make sure that no device is selected.
3. Then select **View → Properties** from the menu or press **Alt+Enter.**
4. The following window is opened:




Tag Name is the segment's name specified in the segment properties.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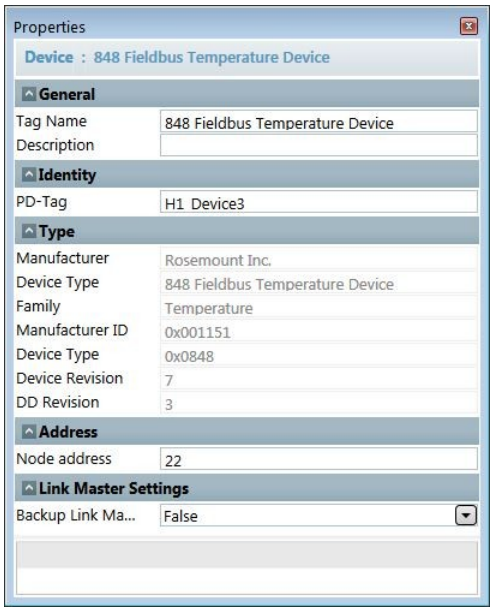
Description allows you to enter a description of the segment.

## 4.11.2 Device properties view

### 4.11.2.1 Device properties view (FOUNDATION fieldbus - FF H1)

1. Select **View → Instances** from the main menu.
2. Then select the desired instance. Now select **View → Properties.** Its properties are displayed in the respective window. If the window is already open and a different device is selected, the window contents immediately change to show the associated values.




The following information is shown for an FF H1 device:

| Property | Description | Example |
|---|---|---|
| **General** | | |
| Tag Name | Unique name within the project. | 848 Fieldbus Temperature Device |
| Description | Comment describing the device in more detail within the context of the project. | This is a Rosemount 848T. |
| **Identity** | | |
| PD-Tag | This is the PD-Tag of the device and has to be unique to a Fieldbus network because it is used for identification. | 848T |
| **Type** | | |
| Manufacturer | Specifies the manufacturer that has issued the device.<br>This entry cannot be changed. | Rosemount Inc. |

| Property | Description | Example |
|---|---|---|
| Device Type | Specifies the name of the device.<br>This entry cannot be changed. | 848 Fieldbus Temperature Device |
| Family | Specifies the functional class the device belongs to.<br>This entry cannot be changed. | Temperature |
| Manufacturer ID | Specifies a 24-bit number, that uniquely identifies the manufacturer, as registered by the Fieldbus Foundation. It is represented as hexadecimal.<br>This entry cannot be changed. | 001151 |
| Device Type | Specifies a 16-bit number, that uniquely identifies the type of the device. It is represented as hexadecimal.<br>This entry cannot be changed. | 0848 |
| Device Revision | Specifies an 8-bit number, that uniquely identifies the revision level of the device type. It is represented as hexadecimal.<br>This entry cannot be changed. | 07 |
| DD Revision | Specifies an 8-bit number, that uniquely identifies the revision level of the device descriptions corresponding to the device type. It is represented as hexadecimal.<br>This entry cannot be changed. | 03 |
| **Address** | | |
| Node Address | The node address of the device. | 20 |
| **Link Master Settings** | | |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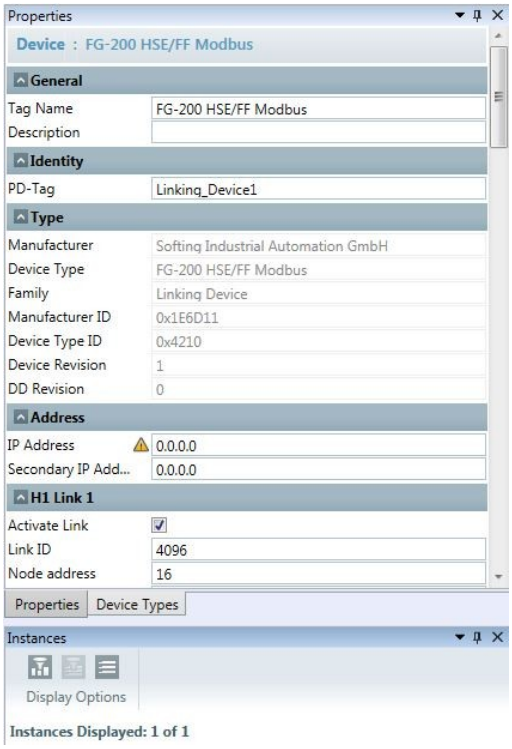
| Property | Description | Example |
|---|---|---|
| Backup Link Master | Specifies if the device shall act as backup link master. | False |

#### 4.11.2.2 Device properties view (FOUNDATION fieldbus - FF HSE)

1. Select **View** → **Instances** from the main menu.
2. Then select the desired instance. Now select **View** → **Properties.** Its properties are displayed in the respective window. If the window is already open and a different device is selected, the window contents immediately change to show the associated values.




The following information is shown for an FF HSE device:

| Property | Description | Example |
|---|---|---|
| **General** | | |
| Tag Name | Unique name within the project. | FG-200 HSE/FF Modbus |
| Description | Comment describing the device in more detail within the context of the project. | |
| **Identity** | | |
| PD-Tag | This is the PD-Tag of the device and has to be unique to a Fieldbus network because it is used for identification. | Linking_Device1 |

| Property | Description | Example |
|---|---|---|
| **Type** | | |
| Manufacturer | Specifies the manufacturer that has issued the device.<br>This entry cannot be changed. | Softing Industrial Automation GmbH |
| Device Type | Specifies the name of the device.<br>This entry cannot be changed. | FG-200 HSE/FF Modbus |
| Family | Specifies the functional class the device belongs to.<br>This entry cannot be changed. | Linking Device |
| Manufacturer ID | Specifies a 24-bit number, that uniquely identifies the manufacturer, as registered by the Fieldbus Foundation. It is represented as hexadecimal.<br>This entry cannot be changed. | 0x1E6D11 |
| Device Type ID | Specifies a 16-bit number, that uniquely identifies the type of the device. It is represented as hexadecimal.<br>This entry cannot be changed. | 0x4210 |
| Device Revision | Specifies an 8-bit number, that uniquely identifies the revision level of the device type. It is represented as hexadecimal.<br>This entry cannot be changed. | 01 |
| DD Revision | Specifies an 8-bit number, that uniquely identifies the revision level of the device descriptions corresponding to the device type. It is represented as hexadecimal. | 0 |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| Property | Description | Example |
|---|---|---|
| | This entry cannot be changed. | |
| **Address** | | |
| IP Address | The IP address that will be assigned to the device. | |
| Secondary IP Address | IP-Address of the secondary HSE device in a redundant configuration. | |
| **H1 Link 1 to 4** | | |
| Link ID | Link ID of the H1 Link. It has to be a segment wide unique number. | |
| Node address | The node address of the link. | |
| Macro Cycle Time (ms) | Specifies the value of the macro cycle time. The unit of the value is millisecond. | |
| Minimum Unscheduled Communication | Specifies the time that shall be left for unscheduled communication. It is defined in percent of the macro cycle time. | |
| Slot Time | Device capability how fast the device can reply upon receipt of a PDU. To assure that all devices participate on the bus the maximum value of the devices of the link should be used. | |
| Maximum response delay | Device capability how fast the device can reply upon receipt of a PDU. To assure that all devices participate on the bus the maximum value of the devices of the link should be used. | |
| Minimum Inter Pdu Delay | Specifies the minimum interval between two frames on the H1 link. | |
| First Unpolled Node Id | Node address of the first node that will not be polled by the LAS of the link. | |

| Property | Description | Example |
|---|---|---|
| Last Unpolled Node Id | Node address of the last node that will not be polled by the LAS of the link. | |
| Time Sync Class | Specifies the quality of the clock accuracy of a device. The value should be set according to the minimum value of all devices at the link. | |
| Per DlpduPhl Overhead | Specifies the physical layer induced delay between the end of the last octet of one data link frame as it appears on the link, and the beginning of the first octet of any other data link frame as it appears on the link. | |
| Max Inter Chan Signal Skew | This parameter allows the maximum permissible time shift for the H1 link to be increased by 0-7 4-bit transmission times. | |
| Post Trans Gap Extension | This parameter allows the gap to be increased by a further 0-7 4-bit transmission times. | |
| Preamble Extension | Each frame on the H1 link starts with a preamble octet which is used by the receiving nodes (Devices) to synchronize to the signal clock. | |
| Max Scheduling Overhead | Specifies the maximum scheduling overhead permitted an LAS DLE by the existing link schedule (for more information refer to IEC/TS 61158-4: 1999, subclause 5.7.5.6). | |
| Def Min Token Deleg Time | The minimum token delegation time. | |
| Def Token Hold Time | Determines how long a device can hold a token. | |
| Target Token Rot Time | Specifies the target time in which all devices have been given the token for acyclic data transfer. | |


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| Property | Description | Example |
|---|---|---|
| Link Maint Tok Hold Time | Specifies the time that the LAS uses within a token rotation for link maintenance which is probing for new node addresses and sending LAS status frames (for more information refer to IEC/ TS 61158-4: 1999, subclause 5.7.5.9). | |
| Time Distribution Period | Time Distribution PDUs will be sent on the bus in 95% or less of that time period. The parameter is specified in milliseconds. | |
| Maximum Inactivity To Claim Las Delay | Specifies the internal delay time a Link Master device needs from the detection of the failure of a LAS to the time the Link Master sends a Claim LAS request. The value should be set according to the highest value of all Link Master devices at the link. | |

#### 4.11.2.3 Controller and device properties view (PROFINET)

1. Select **View → Instances** from the main menu.
2. Then select the desired device or controller. Now select **View → Properties.** Its properties are displayed in the respective window. If the window is already open and a different device is selected, the window contents immediately change to show the associated values.

### Controller

The following information is shown for a controller:

| Property | Description | Example |
|---|---|---|
| **General** | | |
| Tag Name | Unique name within the project | WinPCController |
| Description | Comment describing the device in more detail within the context of the project. | Controller runs on a Windows 7 PC. |
| **Identity** | | |

| Property | Description | Example |
|---|---|---|
| Device Name | This is the device name, which is mandatory for every PROFINET device. When the device name is entered, the syntax is checked to ensure that it conforms to the requirements defined in the specification. | controller |
| **Type** | | |
| Manufacturer | Displays the device manufacturer name. The information given here is read from the catalog and cannot be changed. | Softing |
| Device Type | Displays the device type name with which the device is registered at the PROFINET user organization. The information given here is read from the catalog and cannot be changed. | WinPC Controller |
| Family | Describes the device family. This entry cannot be changed. | Controller |
| Order Number | Specifies the order number. This entry cannot be changed. | CCM-AY-3130 |
| Module Ident No | Specifies the ident number of the module. This entry cannot be changed. | 0x00000001 |
| Vendor ID | Specifies the ID assigned to the device vendor. This entry cannot be changed. | 0x0117 |
| Device ID | Specifies the ID assigned to the device. This entry cannot be changed. | 0x0001 |
| GSDML Version | Not relevant to controllers. | |
| GSDML Release Date | Not relevant to controllers. | |
| **Address** | | |
| IP Address | The IP address by which the device can be reached on the network. | 172.20.12.1 |
| Subnet Mask | The Subnet Mask defines the network type (class A,B,C) | 255.255.255.0 |
| Default Gateway | The default gateway (router) is used if an application on the device wants to communicate with an application on a device located in another network. | 172.20.12.240 |
| **Bus Access** | | |


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| Property | Description | Example |
|---|---|---|
| Interface Name | The name of the Ethernet port used by the controller to access the network. This is NodeX under Windows, and eth0 under Linux. The port specified here is not the interface used by the Configurator to access the network! | Node0 |
| Backup Controller | Specifies whether the controller acts as a backup controller. | |

### Device

The following information is shown for a device:

| Property | Description | Example |
|---|---|---|
| **General** | | |
| Tag Name | Unique name within the project | IM151-3 PN |
| Description | Comment describing the device in more detail within the context of the project. | This is an ET200S. |
| **Identity** | | |
| Device Name | This is the device name, which is mandatory for every PROFINET device. When the device name is entered, the syntax is checked to ensure that it conforms to the requirements defined in the specification. | et200s |
| **Type** | | |
| Vendor | The information given here is read from the catalog. | SIEMENS |
| Device Type | The information given here is read from the catalog. | IM151-3 PN |
| Family | The information given here is read from the catalog and cannot be changed. | IO |
| Order Number | Specifies the order number. This entry cannot be changed. | 6ES7 151-3AA10-0AB0 |
| Module Ident No | Specifies the ident number of the module. This entry cannot be changed. | 0x00000301 |
| Vendor ID | Specifies the ID assigned to the device vendor. This entry cannot be changed. | 0x002A |
| Device ID | Specifies the ID assigned to the device. This entry cannot be changed. | 0x0301 |

| Property | Description | Example |
|---|---|---|
| GSDML Version | Specifies the GSDML version supported by the device description file. This entry cannot be changed. | 2.1 |
| GSDML Release Date | Specifies the issue date of the device description file. This entry cannot be changed. | 7/1/2007 12:00:00 AM |
| **Address** | | |
| IP Address | The IP address by which the device can be reached on the network. | 172.20.12.5 |
| Subnet Mask | The Subnet Mask defines the network type (class A,B,C) | 255.255.255.0 |
| Default Gateway | The default gateway (router) is used if an application on the device wants to communicate with an application on a device located in another network. | 172.20.12.240 |
| **I/O** | | |
| Input Cycle Time | Specifies the cycle time in which the device can send input data to the controller. The minimum value is read from the GSDML file. | 1 ms |
| Output Cycle Time | Specifies the cycle time in which the device can receive output data from the controller. The minimum value is read from the GSDML file. | 1 ms |

### 4.11.3 Properties view buttons

| Button | Name | Effect |
|---|---|---|
| | Collapse region | Hides the available details for a section. |
| | Expand region | Displays the available details for a section. |

## 4.12 Segment Management

A segment represents a self contained communication system. The physical access of the segment has to be defined by associating the corresponding network access profile[98] to the segment.

- How to create a new segment is described in Segment Management functionality[97] and Segment Management buttons[98].
- How to assign devices to a segment is described in Live list view buttons[31].
- How to add devices to a segment is described in Topology view[44].


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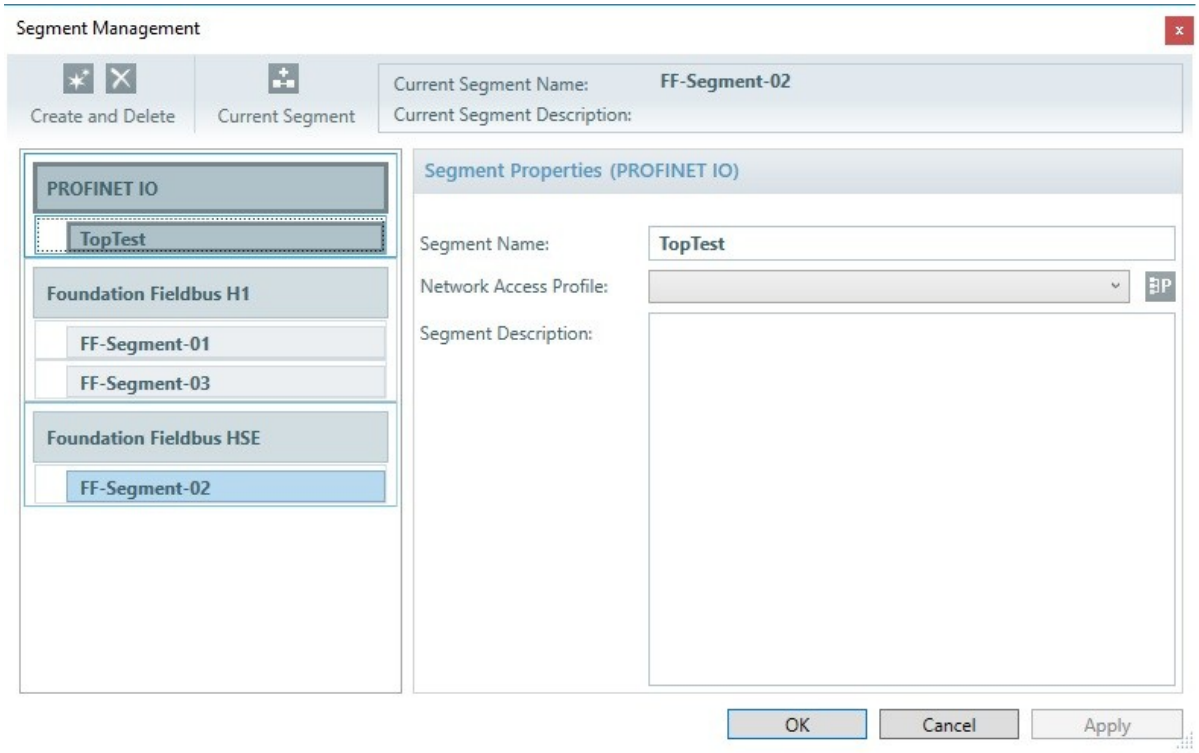
### 4.12.1 Segment Management functionality

Precondition: A project is opened.

1. Select **Project → Segments** to open the **Segment Management** dialog:




Foundation Fieldbus allows to select two different segment types:

- **Foundation Fieldbus H1**
  FF H1 segment accessed via FF USB adapter (Softing FFusb or Softing mobiLink). If you create a segment of this type the network access profile is defining the settings for the FF USB adapter.
- **Foundation Fieldbus HSE**
  FF segment accessed via an Ethernet adapter and the protocol HSE. Access to multiple subordinate H1 segments is achieved by the usage of the gateways FG-110 or FG-200. If you create a segment of this type, the network access profile is primarily defining the Ethernet network adapter to use.

2. Select an already existing segment from the left dialog part or click **[Create]** to create a new segment.
3. For new segments:
   a. Enter the **Segment Name** which is used for management within the project.
   b. Click on the arrow right beside **Network Access Profile** to assign a Network Access Profile 98.
   c. Add a **Segment Description**.
   d. Click **[Apply]** to apply the settings.

The view offers the possibility to define several bus type specific segments for a project.

Each segment has an associated topology that describes the structure of the segment.

For more information on buttons refer to Segment Management buttons 98.

### 4.12.2 Segment Management buttons

| Button | Name | Effect |
|---|---|---|
| | Create New | Creates a new segment. The property values are still undefined. |
| | Delete | Deletes the selected segment.<br>**Note**<br>This button also deletes segments for which a topology has already been created. If the project is not saved, a deleted segment will be available again after reloading the project |
| | Make Current | After a segment has been made current, it can be checked and the code can be generated. |
| | Edit Network Access Profile | Opens the network access profiles window. Here you can create a new network access profile for a newly defined segment. |

## 4.13 Network Access Profiles

This window provides settings to define how the Configurator accesses the physical network. The defined access information is used when the Configurator creates a live list, changes device properties, or transmits the created configuration to the controller/device.

The profile can be renamed if required. This name will be used in the project.

1. From the main menu select **Options** → **Network Access Profiles** or press **Ctrl**+**Shift**+**A**.
2. A dialog is opened allowing you
   a. to create a new network access profile or
   b. to delete an existing network access profile.

For detailed information on how to create and edit network access profiles refer to

- Network Access Profiles (FOUNDATION Fieldbus -FF H1) 98
- Network Access Profiles (FOUNDATION Fieldbus -FF HSE)_2 102
- Network Access Profiles (PROFINET ) 102

### 4.13.1 Network Access Profiles (FOUNDATION Fieldbus - FF H1)

Softing's FFusb hardware 8 and Softing's mobiLink realize the Network Access Profile for Fieldbus Foundation H1. As they acts as an FF H1 device, they have to be assigned with a node address and a PD Tag.

**Note**

The node address as well as the PD Tag have to be unique in the H1 network!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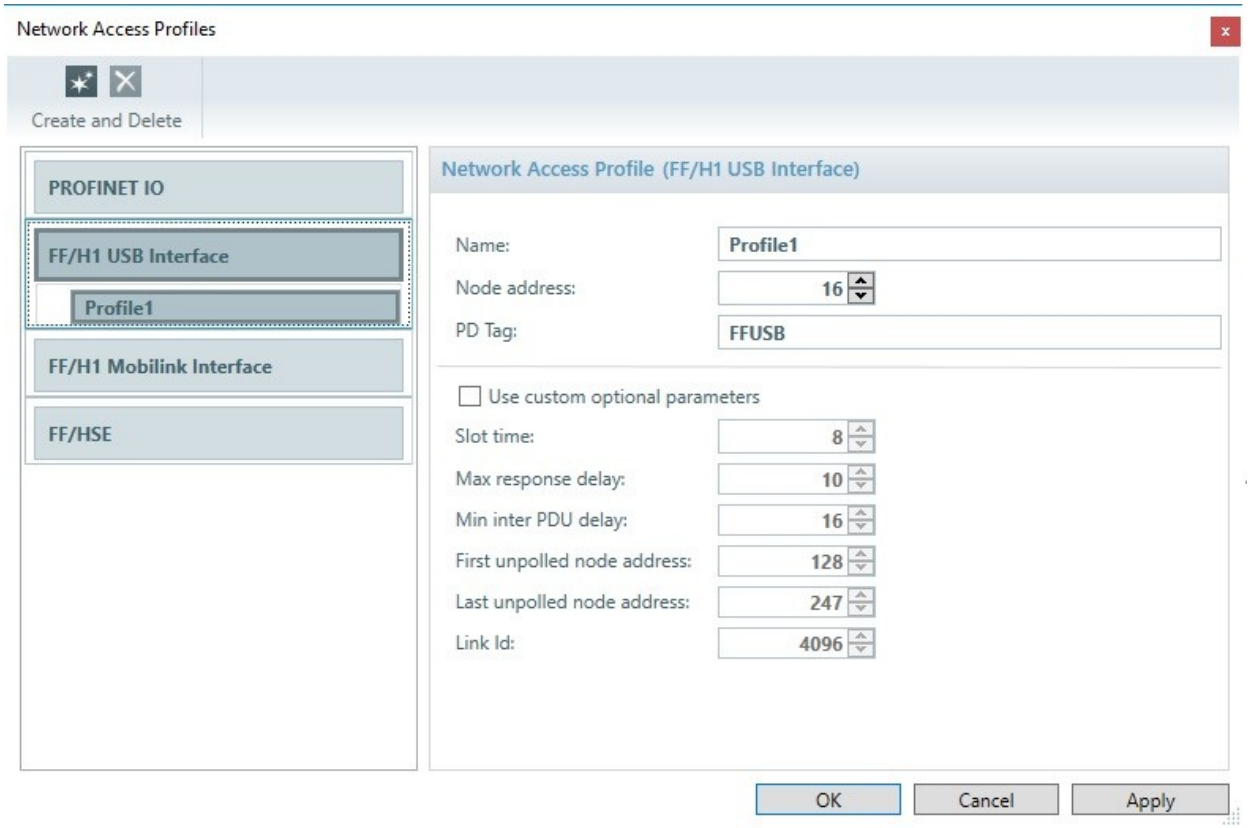
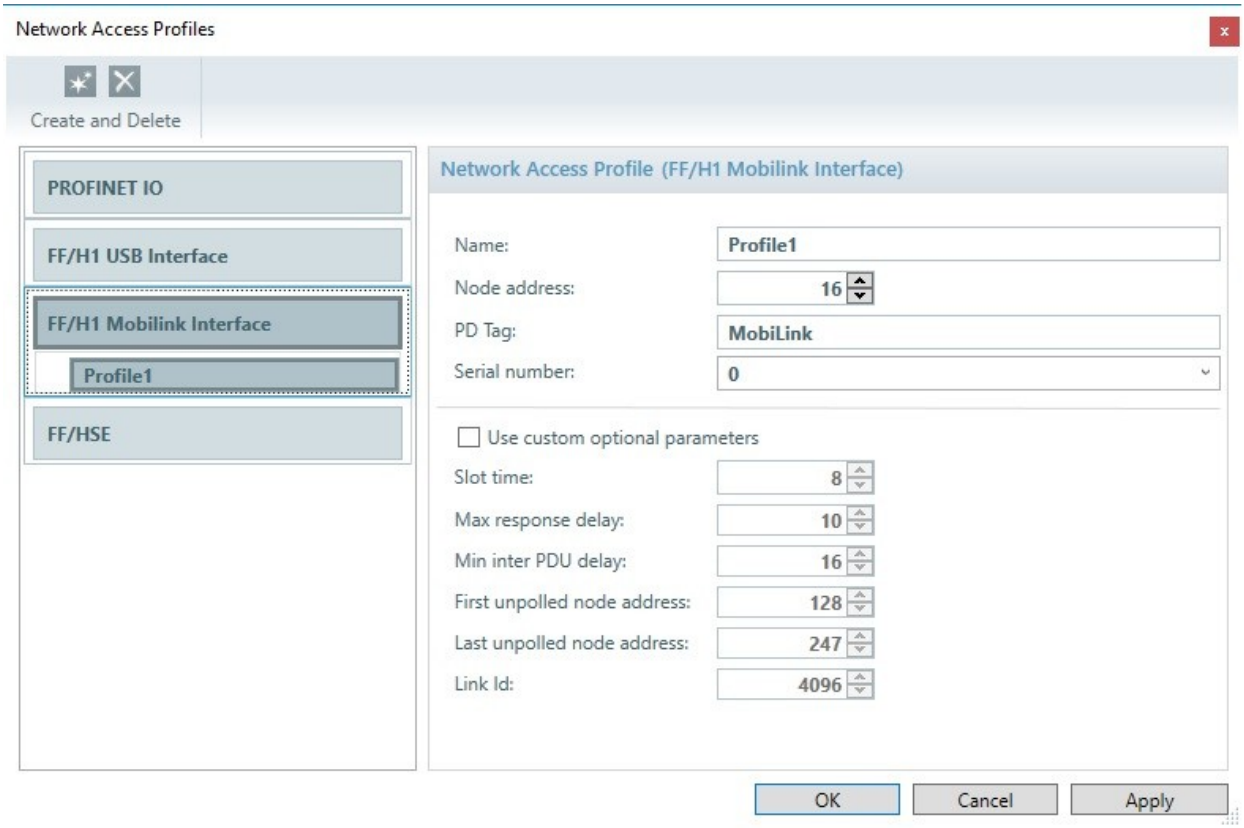



**Note**

Changing the bus parameters of a network access profile does only have effect if

- the FFusb is link master or
- the bus parameters are loaded to the devices with link master functionality.

If the FFusb is link master, then the LEDs are blinking fast. If it is not link master, they blink slowly.




**Note**

Changing the bus parameters of a network access profile does only have effect if

- the mobiLink is link master or
- the bus parameters are loaded to the devices with link master functionality.

If the mobiLink is link master, then the 'FIELDBUS' LED is blinking fast. If it is not link master, it blinks slowly.

## Node address

Addresses used by FOUNDATION fieldbus are in accordance with the following ranges:

- 0-15 are reserved.
- 16–247 are available for permanent devices. Some DCSs (Distributed Control System/Digital Control System) may further subdivide this range. This range is typically shortened for efficiency.
- 248–251 are available for devices with no permanent address such as new devices or decommissioned devices.
- 252–255 are available for temporary devices, such as handhelds.

A custom PD Tag can be entered, if the corresponding check box is selected. A syntax check compliant ISO 646 is performed during input. By default the PD Tag "FFUSB"/"MobiLink" is used.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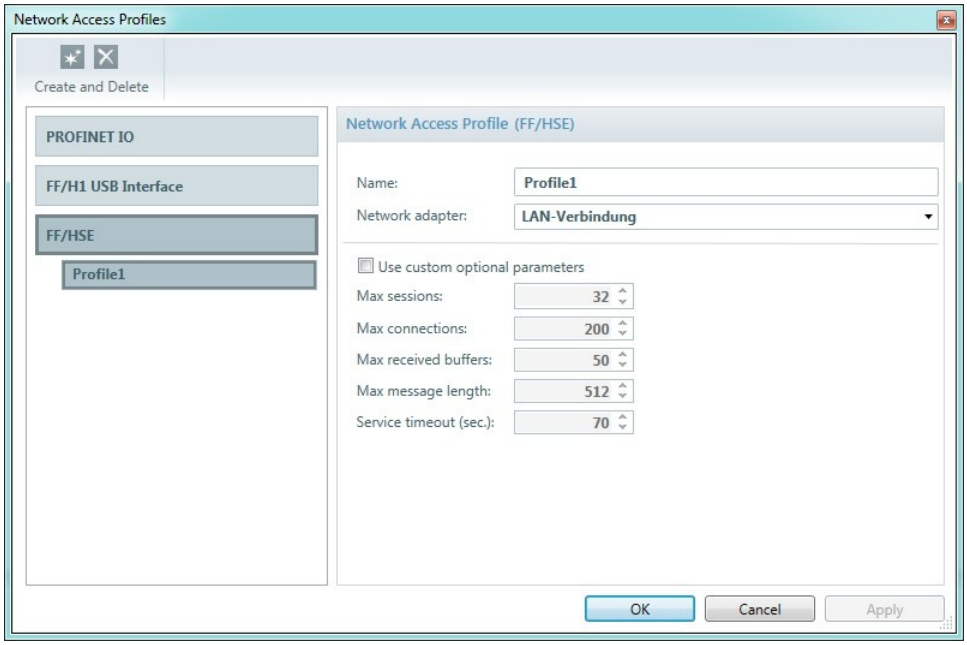
### Optional parameters from FF-CIT

| Parameter | Description | Range / restriction | Default value |
|---|---|---|---|
| SlotTime V(ST) | Device capability how fast the device can reply upon receipt of a PDU. This capability is measured in MaxResponseDelay SlotTimes, V(MRD) V(ST). Both parameters are specified in octet durations. The attributes SlotTime and MaxResponseDelay should be set such that the device represents the maximum response delay in octets of the device. The capability can be obtained from the devices CFF file. When configuring a H1 Link, the maximum value of the product SlotTime MaxResponseDelay of all devices residing on that link should be the minimum value for the Link configuration. This is to assure that all devices participate on the bus. | 1 - 4095 | Support for a value less than the default set in the application is recommended. |
| MaxResponseDelay V(MRD) | Device capability how fast the device can reply upon receipt of a PDU. This capability is measured in MaxResponseDelay SlotTimes, V(MRD) V(ST). Both parameters are specified in octet durations. The attributes MaxResponseDelay and SlotTime should be set such that the device represents the maximum response delay in octets of the device. The capability can be obtained from the devices CFF file. When configuring a H1 Link the maximum value of the product SlotTime u MaxResponseDelay of all devices residing on that link should be the minimum value for the Link configuration. This is to assure that all devices participate on the bus. | 1 - 11 | Support for a value less than the default set in the application is recommended. |
| MinInterPDUDelay | This parameter specifies the minimum interval between two frames on the H1 link. The minimum value of MinInterPDUDelay which a device is able to support is described in the CFF file of a device. When configuring the H1 link the minimum value that can be used for MinInterPDUDelay is the maximum of the values from the CFF files of the used devices. | - | Maximum value of the capabilities of the H1 link and all H1 devices on the link shall be configured. |

### 4.13.2 Network Access Profiles (FOUNDATION Fieldbus - FF HSE)

The Communication Configuration Tool provides the possibility to access an FF/HSE network via an Ethernet adapter.




| | |
|---|---|
| **Name** | Profile name. Default is **Profile<n>**. Enter a unique custom profile name. There are no restrictions on characters. |
| **Network adapter** | Choose you required connection from a drop-down list. The adapter names available correspond to the ones specified in the operating system.<br>**Note:** it is possible to define a network adapter by typing its name, e.g. if the configuration is done for a different PC. |

The following parameters are optional:

| | |
|---|---|
| **Max sessions** | The maximum number of simultaneously opened sessions. |
| **Max connections** | The maximum number of simultaneously opened connections. |
| **Max received buffers** | The maximum number of receive buffers. |
| **Max message length** | The maximum length in bytes of messages received or sent by the session. |
| **Service timeout** | The time period to elapse without a service response from a device before the service is considered failed. |

### 4.13.3 Network Access Profiles (PROFINET)

**Note**

Make sure you have administrator rights on your PC. Start the application with administrator rights. This will allow you to change settings such as IP addresses.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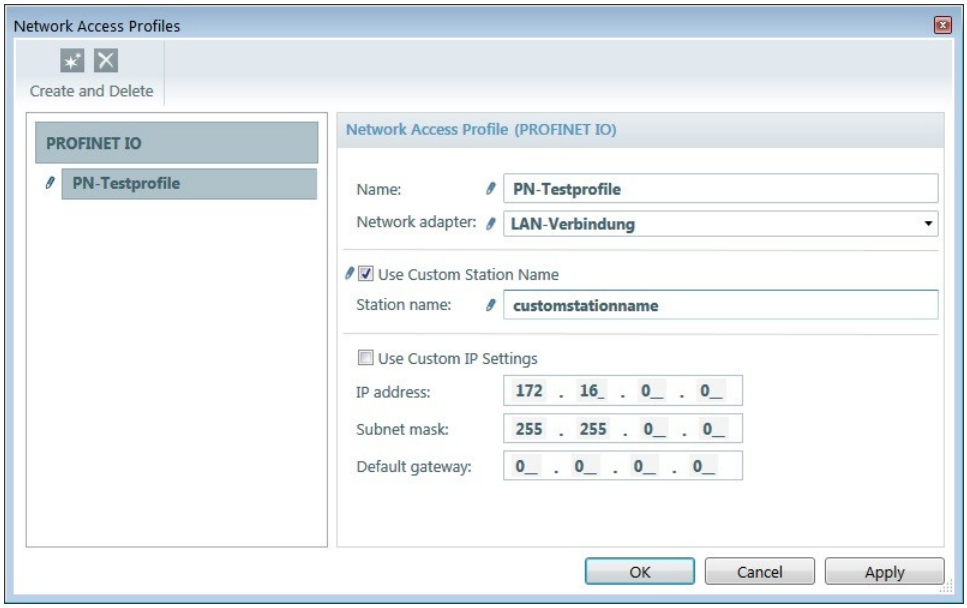



| | |
|---|---|
| **Name** | Profile name. Default is **Profile<n>**. Enter a unique custom profile name. There are no restrictions on characters. |
| **Network adapter** | Choose you required connection from a drop-down list. The adapter names available correspond to the ones specified in the operating system. |
| **Station name** | Default is the machine name.<br>Activate **Use Custom Station Name** to enter a custom name. A syntax check is performed during input. Every PROFINET station must have a station name. |
| **IP address** | The adapter interface may already have an IP address which was assigned by the operating system.<br>Alternatively, you can assign custom IP address. This address is used whenever the Configurator accesses the interface. To do so, activate **Use Custom IP Settings** and enter the corresponding values. A syntax check is performed during input. |

You can define several profiles. To switch between different profile definitions, select the desired profile from the left pane.

**Note**

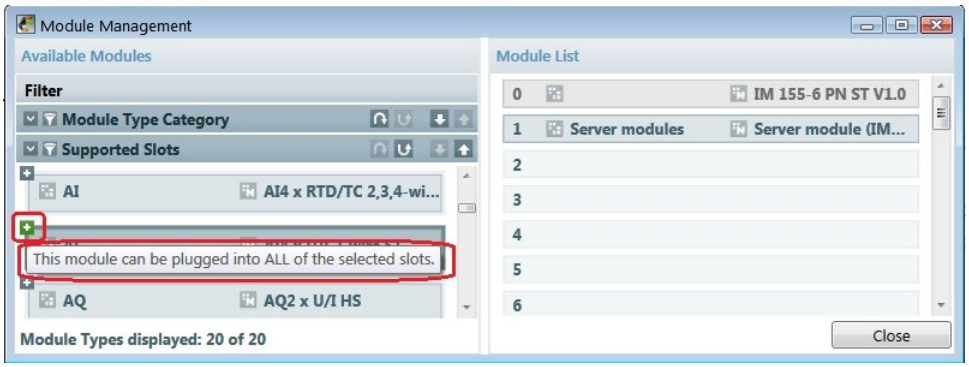
If an IP address that has not been entered in the desired network adapter by the operating system, but has been specified and enabled in the network access profile (**Use Custom IP Settings** is activated) is to be used for the local supervisor/controller (stack), you will need administrator rights under Windows 7 for every online action in the Communication Configuration Tool (e.g. Scan, SetIP, SetName, StartBlink, StopBlink, FactoryReset, Download). This requirement is due to the operating system.

## 4.14 Module Management (PROFINET only)

### 4.14.1 Module Management view functionality (PROFINET only)

The Module Management view allows to define individual modules.

1. Open the Topology view[44] and select a device.
2. Right-click the device and select **Configure Modules** from the context menu. Available modules appear on the left pane.
3. Select an empty number on the right pane to add a module from the left pane.
4. Move the mouse over a module to see whether it can be plugged into a slot.
5. Click the plus icon to add the module to the module list:




- The information on the modules is read from the GSDML file. The displayed modules can be filtered by different categories. These categories are also defined in the GSDML file.
- The left-hand part of this view shows the available modules while the right-hand part displays the slots into which the modules can be plugged by copy and paste. Each of the modules listed provides information on the supported slots.
- The maximum possible number of slots is given on the right.
- The defined modules are available after the view is closed. In a next step, the modules can be parametrized.

### 4.14.2 Module Management buttons (PROFINET only)

| Button | Name | Effect |
|---|---|---|
| | Collapse region | Hides the available details for a section. |
| | Expand region | Displays the available details for a section. |
| | Apply Defined Filter Criteria | Applies the defined filter criteria. |
| | Reset all filters below | There are four different filter criteria. If this button is clicked, the settings of all the criteria located below are reset to the defaults. |
| | Reset all filters above | There are four different filter criteria. If this button is clicked, the settings of all the criteria located above are reset to the defaults. |
| | Move current filter criterion below | Moves the current filter criterion down one level. |
| | Move current filter criterion above | Moves the current filter criterion up one level. |
| | Plug module into suitable slots | Another way to plug modules into suitable slots, besides copying and pasting, is to use this button. |

You can find more information on how to apply filters in Device types filtering[67].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## 4.15 Edit parameters

1. Select a device in the Topology view.
2. Right-click to open the context menu
3. Select **Edit Configuration Parameters** (or **Edit Device Parameters** - FOUNDATION fieldbus only) to define or modify specific parameters.

For bus-specific parameter configuration refer to:

Edit device parameters (FOUNDATION fieldbus) 105

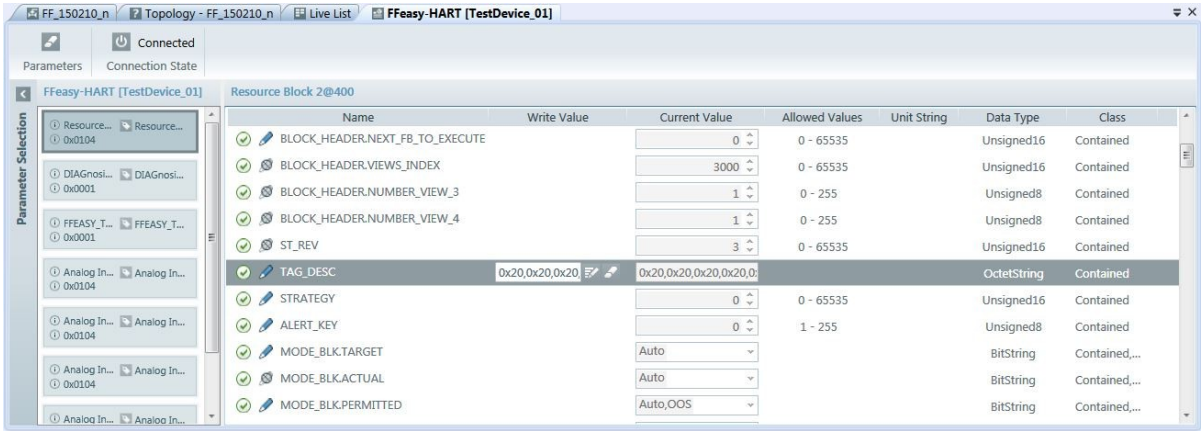
Edit configuration parameters (FOUNDATION fieldbus) 106

Edit configuration parameters (PROFINET) 108

### 4.15.1 Edit device parameters (FOUNDATION fieldbus)

This functionality allows you to change block parameters of a device without creating and configuring a project. Make sure the according device description is part of the type catalog. Otherwise the button will be disabled.

1. Select a device
   a. in the right pane of the live list view or
   b. in the topology view or
   c. from the Function Block application view.
2. Click **[Edit device parameters]** from the live list view, from the topology view or from the function block application view.
3. The button is disabled when the according device description is not part of the type catalog
4. A window as shown is opened. The blocks and parameters can be selected by left mouse click on the block within the left pane and the parameter name on the right pane:




#### Table description

| Column name | Meaning |
|---|---|
| ✓ | Parameter has been read - connection is established. |

| Column name | Meaning |
|---|---|
| | Parameter has yet not been read - connection is interrupted or being established. |
| / | Displays whether a value can be modified ( ) or not ( ) (see also Write value[106] below). |
| Write Value | Field to modify the original parameter name as defined within the device description - see below. |
| Current Value | The value read from the device. |
| Allowed Values | The valid value range. |
| Unit String | Unit string, if applicable. |
| Data Type | Data type |
| Class | Parameter usage and parameter storage according to FF specifications. |

### Write value - editing parameters

Precondition: the value is modifiable ( ).

1. Click into the corresponding parameter field in column **Write Value**.
2. Enter the your specific value or select a value from the drop-down list.
3. Click **[Write Value]** ( ). The modified value is then written into the field **Actual Value**.
4. To clear a written value, click **[Clear Value]** ( ).

**FF-specific restrictions**

Some parameters, for example the CHANNEL parameter, can only be written when the block is set to OOS (out of service).

**Connection is reestablished after downloading a segment**

If during online maintenance you start downloading a segment[117], the online connection might be interrupted. If so, the status icons will become red ( ). The system will then reestablish the connection and the icons will become green again ( ).

## 4.15.2 Edit configuration parameters (FOUNDATION fieldbus)

This functionality allows to configure block parameters within a project.

1. Select a device
   a. in the right pane of the live list view or
   b. in the topology view or
   c. from the Function Block application view.

2. Click **[Edit Configuration Parameters]** from the live list view, from the topology view or from the function block application view.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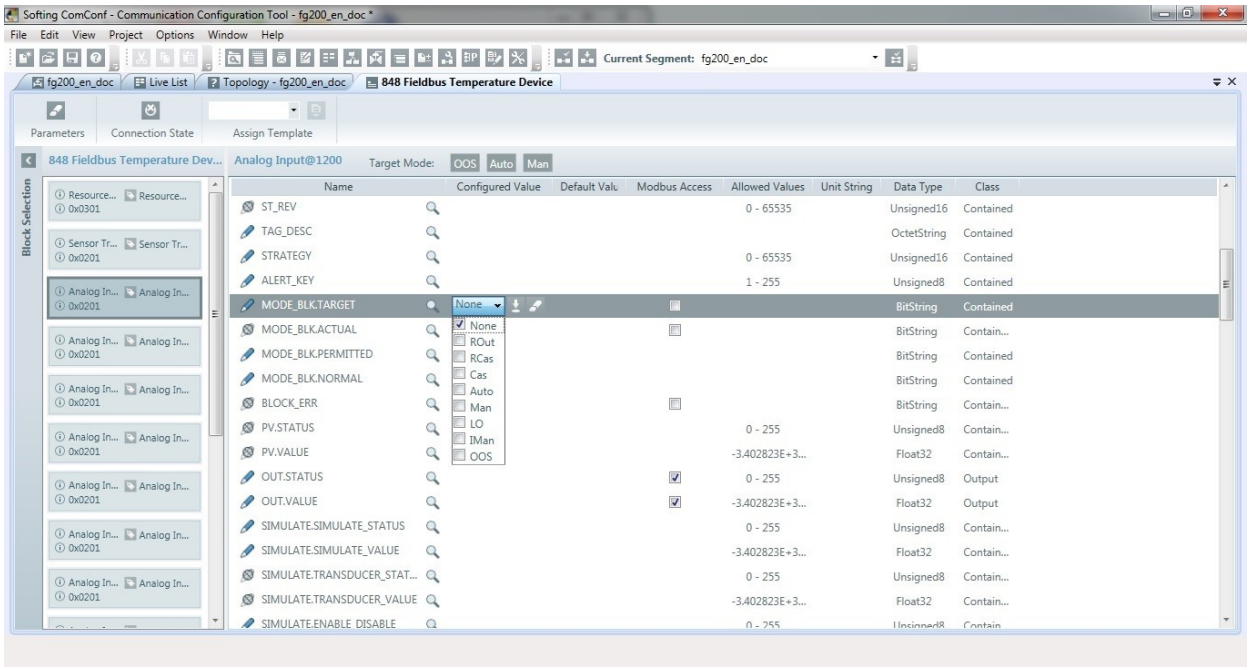
3. A window as shown is opened:

### Parameter modification window




### Table description

| Column name | Meaning |
|---|---|
| / | Displays whether a value can be modified ( ) or not ( ). |
| Name | Parameter name as defined within the device description. |
| Configured Value | The configured value will be written to the device during download. It can be modified, if the specific value contains the modifiable icon ( ). |
| Default Value | The default value specified within the device description.<br>**Note**<br>The default value might or might not be the actual value on the device. The actual value on the device might have been changed. |
| Modbus Access | Enables Modbus mapping for this parameter (see section How to configure parameters for Modbus access 133 for more information). |
| Allowed Values | The valid value range. |
| Unit String | Unit string, if applicable. |
| Data Type | Data type |
| Class | Parameter usage and parameter storage according to FF specifications. |

### Modify parameters

Precondition: the value is modifiable ( ).

You can

- open a list box and select the desired value

or

- modify a value within the corresponding list field.

Click to set the selected value.

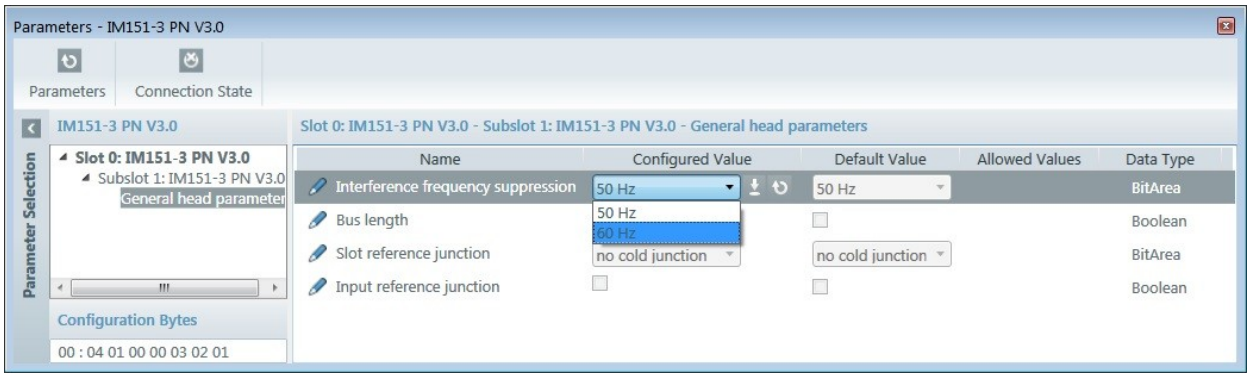
Click to clear a value and reset it to its default value.

**Note**

Changing the configured value only results in a changed actual value after downloading the data to the device (see also Download segment 117).

### 4.15.3 Edit configuration parameters (PROFINET)

The parameters are displayed for the individual slots/modules/subslots. First, the submodule for which the parameter values are to be edited is selected in the box at the top left:




Its parameters are then shown in the box on the right. The following information is given for each parameter:

| Column name | Meaning |
|---|---|
| / | Displays whether a value can be modified ( ) or not ( ). |
| Name | Parameter name as defined within the device description |
| Configured Value | Allows to modify a value, if the specific value contains the modifiable icon ( ). |
| Default Value | The value read from the device. |
| Allowed Values | The valid value range. |
| Data Type | Data type |

#### Modify parameters

You can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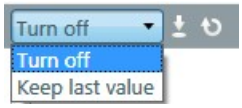
- open a list box and select the desired value




or

- activate/deactivate an option

Click to set this value.

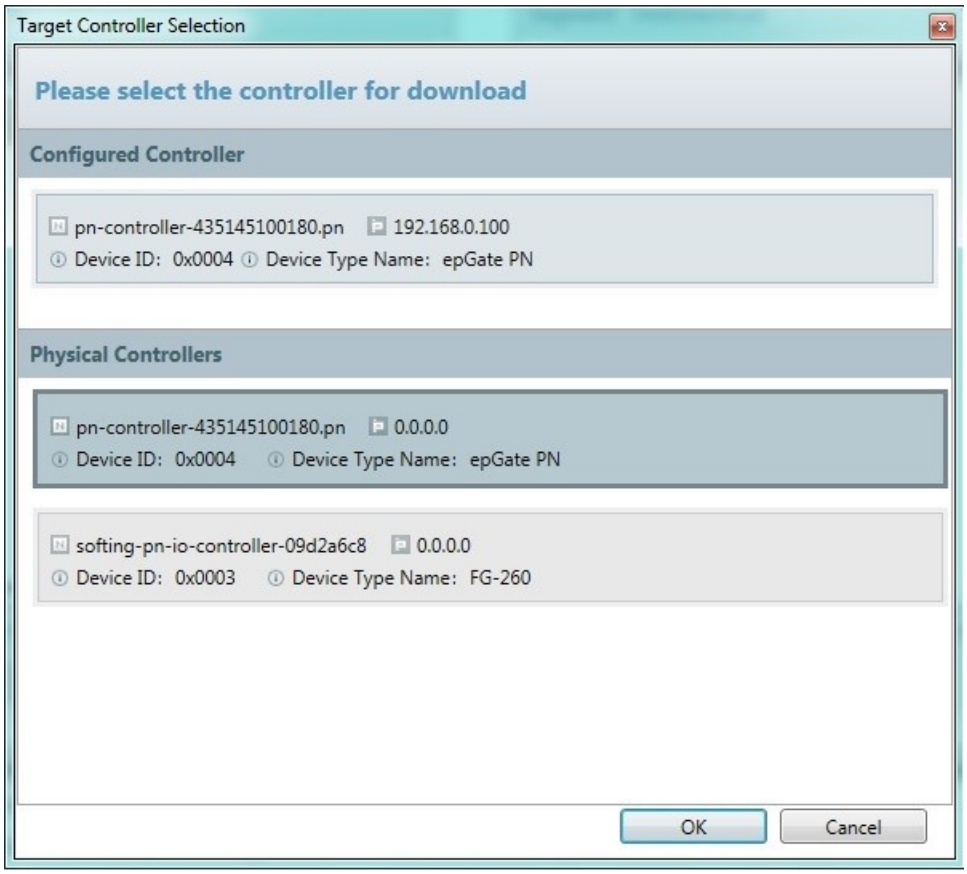
Click to reset the parameter to its default value.

## 4.16 Select target controller for download

The window "Target Controller Selection" is shown during the download of a segment. It requests the user to select the controller the configuration shall be downloaded to.

In order to continue the download of the configuration the target controller has to be selected and the selection has to be confirmed via the button "OK".

The download of the configuration can be canceled via the button "Cancel".




### Configured Controller:

Presents the controller that has been configured in the segment.

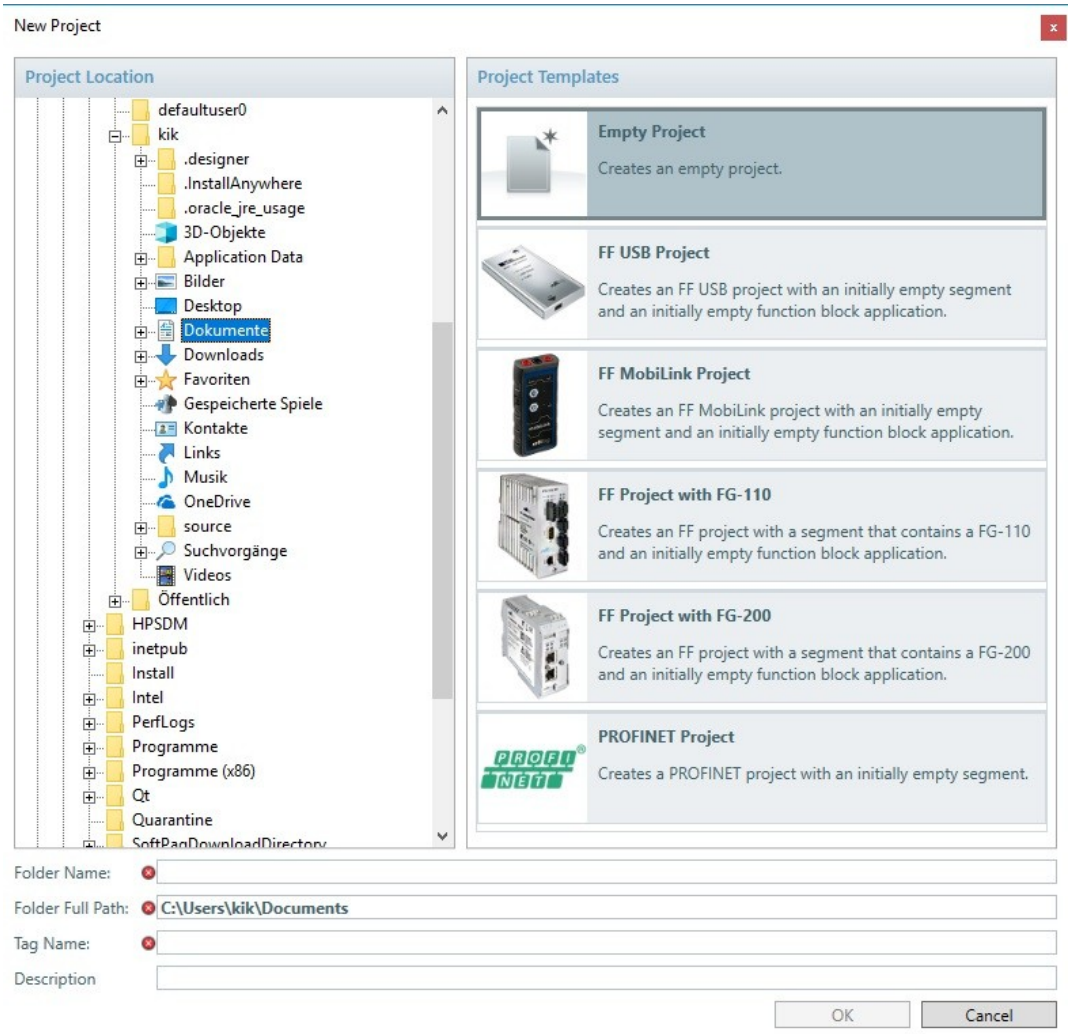
### Physical Controllers:

This part present the physically available controllers. If a physical controller can be uniquely identified to the configured controller, this one appears first in list and is already selected.

Physical controllers whose type does not correspond to the configured controller are not selectable.

## 4.17 New Project window

Select **File → New Project** from the menu to open the following window:




### Project Templates

The Communication Configuration Tool allows you to select from different project templates. The following project templates can be selected:

- "Empty Project" template without any bus specific configuration.
- Template to access and configure an FF network via the FF USB adapter (FFusb).
- Template to access and configure an FF network via the FF USB or bluetooth adapter (mobiLink).
- Template to access and configure an FF network with an FG-110 gateway. Access to the network is via Ethernet.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- Template to access and configure an FF network with an FG-200 gateway. Access to the network is via Ethernet.
- Template to access and configure an PROFINET network.

### Folder Name

Here you can specify the name of the folder where the project will be saved.

### Folder Full Path

Displays the root folder under which project folders will be created.

### Tag

The tag name for the project. The folder name is used as a default value.

### Description

A description of the project can be added.

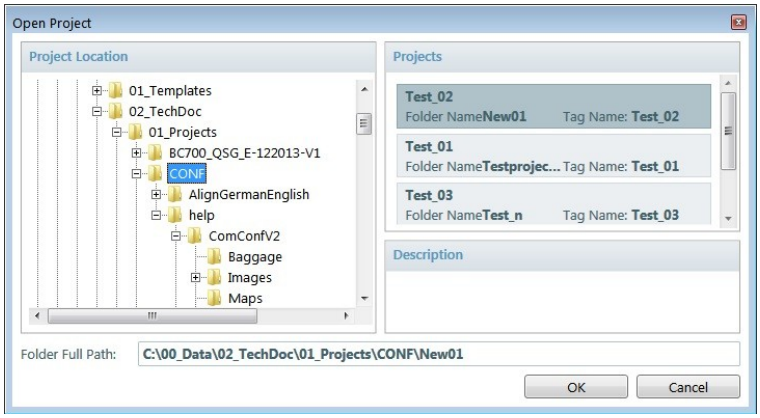
Click **[OK]** to create the new project.

**Note**

You can modify tag name (project name) and project description at a later date. To do so, select **Project** → Project Properties... 115 from the menu.

## 4.18 Open Project window

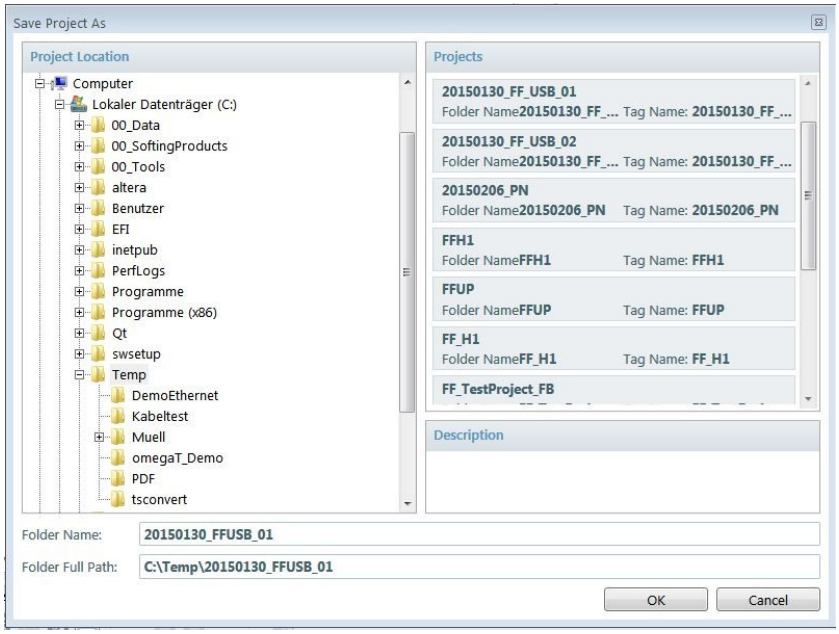
Select **File** → **Open Project** from the menu to open the following window:




The complete path in which the projects are stored can be changed.

## 4.19 Save Project As window

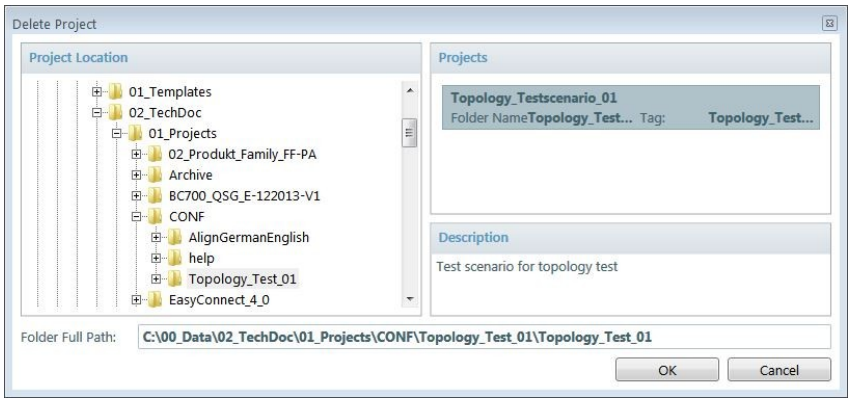
Select **File → Save Project As** from the menu to save a project under a different name or at a different location:




The complete path in which the project is stored can be changed.

## 4.20 Delete Project window

Select **File → Delete Project...** from the menu to open the following window:




**Note**

Projects currently in use cannot be deleted.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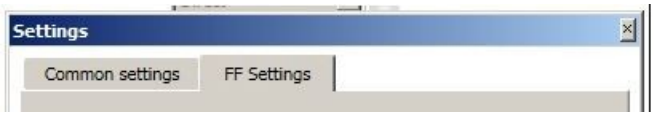
## 4.21 Settings window

From the menu select **Options → Settings...** to open a dialog with two tabs:

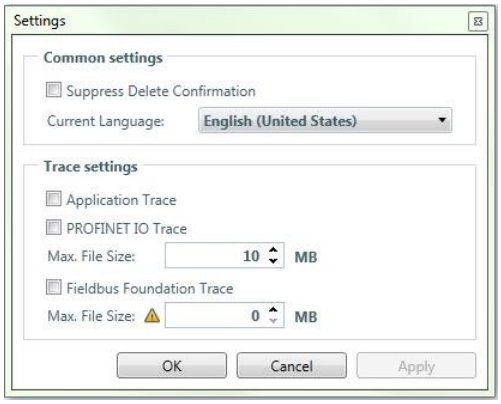



Select

- Common Settings[113] to modify settings for the ComConf such as language and trace settings or select
- FF Settings[114] to modify FF-specific settings such as updating the standard dictionary.

For all settings to be applied restart the Communication Configuration application.

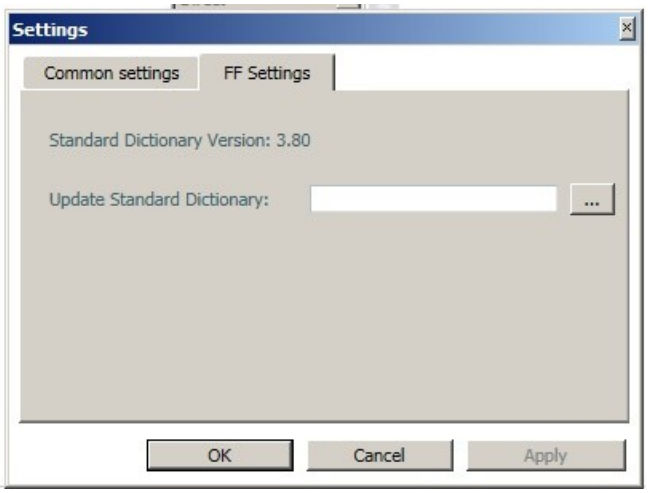
### 4.21.1 Common settings




Here you can edit global settings for the program:

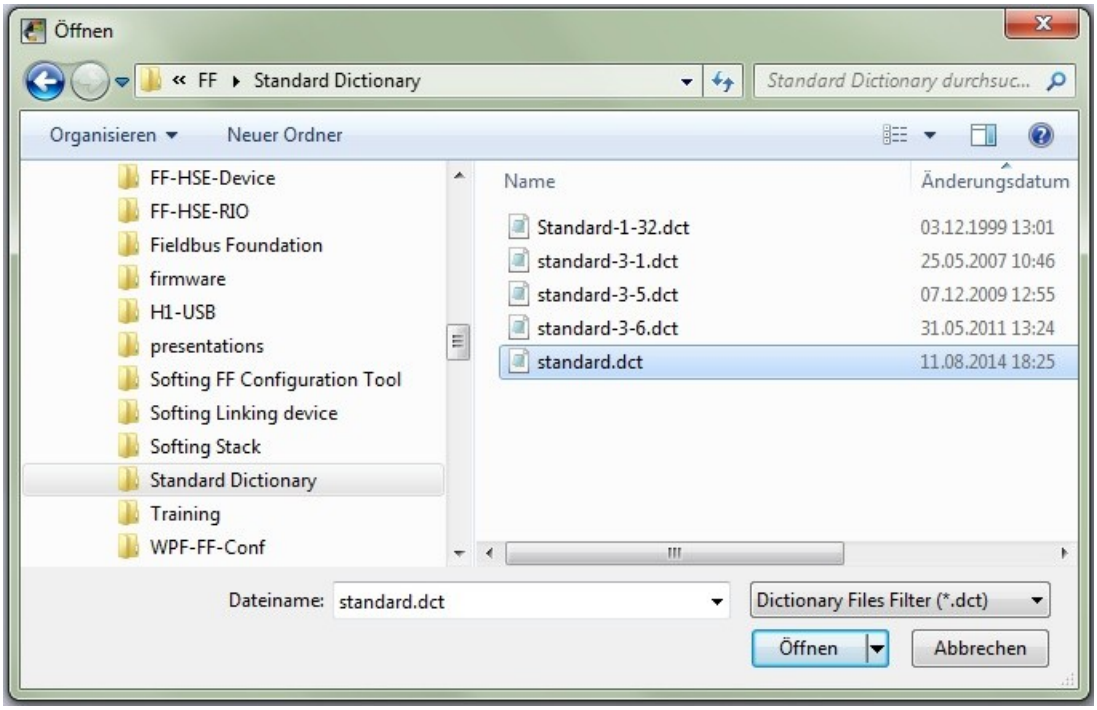
| **Common settings** | |
|---|---|
| Suppress Delete Confirmation | Activate to suppress the confirmation box when deleting projects or other data. |
| Current Language | Select your user interface language. Available languages are English and German. |
| **Trace settings** | |
| Application Trace | Trace information is created and saved. It is stored in the following folder: *<user>\AppData\Local\Softing\CONF\Log*. |
| PROFINET IO Trace | Trace information for access to PROFINET is created and saved. |
| Max. File Size: | Specify the maximum size of log files. |
| FOUNDATION fieldbus Trace | Trace information for access to FOUNDATION fieldbus is created and saved. It is stored in the following folder: *<user>\AppData\Roaming\Softing\FF-CIT\Traces* |
| Max. File Size: | Specify the maximum size of log files. |

### 4.21.2 FF Settings




- Displays the standard dictionary version.
- Allows to update the standard dictionary. Proceed as follows:

1. Copy the file *standard.dct* to your PC.
2. In the **Settings** dialog, tab **FF Settings** click **[...]** to open an explorer window.
3. Select the file you previously copied to the location above and confirm with **[Open]:**




4. Complete with **[OK]**.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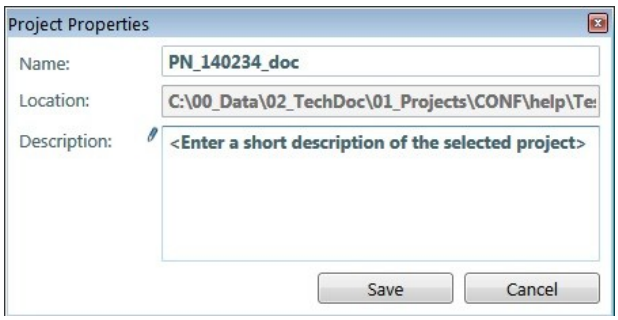
## 4.22 Project Properties window

Select **Project** → **Project Properties...** from the menu to open the following window:

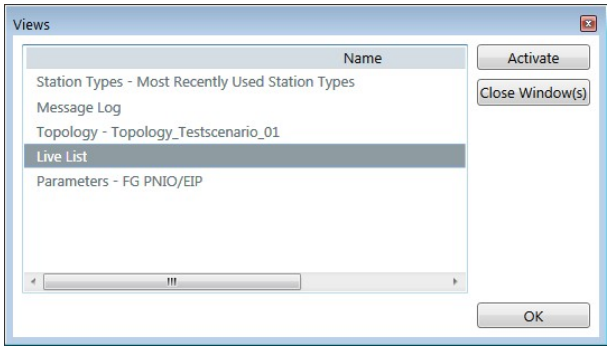



The project can be renamed, but the location cannot be changed.

Text given in the **Description** box can also be added or edited.

## 4.23 Views window

Select **Window** → **Views** from the menu to open the following window:




Here you can activate or close selected windows.

# 5 Menu items

## 5.1 File menu

| Menu command | Keyboard shortcut | Functionality |
|---|---|---|
| **New Project...** | **Ctrl + N** | Creates a new project. |
| **Open Project...** | **Ctrl + O** | Shows the existing projects/folders contained in the default folder. Select a project and click **[OK]** to open the selected project. |
| **Close Project** | | Closes the currently active project. If changes have been made since the last time the project was saved, users will be asked if they want to discard or apply the changes. Windows that are unrelated to the project contents will not be closed. For example, while the window containing the Topology view will be closed, the Type Catalog or the Message Log window will remain open. |
| **Save Project** | **Ctrl + S** | Saves the project under its current name. This menu item is only available if changes made to the project have not yet been saved. |
| **Save Project As...** | | Saves the project under the same name in a different folder. The folder needs to be specified. |
| **Project Export** | | Exports the customer's project data (topology, segment properties, device properties, links and blocks). The location of the export file is the project folder. |
| **Delete Project...** | | Removes the project from the storage medium. |
| **Recent Projects** | | Lists the most recently used projects. |
| **Exit** | **Alt + F4** | Exits the program. |

## 5.2 Edit menu

| Menu command | Functionality |
|---|---|
| **Cut** | Removes a selected item and places it in the clipboard. |
| **Copy** | Copies a selected item to the clipboard. |
| **Paste** | Inserts an item from the clipboard. |
| **Delete** | Removes a selected item. |
| **Select All** | Selects all items in the current view. |

## 5.3 View menu

| Menu command | Functionality |
|---|---|
| **Live List** | Displays the Live List view 26. The menu item is always available. |
| **Current Topology** | Only available if a project is open. A project may contain one or more segments. For each segment, a device configuration can be defined in the Topology 44 view. A segment and the Topology view associated with it can be made current. Selecting this menu item activates the Topology view of the respective segment, or opens its Topology view if not displayed yet. |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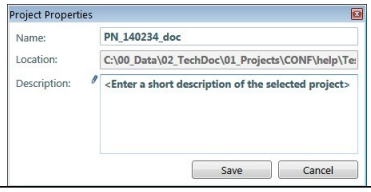
| Menu command | Functionality |
|---|---|
| **Topology** | Only available if a project is open. This menu item allows to open a Topology[44] view of a selected segment. |
| **Current Function Block Application** | Opens the currently active function block application, see Function block application view (FOUNDATION fieldbus only)[48]. |
| **Function Block Application** | Allows to open the function block application of a specific segment from a list, if more than one segment is configured. (See also Function block application view (FOUNDATION fieldbus only)[48] and Segment Management[96].) |
| **Instances** | Only available if a project is open. Displays all available instances. |
| **Device Types** | Opens the Device Types view[66], or activates it if already open. |
| **Type Catalog Maintenance** | Displays the Type Catalog Maintenance[69] dialog. |
| **Templates** | Opens the Templates view (FOUNDATION fieldbus only)[70] allowing to add, edit and delete FOUNDATION Fieldbus templates. |
| **Message Log** | Opens the Message Log[77], or activates it if already open. |
| **Properties** | Opens the Properties[115] view for the selected item, or activates it if already open. |
| **Toolbars** | Allows for choosing whether the File, Edit, View and Project toolbars will be displayed. |
| **Status Bar** | Specifies whether the status bar is displayed or not. |

## 5.4 Project menu

Precondition: A project is open.

| Menu command | Functionality |
|---|---|
| **Choose Current Segment** | The available segments in the project are provided for selection of the segment to be made current. |
| **Segments...** | Displays the Segment Management[97] pop-up window. |
| **Build All Segments** | Builds all created segments. The result is entered in the Message Log. If the check is successful, the configuration information for the controller is generated automatically. The generated code is stored within a set of files (see also Check and compile the configuration[128].) |
| **Build Current Segment** | Builds the current segment. The result is entered in the Message Log. If the check is successful, the configuration information for the controller is generated automatically. The generated code is stored within a set of files (see also Check and compile the configuration[128].) |
| **Build Segment** | Shows the available segments, which can be build individually. The result is entered in the Message Log. If the build is successful, the configuration information for the controller is generated automatically. The generated code is stored within a set of files (see also Check and compile the configuration[128].) |
| **Download Current Segment** | Downloads the generated configuration information to the device(s). If there is no connection to one or more of the devices, a warning is displayed in the Message Log. |
| **Download Segment** | Shows the available segments, for which the generated configuration information can be downloaded individually. |

| Menu command | Functionality |
|---|---|
| | **Connection reestablishes after downloading a segment**<br>If during online maintenance[36] you start downloading a segment, the online connection might be interrupted. If so, the status icons will become red (). The system will then reestablish the connection and the icons will become green again (). |
| **Project Properties** | Displays a dialog box with the project name and location is displayed. These two fields are not editable. The description is also shown and can be edited.<br>  |

## 5.5 Options menu

| Menu command | Functionality |
|---|---|
| **Network Access Profiles** | Displays the dialog for setting the network access profiles[98]. |
| **Settings** | Displays the dialog for editing global program settings[113]. |
| **Reset Settings** | Resets the settings to the factory defaults. |

## 5.6 Window menu

| Menu command | Functionality |
|---|---|
| **New View** | Only available if a project is open. Creates a new view of the same kind, displaying the same contents. |
| **Close Current View** | Only available if a project is open. Closes the current view. |
| **Close All But Current View** | Only available if a project is open. Closes all views but the current one. |
| **Close All Views** | Only available if a project is open. Closes all views. |
| **Views** | Displays a list of the current views. When a view is selected in the list and the **[Activate]** button is clicked, the focus is moved to the selected view. |
| **Reset Layout** | Resets the layout settings to the factory defaults. |

## 5.7 Help menu

| Menu command | Functionality |
|---|---|
| **Contents** | Opens the online help with the table of contents tab selected |
| **Index** | Opens the online help with the index tab selected |
| **Search** | Opens the online help with the search tab allowing you a full-text search for terms entered |
| **About** | Opens the product's **About** box with information about |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| | |
|---|---|
| | ▪ the supported protocols,<br>▪ the software version,<br>▪ and the copyright and address information. |

# 6 Tutorials

## 6.1 How to define the interface of the configurator to the network

Network access is required for

- scanning for devices during online configuration,
- changing device properties (device name),
- downloading the configuration to the controller.

In the Communication Configuration Tool, a network access profile must be defined. This profile describes the access to the network. Multiple network access profiles can be defined since a computer may have more than one Ethernet port. It is also possible to assign multiple network access profiles to a single physical interface. In this way, different IP addresses can be used in different projects.

### Requirement

A network access profile can be defined even if no project is currently active.

**Step 1**: Activate the required window.

⇨ Select **Options** → **Network Access Profiles**.

**Step 2**: Select your specific bus system and click create to create a new network access profile 98.

**Step 3:** Fill out the bus-specific access profile window. Refer to

- Network Access Profiles (PROFINET ) 102
- Network Access Profiles (FOUNDATION fieldbus ) 98

for bus-specific instructions.

**Step 4**: Save the settings.

## 6.2 How to define the network topology

The topology of the network is defined in the Topology view. In the current version of the Communication Configuration Tool, the topology is only given as a logical representation. Logical connection lines are drawn between the controller and the devices used. There is no check to see whether the device layout corresponds to reality. It is not possible to assign more than one logical connection to a device without an internal switch. If this is attempted, an error message will be generated when the segment check is run.

### Requirement:

A project must exist.

**Step 1:** Activate the required view

⇨ If a new project is opened, an empty Topology view is displayed automatically. An additional topology view can be created by selecting **Window** → **New View**.

**Step 2:** Add a controller


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⇨ As controllers are device types, they are included in the type catalog. The following two controllers are currently available:

- **Softing WinPC Controller**. This is a PROFINET controller stack that can be executed on Windows 7.
- **Softing RTEM Controller.** This is a PROFINET controller stack that can be executed on Softing's FPGA Module.
- **Softing FG-260** gateway**.** This is gateway between EtherNet/IP and PROFINET networks with integrated PROFINET controller functionality.

⇨ After the required device type has been selected in the type catalog, drag and drop the controller into the topology view where it is instantiated. Set name, IP address and node correctly according to the specifications defined in the project (name and IP addresses) and according to the controller hardware (node).

**Step 3:** Add devices

⇨ A device is only available in the type catalog if its GSDML file has been imported. The device type is represented by the Device Access Point (DAP) in the type catalog view. GSDML files describe device families. The members of a family differ at least in the DAP. Therefore, the catalog may include multiple entries. The DAPs of different devices differ at least in the ModuleIdentNumber and, in most cases, also in the order number.

⇨ After the required device type has been selected in the type catalog, drag and drop the device into the topology view where it is instantiated. Filter the catalog entries to improve readability of the type catalog view.

**Step 4:** Create logical connections between instances in the topology view

⇨ Before a connection can be created, an instance has to be selected in the Topology view. On selection, an arrow appears in the top right corner of the instance. Click this arrow with the mouse. When the mouse pointer changes to an arrow, press the left mouse button and drag the arrow to another instance.

## 6.3 How to assign a device name or PD tag

### 6.3.1 How to assign a PD tag (FOUNDATION fieldbus)

Every device in the network must have a unique name. FOUNDATION fieldbus uses PD tags.

This tag name is defined in the project and assigned in the live list. This process involves the following steps.

#### Requirement:

A topology has been created.

**Step 1:** Select the relevant instance

⇨ Select the instance to which a name is to be assigned.

**Step 2:** Activate the **Properties** view

This can be done in two ways:

⇨ select the instance and then press the key combination **Alt+Enter**, or

⇨ selecting **View → Properties**.

If the view is already open, the properties of the instance will be displayed immediately after the instance is selected.

**Step 3:** Enter the PD tag

⇨ The PD tag is given in the Identity section. If no tag has been entered yet, an exclamation mark is shown next to the input field. This symbol disappears as soon as characters are typed into the field. If the entered characters are not permitted, a white cross on a red background will be displayed next to the input field.

⇨ After entering the PD tag, it is immediately shown in the selected instance of the topology view.

**Step 4:** Assign a configured device to physical device in live list.

⇨ Refer to Live list view buttons 31 for a description on how to perform this task.

Alternatively you can configure the PD tag directly on the physical device via the Online Maintenance 36 view and assign the physical device to the configured device 31.

### 6.3.2 How to assign a device name (PROFINET)

Every device in the network must have a unique name. PROFINET uses device names.

This name is assigned in the project and downloaded to the device. This process involves the following steps.

#### Requirement:

A topology has been created.

**Step 1:** Select the relevant instance

⇨ Select the instance to which a device name is to be assigned.

**Step 2:** Activate the **Properties** view

This can be done in two ways:

⇨ select the instance and then press the key combination **Alt+Enter**, or

⇨ selecting **View → Properties**.

If the view is already open, the properties of the instance will be displayed immediately after the instance is selected.

**Step 3:** Enter the device name

⇨ The device name is given in the Identity section. If no name has been entered yet, an exclamation mark is shown next to the input field. This symbol disappears as soon as characters are typed into the field. If the entered characters are not permitted, a white cross on a red background will be displayed next to the input field.

⇨ After entering the device name, it is immediately shown in the selected instance of the topology view.


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In a next step, device names can be assigned[34] to all remaining instances, or the IP address information can be specified for the selected instance.

## 6.4 How to define IP addresses

Every PROFINET device needs an IP address. While the defined device name is assigned to the device during the configuration, the IP address is assigned by the controller at runtime. The IP addresses are part of the configuration information that is provided to the controller as soon as the configuration has been completed.

### Requirement:

A topology has been created.

**Step 1:** Select the relevant instance

⇨ The instance to which the IP addresses are to be assigned is selected.

**Step 2:** Activate the **Properties** view

This can be done in two ways:

⇨ select the instance and then press the key combination **Alt+Enter**, or

⇨ selecting **View → Properties**.

If the view is already open, the properties of the instance will be displayed immediately after the instance is selected.

**Step 3:** Enter the IP addresses

The IP addresses are given in the Address section. Three addresses are assigned here:

⇨ IP address of the device, for example 172.20.12.1

⇨ Subnet mask, for example 255.255.0.0

⇨ Default gateway, for example 172.20.12.1

If no IP address has been entered yet, an exclamation mark is shown next to the input field. This symbol disappears as soon as numbers are typed into the field. If the entered numbers are not permitted, a white cross on a red background will be displayed next to the input field.

## 6.5 How to define modules and parameters

PROFINET differentiates between compact and modular devices. A compact device has a fixed functionality, whereas the functionality of a modular device can be adapted to suit specific requirements. For this purpose, modules are selected from the set of available modules and assigned to the respective slots. The procedure described here is also very useful to check the modules implemented in compact devices.

### Define modules

Prerequisite: A topology has been created.

**Step 1:** Select the relevant instance

⇨ The instance for which the implemented modules are to be specified or checked is selected.

**Step 2:** Activate the Module Management view

⇨ After the instance has been selected, open the context menu by pressing the right mouse button. Then select the Module Management menu item from the context menu.

**Step 3:** Display the modules

⇨ The available modules are listed in the left-hand part of the view. The list can be filtered in two ways:

1. Filter by category

A category can be assigned to each module. This information is given in the GSDML file. The categories defined in the file are provided as the values for the Module Type Category filter criterion.

2. Filter by supported slot number

Not all modules support all slots. The left-hand part of the view therefore shows the slots into which the modules can be plugged. It is also possible to activate a slot and then use this information as a filter criterion.

**Step 4:** Plug the modules into the slots

⇨ Use drag and drop. To plug the same module into several consecutive slots, click the plus button in the top left corner of the respective module repeatedly.

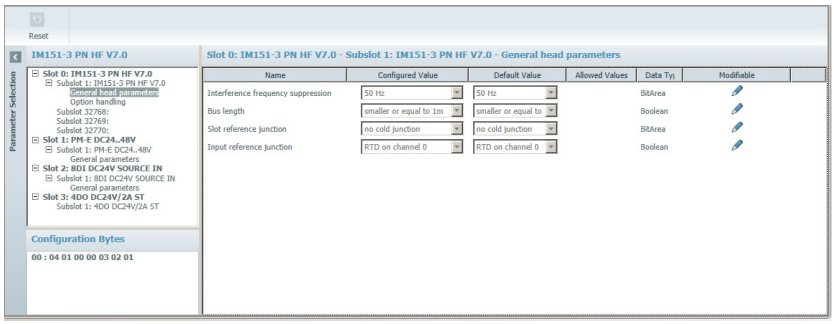
The data is applied when the Module Management view is closed. The module information is now also available in the respective instance of the Topology view. It shows the number of slots used and the module types plugged into these slots.

## Define parameters

**Step 1:** To define parameters, open the **Topology** view

**Step 2:** Select the required device instance.

**Step 3:** Right-click on the instance and select **Configure Parameters**:





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## 6.6 How to represent a switch without PROFINET functionality in the topology view

Switches are used for communication in PROFINET networks. They are available in different versions:

- External switch with PROFINET functionality
- Switch functionality integrated in PROFINET device
- External switch without PROFINET functionality

As the first two versions listed are PROFINET devices, GSDML files are available for these products. This way external switches, in particular, can be treated just like other devices during configuration.

How can switches be integrated into the configuration if they are not described by an GSDML file?

### Requirement:

A topology has been created.

**Step 1:** Insert a connector

⇨ A logical connection has already been created to connect two devices. The connection is selected. Press the right mouse button to enable the Add Connector action. A gray circle is displayed, which represents the external switch.

**Step 2:** Create additional connections between devices and the external switch

⇨ Select an instance in the topology view. On selection, an arrow appears in the top right corner of the instance. Click this arrow with the mouse. When the mouse pointer changes to an arrow, press the left mouse button and drag the arrow to the connector.

Information about external switches that are not PROFINET devices is not stored in the binary result file.

## 6.7 How to transmit the device name to a PROFINET device

During the configuration, a device name and an IP address are defined for each device. The controller uses the device name at runtime to detect the configured devices and assign the IP addresses to them. The factory default name of the device will usually not correspond to the name used in the project. Therefore, the device name can be modified in the Communication Configuration Tool.

### Requirement:

The live list has been created and the device name to be assigned is known. The topology of the network thus may have been defined already.

**Step 1:** Select the device

⇨ After a successful network scan, the list of found devices is displayed in the left-hand part of the Live List view. The device can now be selected in the list and the Online Maintenance button can be clicked. A pop-up window is displayed.

**Step 2:** Set the device name

⇨ The Online Maintenance window shows the available information about the device. In the bottom part of the window, two tabs are provided. The Address tab displays the read device name. This name can be changed. The IP addresses can also be edited. The Miscellaneous tab provides a number of buttons, which can be used to perform the following functions:

- Start Blink: An LED of the device has to blink on demand at a specified frequency and for a specified time. This allows identifying which live list device corresponds to which physical device. This function is particularly useful if many of the same devices are used in a configuration.
- Stop Blink: Stops the Blink function.
- Factory Reset: Resets the variable values for device names and IP addresses to the factory defaults.

⇨ After the physical device associated with the live device has been identified and the new device name has been entered, the device name can be transmitted to the device. This is done using the Set button to the right of the device name line.

⇨ Information on this action is entered in the Message Log.

**Step 3:** Check the new device name

⇨ Repeat the network scan and check the properties of the displayed device.

**Note**

In the current version, the Configurator does not automatically match the device name of the physical device to the name assigned in the configuration. You need to perform this task manually.

## 6.8 How to match live list devices to instances in the topology view

If the live list is created for a specific segment for which device instances have been defined in the Topology view, the instances are automatically matched to the found devices.

### Requirement:

A configuration exists and information has been acquired from the physical network.

The procedure is different depending on the bus system used. Refer to the corresponding bus system:

Automatic assignment (PROFINET)[127]

Automatic assignment (FOUNDATION fieldbus)[126]

For more information about live list creation refer to Live list view (FOUNDATION fieldbus )[27] and to Live list view (PROFINET )[29].

### 6.8.1 Automatic assignment (FOUNDATION fieldbus)

The automatic assignment has the following results:

| Result | Reason | Remark |
|---|---|---|
| Type unknown  | • Type catalog contains no description for the found device | • The appropriate description file may need to be imported. |


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| Result | Reason | Remark |
|---|---|---|
| Not assignable | • There is no configured device of the same type as a found device. The type check is based on the comparison of manufacturer ID, device type, device revision and DD revision of the device. | • A device of the appropriate type has to be added to the configuration.. |
| Uniquely assigned | • There is a 1:1 match between a configured device and a live list device. The type and the device name are exactly the same in both the live list device and the configured device, and there is no other device instance that has the same properties. | |
| Ambiguously assigned | • There is more than one device with the same device name either in the Live List or in the Topology view. | • The assigned device names have to be unique. |
| Assignable | • The live list device and the device in the Topology view have the same type, but different device names and/or node addresses. | • The device names and/or node addresses need to be changed. |

### 6.8.2 Automatic assignment (PROFINET)

Different PROFINET services are used to create the live list.

- DCP; here the device is addressed using the MAC address.
- Read; not all important data can be acquired using DCP. The Read service is based on the TCP/IP protocol. It requires the assignment of an IP address to the device so that the Communication Configuration Tool can reach the device.

The automatic assignment has the following results:

| Result | Reason | Remark |
|---|---|---|
| Type unknown | • Device has no IP address<br>• IP address of the device is in a different subnet<br>• ModuleIdNumber of the DAP is not available<br>• Type catalog contains no GSDML file for the found device | • The appropriate IP address may need to be assigned to the device<br>• The settings of the network access profile may need to be changed.<br>• The appropriate GSDML file may need to be imported. |
| Not assignable | • There is no configured device of the same type as a found device. The type check is based on the comparison of VendorId, DeviceId, ModuleId of the DAP | • The configuration in the Topology view has to be adapted to the live list devices. |

| Result | Reason | Remark |
|---|---|---|
| | • The same device is described in multiple GSDML files in the type catalog. The Communication Configuration Tool performs a preselection, but the configured device is of a different type. | |
| Uniquely assigned | • There is a 1:1 match between a configured device and a live list device. The type and the device name are exactly the same in both the live list device and the configured device, and there is no other device instance that has the same properties. | |
| Ambiguously assigned | • There is more than one device with the same device name either in the Live List or in the Topology view. | • The assigned device names have to be unique. |
| Assignable | • The live list device and the device in the Topology view have the same type, but different device names. | • The device names need to be changed. |

## 6.9 How to check, compile and download the configuration to the target device

### Check segment

1. Click **[Check Current Segment]**, press **F7** or click to check the current segment.
2. The Configurator first checks the current configuration. If the check is successful, the configuration is compiled to a set of files. The internal structure of these files is bus specific.
3. Data needed by a controller or host system to access the specific bus is exported to a folder *<Project>\Current\Export\<ProjectName><UUID>*.

**PROFINET-specifics:**

For a description on how to handle the code domain with a windows controller refer to Softing controller on Windows PC communicating with Softing device on another Windows PC 129

### Download segment

1. Click **[Download Current Segment]**, press **F9** or click to download the configuration on the current segment.
2. The Configurator checks and compiles the configuration.
3. Then the created binary file is downloaded to the RTEM controller.

   The download progress is shown in the status bar (
   
   ). If you need to cancel this operation, click .


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**Note**

The FG-260 must meet the following two requirements:

- It must be located in the same network as the PC running the Communication Configuration Tool, and it must be accessible.

## 6.10 How to configure a Softing controller to communicate with Softing device

A Softing controller on Windows PC communicates with a Softing device on another Windows PC (PROFINET only).

### Requirements:

Softing's Communication Configuration Tool, PROFINET IO Controller and PROFINET IO Device products have been installed. The controller and the device should be installed in different PCs. As an alternative, they can be installed in a single PC that has two different Ethernet ports. In this case, the controller and the device must be assigned to different Ethernet ports.

The Communication Configuration Tool and the controller can be installed on the same PC.

A project, a segment, and a topology exist. The network access profile has also been defined and assigned to the segment.

1. Import the GSDML file for the device using the Type Catalog Maintenance view 68.
   The view can be accessed in different ways, e.g. by clicking the **[Maintenance]** button in the Device Types view.
   The file to be imported is located in the following folder: *..\Program Files (x86)\Softing\Profinet \Stack\V1.76\SDK\Stack\GSD*
2. Create the topology.
   The system consists of two instances:
   - Softing WinPC Controller. This device type has been preinstalled.
   - the Softing PROFINET IO Device Developers Kit for PC. This device type needs to be installed.

   A connection is created between the controller and the device.
3. Assign device names, IP addresses and interface name.
   - In the sample application, the name of the device is "devkitpc-1.pnio-sys". We recommend using this name in the project. The IP address can be set to suit the specific setup.
   - For the controller, the interface name has to be adapted in the "Bus Access" section of the Properties view. The same name that was assigned by the system to the Softing Industrial Ethernet Driver must be entered in the Interface Name field. Examples are Node0 or Node1. The field is case sensitive!
4. Define modules, cycle time and parameter settings.
5. Click the Module Management button to display the window for defining the modules. The sample application uses the modules "Digital 8 Bit Input", "Digital 8 Bit Output", "Digital 16 Bit Input" and "Digital 16 Bit Output".
   - We recommend using these modules. Adapt the sample application if other modules are used.

- In the "I/O" section of the Properties view, the cycle time for I/O data exchange can be set. The default setting is 16 ms. We recommend starting out with a longer cycle time, e.g. 256 ms. Depending on the performance of the PC and the load from other programs, it may happen that the cycle time cannot be maintained and the connection breaks.
- When using the modules given above, no parameters have to be set.

6. Check and compile the configuration, and download it to the target system
7. Click the **[Download Current Segment]** button to have the Configurator checking the current configuration. If the check is successful, the configuration is compiled to a binary file with an internal structure that is known to the controller.

   The binary file is saved to the folder *<Project>**Current**Export**<ProjectName><UUID>*\.
8. Transmit the configuration result to the controller application
   The application can be called with the binary file name passed as a parameter. How to proceed is described in the corresponding file for the PROFINET IO Sample.


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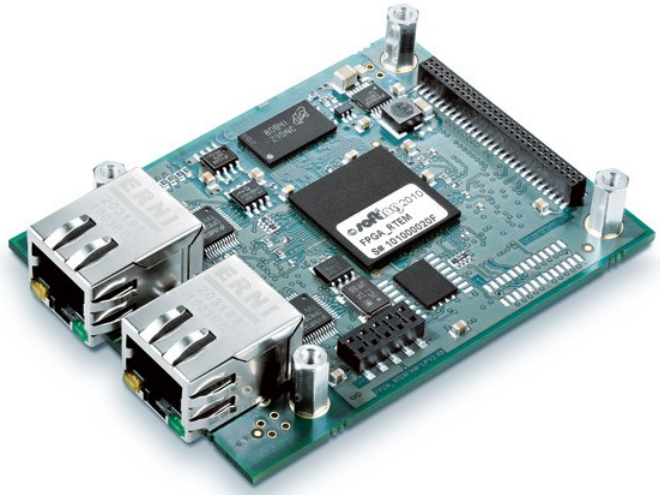
## 6.11 How to configure a Softing controller on a RTEM

**Requirements:**

- The PROFINET IO Controller is running on a Real Time Ethernet Module (RTEM) from Softing.



- Softing's Communication Configuration Tool and PROFINET IO Device products have been installed.
- A project, a segment, and a topology exist. The network access profile has also been defined and assigned to the segment.

1. Import the GSDML file for the device using the Type Catalog Maintenance view 68.
   The view can be accessed in different ways, e.g. by clicking the Maintenance button in the Device Types view.
2. Create the topology.
   The system consists of two instances:
   - Softing RTEM Controller. This device type has been preinstalled.
   - Softing PROFINET IO Device Developers Kit for PC. This device type may need to be installed.

   A connection is created between the controller and the device.
3. Assign device names, IP addresses and interface name.
   - In the sample application, the name of the device is **devkitpc-1.pnio-sys**. We recommend using this name in the project. The IP address can be set to suit the specific setup.
   - For the controller, **eth0** is entered for the interface name in the "Bus Access" section of the **Properties** view. This entry can be used if no changes have been made to the implementation on the RTEM.
4. Define modules and parameter settings.
5. Click the Module Management button to display the window for defining the modules. The sample application uses the modules "Digital 8 Bit Input", "Digital 8 Bit Output", "Digital 16 Bit Input" and "Digital 16 Bit Output".
   - We recommend using these modules. The sample application needs to be adapted if other modules are used.

- In the "I/O" section of the Properties view, the cycle time for I/O data exchange can be set. The default setting is 16 ms. We recommended starting with a longer cycle time. Depending on the performance of the PC and the load from other programs, it may happen that the cycle time cannot be maintained and the connection breaks.
- When using the modules given above, no parameters have to be set.

6. Check and compile the configuration.
   - When the **[Check Current Segment]** button is clicked, the Configurator first checks the current configuration. If the check is successful, the configuration is compiled to a binary file with an internal structure that is known to the controller.
   - The binary file is saved to the folder <Project>\Current\Export\<ProjectName><UUID>\ .
7. Transmit the configuration result to the target system

   When you click the Download Current Segment button , the Configurator not only checks and compiles the configuration, but also downloads the created binary file to the RTEM controller.

   The RTEM controller must meet the following two requirements:
   - It must be located in the same network as the PC running the Communication Configuration Tool, and it must be accessible.
   - The device name of the controller must correspond to the device name of the instance.

   How to proceed is described in the corresponding file for the PROFINET IO Sample.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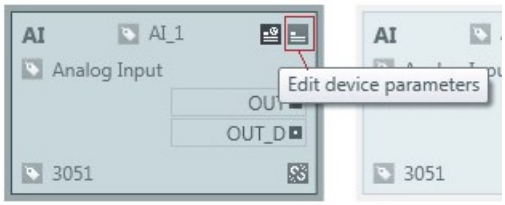
## 6.12 How to access H1 device parameters using a Modbus Master

The Modbus can only be configured for Softing devices FG-110 and FG-200 (FOUNDATION fieldbus only).

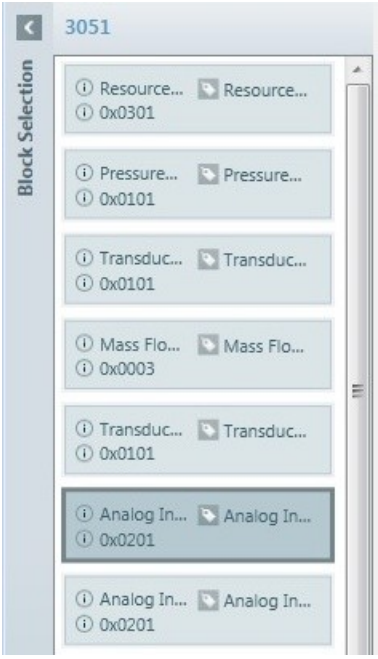
### Requirement:

A topology has been created.

1. Select the superordinate FF-HSE segment of the linking device.
2. Go to the **Properties** view. If the properties are not visible, select menu **View → Properties**.
3. Configure the limits of the Modbus register ranges in the Properties View of the HSE segment 85.
4. Navigate to the H1 device in which you would like to configure in the Properties View.
5. Click the Edit Device Parameters icon **(** **)** to open the **Parameter** view of the corresponding H1 device.




6. Select a block in the left side bar of the Parameter view.




7. Activate the Modbus Access to map the FF parameters to Modbus.
   With a FG-200 the majority of the block parameters can be mapped to Modbus. Parameters that cannot be mapped to Modbus are: CONFIRM_TIME, RESTART and WRITE_LOCK in the resource block of each device.

8. Click on ( ) to build a segment code for the current segment or click on ( ) to build a segment code for all segments.
   See a description of the main window buttons here 21 .

9. Download the configured data to the corresponding segment in menu **Build → Segment → [Name of Segment]**.
10. Load the configuration files of the corresponding FG-110 and FG-200 via the device's web interface.

    For details see the FG user manuals.
11. Access the H1 device parameters from the Modbus master. You find a overview of the Modbus parameter mapping here:
    <ProjectFolder>\Export\<ProjectName><GUID>\ModbusMapping.html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## 6.13 How to access H1 device parameters using an OPC Client

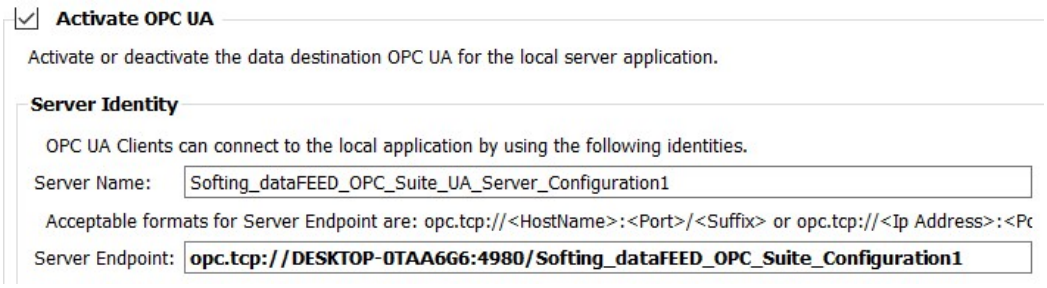
1. Configure the Modbus parameters as described in the chapter above 133.
2. Start the dataFEED configuration suite application.
3. Select **Configuration →  New** and create a new configuration.
4. Select the data source *Modbus* and click the icon *Add a new data source*.
   A configuration wizard is launched and helps you through the configuration steps.
5. Enter the connection name on the first page of the wizard.

   **Note:**
   The connection name will be used as root node in the address space of the OPC server.

6. Enter the IP Address of the FG device in the *Communication Settings* window.
7. Select the following settings:
   - Start-Adresse 1
   - Use Word Swap
8. Click **[Continue]** and in the next window again **[Continue]**.
9. Click the icon to import the address space definition file with the page *Address Space.*
   ComConf generates a corresponding address space definition file. You will find the file here:
   *<ProjectFolder>\Export\<Segment name>[<GUID>]\dataFEED_<PDTag of FG-xxx>.txt*
10. Click **[Finish]** to close the wizard.

    **Note:**
    If you keep the default data source setting *OPC Client, continue with Step 13*.

11. Select **Data Destination → OPC UA Client** to activate OPC UA.
12. Tick the checkbox *Activate OPC UA* in the OPC UA Property window. If you're not using the OPC UA Discovery Service enter the displayed Server Endpoint ID in your OPC UA client to connect with the server.




13. Now select **Local Application → Start**.

# 7 Frequently asked questions


- There are more connections targeted at slot 0 than ports available on the plugged module 136
- A symbol for an incorrect entry appears 136
- A device cannot be assigned to any instance 136
- An FF device is connected but not displayed in the Live List 137
- An FF device is connected but the live list displays this device with device type zero 137


## 7.1 More connections targeted at slot 0 than ports available

**Question:**

During the segment check or the code generation for a segment, the error "There are more connections targeted at slot 0 than ports available on the plugged module" is displayed in the Message Log. (PROFINET only).

What is the cause of this error and how can it be corrected?

**Answer:**

⇨ PROFINET devices can have 1, 2 or more Ethernet ports. Consequently, a device can be directly connected to one, two or even more other devices. During the creation of the topology, there is no check to see whether the specified connections are feasible. This check is only performed when the code is generated.

⇨ The error can be corrected in the following ways:

- The design must match the physical topology; connections that do not correspond to reality must be removed.
- In the physical system, a switch is used that is not a PROFINET device. Refer to How to represent a switch without PROFINET functionality in the topology view 125 to find a description on how this error can be corrected.

## 7.2 Symbol for incorrect entry appears

**Question:**

When entering the device name, the symbol for an incorrect entry appears. But actually there is no error.

Why does this happen and what can be done?

**Answer:**

⇨ The "-" (dash) character must not be given at the end of a device name, but it is allowed anywhere else within the name. While the name is being typed, its syntax is immediately checked. If the "-" character is entered, the check at first assumes that this character is at the end of the name, and thus indicates the error. The error symbol will disappear immediately as soon as more characters are entered.

## 7.3 Device cannot be assigned to instance

**Question:**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Though a device was found in the network scan performed in the Live List view, it cannot be assigned to any instance of the Topology view (PROFINET only). What causes this problem and how can it be solved?

**Answer:**

⇨ One of the criteria used to assign a found device to an instance from the Topology view is the Module ID of the DAP. The ID can only be determined if the Communication Configuration Tool can perform an "ImplicitRead" for the device. This is only possible, however, if the device has an IP address and can be reached by this IP address.

⇨ To solve the problem, an appropriate IP address needs to be assigned to the device. This is done by selecting the device and clicking the "Online Maintenance" button. A pop-up window is displayed where IP addresses can be entered and transferred to the device.

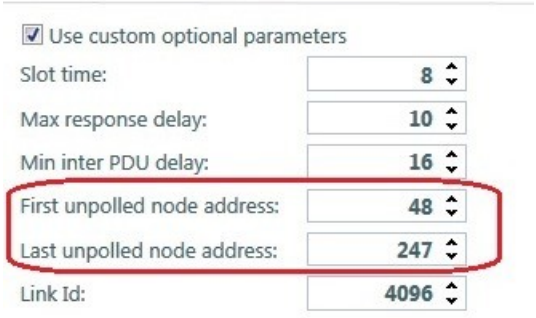
## 7.4 FF device connected but not displayed in the Live List

**Question:**

Though an FF device is connected, it is not displayed in the Live List when scanning. (FOUNDATION fieldbus only)

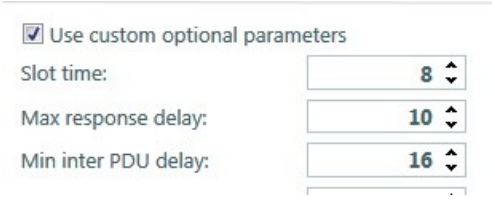
**Answer:**

1. Open the Network Access Profiles and make sure the device's node address is not in the range of the unpolled node addresses:




If required, modify the value range accordingly.

2. The device is too "slow" for the bus parameters configured. Communication Configuration Tool uses default values (see screenshot below). Check manufacturer's device description to find out device-specific values. Then adapt them accordingly in the network access profile.




## 7.5 FF device connected but displayed with device type zero

**Question:**

Though an FF device is connected, the live list displays this device with device type zero. Usually the device is shown with a default address in the range from 248 to 252. (FOUNDATION fieldbus only)

**Answer:**

Assign the device a node address in the range of the polled node addresses. To do so, select the device, then open Online Maintenance and then set the node value to a value in the range allowed. Then click **[Assign]**. Now update the live list.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# 8 Glossary of terms

| Term | Description |
|---|---|
| AI | Analog Input block. |
| Allocated block instance | An allocated block instance is a block instance established in a device. A block instance may be permanently allocated or dynamically allocated. |
| AOI | Acronym for Add On Instructions for assemblies used in conjunction with RS Logix. |
| Application View | A view illustrating the control application and the logical information flow. The view is comprised of logical control units and connections between those control units. Logical control units are assigned to device or module objects of the topology view. |
| Associated block instances | An allocated block instance and a used block instance are called associated, if a logical relationship between these instances has been established, indicating the allocated block instance shall be the device resource performing the application task expressed by the used block instance in an FBAP. |
| Association | A relationship between two or more entities. Implies a connection of some type - for example one entity uses the services of another, or one entity is connected to another over a network link. |
| BL | Business Logic |
| BLM | Backup Link Master. |
| Block association list | List which establishes the connection between<br>▪ function block within the function block application and a function block of a device.<br>▪ configured transducer block and the transducer block of a device.<br>▪ resource block and the resource block of a device. |
| Block instance | Block instance is the common term for both the establishment of a block in a device (called an allocated block instance then) and the establishment of a block in an FBAP (called a used block instance then). |
| Block (type) | Block indicates a function block, transducer block or resource block. The term block type stands for the class or type of the block. If the term block is mentioned the instance of a certain block type is meant. |
| BusType | Identification of the fieldbus type e.g. PN, FF, PB. |
| CFF | Fieldbus Foundation capability file for H1 devices. |
| CFH | Fieldbus Foundation capability file for HSE devices. |
| Check State | The check state of a configuration entity (like e.g. segment, device, FBAP, function block, ...) is the result of validating the entity during a check/build operation. The check state can be one of the following: |

| Term | Description |
|---|---|
| | • unchecked: no validation has been performed since the entity was added to the project or a configuration modification potentially changing the validation result was performed.<br>• valid: no validation errors have been detected for the entity in its most recent validation.<br>• invalid: validation errors have been detected for the entity in its most recent validation.<br>The following general rules apply for configuration entities containing other configuration entities (like e.g. segments containing devices):<br>• The check state of an entity containing at least one invalid entity is "invalid".<br>• The check state of an entity containing no invalid entities but at least one unchecked entity is "unchecked". |
| CIF | Abbreviation for Control In the Field. CIF is a control strategy available with the BusType FF to achieve the control only with the devices available on the network.<br>In contrast an IO based control strategy conveys all IO to/ from the DCS to achieve the control. The actual control algorithm is conducted by the DCS. |
| Component Model | The component model provides a detailed view of the various hardware and software components that make up the proposed system. It shows both where these components reside and how they inter-relate with other components. Component requirements detail what responsibilities a component has to supply functionality or behavior within the system. |
| CONF | Abbreviation for the Softing Communication Configuration Tool. The Softing Communication Configuration Tool allows to configure multiple different bus systems (FF, ProfiNET etc.) |
| Controller | A controller is a device processing inputs and calculating outputs.<br>Fieldbus specific examples: PROFINET controller, Ethernet IP scanner, Profibus Master Class 1. Does not apply to Fieldbus Foundation. |
| C/S | Client / Server Connection resp. communication relationship. |
| Ctor | Abbreviation for "constructor" of a class. |
| Customer | A person or a company that requests An entity to transport goods on their behalf. |
| DCS | Abbreviation for Distributed Control System. |
| DD | Fieldbus Foundation binary device description. |
| DDL | Device Description Language as defined with the document FF-900. |


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| Term | Description |
|---|---|
| Device | This is a synonym used for various types of field devices that are controlling the process. In PROFINET it is used to reference the protocol implementation in a field device. |
| Dynamically allocated block instance | A dynamically allocated block instance is an allocated block instance which requires an allocation procedure to be performed to establish the block instance in a device. |
| FB | Function Block. |
| FBAD | Function Block Application Diagram. |
| FBAP | Function Block Application Process. |
| FBLIB | FF-CIT function block library. Comprises XML representations of Fieldbus Foundation Dds (see DD). These XML representations are called XML-DD. A Fieldbus Foundation binary DD is converted by the FF-CIT DD Importer during the DD import process (along with the capability file) and added to the FBLIB. See also DEVLIB. |
| FF | Abbreviation for the BusType FOUNDATION fieldbus. |
| FF-SIS | Foundation Fieldbus Safety Instrumented System.<br>A closed transmission system for communication purposes suitable for use in a SIS. Achieves trusted communication between SIS equipment connected to the transmission system. (Adapted from IEC 62280-1).<br>Protocol and application specifications for safety systems. Covers specific protocol enhancements layered over the standard FF communication protocol, definition of SIS blocks (RB and FB) etc. The FF-SIS architecture is designed to meet the requirements of IEC 61508 (ISL) parts 1 through 3. |
| Gateway Device | A device allowing to connect networks with different incompatible network protocols and addressing schemes.<br>A gateway device spawns a network subsegment of a linked bus system. The gateway device belongs to a Network segment of a primary bus system but spawns a subsegment of a linked bus system. Examples:<br>▪ ProfiNET / H1 proxy.<br>▪ FF / Hart gateway. |
| GSD | Basic PROFIBUS device description. |
| GSDML | Generic Station Description Markup Language.<br>Device description language specified by PI. It is used to describe the features of a PROFINET device. |
| GUI | Abbreviation for Graphical User Interface. |
| HANDLING | Denotes an attribute of a FF DD item. HANDLING specifies whether the corresponding item can be read, written or both. The attribute can be evaluated according to a conditional expression. In this case the attribute may change if the value of a controlling variable changes. |
| HIST | Host Interoperability Support Test. |
| HSE | Foundation Fieldbus High Speed Ethernet protocol. |

| Term | Description |
|---|---|
| H1 | The bus system described in the FF System Architecture Specification. The data link layer for the H1 bus is specified in the Data Link Protocol Specification. |
| IEC | Abbreviation for INTERNATIONAL ELECTROTECHNICAL COMMISSION. |
| IF | Abbreviation for Interface. |
| Invalid applicable | This term applies to user input validation states in several contexts:<br>The user input is not permissible, but can be persisted. |
| Invalid non-applicable | This term applies to user input validation states in several contexts:<br>The user input is not permissible and cannot be persisted. |
| LAS | Link Active Scheduler. |
| LD | Abbreviation for Linking Device. |
| Link ID | Address information identifying a H1 segment. The segment could be spawned by a HSE Linking device or a H1 Bridge. |
| Linked Bus System | A linked bus system is the bus system used in a network subsegment. A linked bus system might be equal to or differ from the primary bus system depending on the gateway device used to integrate the network subsegment into the network segment. |
| LL | Live List |
| LLV | Abbreviation for Live List View. |
| LM | Link Master. |
| LUV | Abbreviation for Last Usable Value. Used in conjunction with communication quality. |
| MAX_VALUE | Denotes an attribute of a FF DD item. Defines the maximum value resp. range for the value of a DD item. The attribute can be evaluated according to a conditional expression. In this case the attribute may change if the value of a controlling variable changes. |
| MIN_VALUE | Denotes an attribute of a FF DD item. Defines the minimum value resp. range for the value of a DD item. The attribute can be evaluated according to a conditional expression. In this case the attribute may change if the value of a controlling variable changes. |
| MRU | Abbreviation for Most Recently Used. Indicates a list of items most recently used by the user. |
| MVC | Multi Variable Container. |
| NAP | Abbreviation for Network Access Profile. Refer to term Network Access Profile. |
| NAPV | Abbreviation for Network Access Profile View. Refer also to Network access profile. |
| Network Access Profile | Bus specific data structure containing all information needed for the configurator to connect to a segment via one of the PCs network interfaces. |


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| Term | Description |
|---|---|
| | The first member of the data structure always is the unique bus type.<br>Network access profiles are managed in the Network Access Profiles[98] view.<br>In order to connect to a segment, a network access profile has to be assigned to a controller / master device.<br>Network access profiles are stored machine specific (not in the project!) since they depend on the interfaces of an individual PC. The usage with the controller is stored in the project. Like used description files for devices, the used network access profiles may be transported along with the project data. |
| Network scan | Detection of the devices connected to a network. The term is equivalent to the term live list. |
| Network Segment | A network segment is a set of devices with a logical relationship and their interconnections. Devices in one network segment have to be connected physically (i.e. for any two devices in the network segment there must be a physical connection path). Multiple network segments might be represented in a set of physically connected devices. |
| Network Subsegment | A network subsegment is a subset of a network segment which is spawned behind a gateway device in that network segment. |
| OD | Object dictionary. |
| OMV | Abbreviation for Online Maintenance View. |
| OPC | Abbreviation for OLE for Process Control. |
| PARV | Abbreviation for Parameter View. |
| PB | Abbreviation for the bus system ProfiBus. |
| PDM | Abbreviation for the CONF Project Data Model. |
| PD-Tag | Physical Device -Tag. |
| Permanently allocated block instance | A permanently allocated block instance is an allocated block instance which is always established in a device and does not require an allocation procedure to be performed beforehand. |
| PN | Abbreviation for the BusType ProfiNet. |
| Primary Bus System | The primary bus system is the bus system used in the part of the network segment directly accessed by the configurator. |
| PRPV | Abbreviation for Property View. |
| P/S | Publisher / Subscriber Connection resp. communication relationship. |
| RB | Resource block. There is one resource block per virtual field device (VFD). |

| Term | Description |
|---|---|
| ReferencePath | The reference path is a unique identifier of a reference or location of a DD Item. The reference path can be utilized to locate the actual visual 'object' (Dialog, Menu, etc.) within the host implementation. The GetItem() methods are not unique in the essence that they return the DD Item. They return an enumerator of IBLDDSItemStructure interface representing the references of the DD Item.<br>For instance if a specific Menu DD Item is a sub-menu that is referenced twice GetItem() will return the two reference "locations". The reference path then uniquely identifies the reference location within the tree of DD Items kept within the component ffcitdds.<br>Host systems integrating the FF-CIT are recommended to traverse the tree of DD Items stored within the component once and keep the reference path for each DD Item that has a visual correspondence (dialog, menu, etc). Then if an item changes GetItem() can be invoked to identify all reference locations of the DD item. The reference path then can be used to locate the hosts visual objects. |
| RQ | Abbreviation for requirement. |
| RS | Abbreviation for restriction. |
| SCG | Abbreviation for FF-CIT Schedule & Code generator. |
| SEMV | Abbreviation for Segment Management View. |
| Setup component | Software component of a setup that can be integrated into other setups.<br>Note: On Windows systems a setup component is represented as merge module. |
| SIS | equivalent to FF-SIS. |
| Device | Network attached hardware entity. A device is not a module. |
| Device object | Software representation of a <device>. |
| Device type family | The device type family attribute of a device type is a means to categorize device types. Examples for values of the attribute are Pressure, Temperature, Flow etc. This attribute is generally bus specific.<br>• The family of a device type can be obtained from an external type description if the bus system supports this (e.g. PB, PN).<br>• The family of a device type may also be hard-coded and provided as additional information during the import process of an external type description if the bus system does not support a family (e.g. FF).<br>The device type family is more like a category. |
| SUT | Abbreviation for System under test. |
| Switch | In a communication context, a switch references a device that forwards frames based on specific rules. Switches do have ports, i.e. connection points for Ethernet cables. A switch has at least two ports. |


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| Term | Description |
|---|---|
| TB | Transducer block. The TB is responsible for capturing the process value from the sensor or writing process values to the actuator. |
| Topology View | A view representing the physical topology of the bus system. The view comprises all device objects and module objects and port objects and their connections.<br>There exist bus specific device objects which are not configurable. Depending on the bus system those objects are shown or not shown. |
| TOPV | Abbreviation for Topology view. Refer also to the term Topology view. |
| UC | Abbreviation for Use Case. |
| UCD | Abbreviation for Use Case Diagram. |
| UI | Abbreviation for User Interface. |
| Use Case | A Use Case represents a discrete unit of interaction between a user (human or machine) and the system. A Use Case is a single unit of meaningful work; for example creating a train, modifying a train and creating orders are all Use Cases.<br>Each Use Case has a description which describes the functionality that will be built in the proposed system. A Use Case may 'include' another Use Case's functionality or 'extend' another Use Case with its own behavior.<br>Use Cases are typically related to 'actors'. An actor is a human or machine entity that interacts with the system to perform meaningful work. |
| Used block instance | A used block instance is a block instance contained in an FBAP (i.o.w. the establishment of a block in an FBAP). |
| Valid | This term applies to user input validation states in several contexts:<br>The user input is permissible in a local checking context and can be persisted. |
| VALIDITY | Denotes an attribute of a FF DD item. The attribute can be true or false. If false, the corresponding DD item (Variable, Method etc.) is not valid. The validity does not specify how the item is displayed with a user interface if it evaluates to false. |
| VCR | Virtual Communication Relationship. |
| VFD | Virtual Field Device. |

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