

User Guide

PROFINET Gateways



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1 About this guide

1.1 Read me first

Please read this guide carefully before using the device to ensure safe and proper use. Softing does not assume any liability for damages due to improper installation or operation of this product.

This document is not warranted to be error-free. The information contained in this document is subject to change without prior notice. To obtain the most current version of this guide, visit the download center on our website at: <http://industrial.softing.com/en/downloads>

1.2 Target audience

This guide is intended for experienced operation personnel and network specialists responsible for configuring and maintaining field devices in process automation networks. Any person using a PROFINET Gateway must have read and fully understood the safety requirements and working instructions in this guide.

1.3 Typographic conventions

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:
\\<Application 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.



Video

This symbol refers to a video on the corresponding topic.

1.4 Document history

Document version	Changes since last version
1.00	First version
1.01	New Corporate Identity implemented.
1.10	External references added.
1.20	Description and instructions of pnGate PB model added.
1.21	Corrections and additions of video references
1.22	Maximum permissible ambient temperatures changed for horizontal and vertical mounting of gateways. See Installation positions ^{□14} for details.
1.30	Document restructured. Editorial changes. Chapter on GSDML file update and upload ^{□31} and chapter on switching from a 2-channel to a 4-channel gateway ^{□33} included. RJ45 status LEDs ^{□53} explained.
1.30-1	Communication port ^{□17} details added.
1.30-2	Corrections in Chapter About PROFINET Gateways ^{□7} and Softing contact address changes
1.30-3	Diagrams in Chapters Connection diagram pnGate PA ^{□10} and Connection diagram pnGate PB ^{□10} updated
1.31	Chapter 5.4 Asset management with ABB FIM ^{□44} added.
1.31-1	Minor editorial changes.

1.5 Related documentation and videos

See the following links for additional product information:

- [Documents](#)

1.6 Document feedback

We would like to encourage you to provide feedback and comments to help us improve the documentation. You can write your comments and suggestions to the PDF file using the editing tool in Adobe Reader and email your feedback to support.automation@softing.com.

If you prefer to write your feedback directly as an email, please include the following information with your comments:

- document name
- document version (as shown on cover page)
- page number

2 About PROFINET Gateways

The PROFINET Gateway is a host interface for integrating PROFIBUS PA and PROFIBUS DP segment devices in PROFINET systems. The Softing PROFINET Gateway is available in three models:

- The **pnGate PA** model is available in as a 2-channel and as a 4-channel version. Both versions integrate PROFIBUS PA (**P**rocess **A**utomation) segments in PROFINET systems at a fixed speed of 31.2 kbit/s, typically used in areas of process automation with explosive atmosphere.
- The **pnGate PB** integrates PROFIBUS DP (**D**ecentralised **P**eripherals) networks in PROFINET systems at speeds of up to 12Mbit/s, typically via a centralized controller in factory automation. Additionally it also integrates PROFIBUS PA segments in PROFINET systems.
- The **pnGate DP** integrates one PROFIBUS DP (**D**ecentralised **P**eripherals) network with up to 32 PROFIBUS DP devices in PROFINET systems at speeds of up to 12Mbit/s.

All three PROFINET Gateways support industry-standard device configuration, parametrization and condition-monitoring tools. In addition, the gateway user interface helps supports the conversion of PROFIBUS GSD files to a single generic PROFINET GSDML file.

Engineering systems and asset management systems

The gateways can be managed with the following tools:

- PROFINET engineering systems (e.g. Siemens TIA Portal)
- FDT frame application (e.g. PACTware)
- Siemens SIMATIC PDM (Process Device Manager)

2.1 Intended use

This series of gateways has been designed to integrate to integrate PROFIBUS devices into PROFINET-based networks. Any other use is not intended. Follow the instructions in this document on how to configure and operate the gateways.



CAUTION

Do not use this device in hazardous areas! See Section [Specifications](#)⁸ for permissible ambient conditions.

2.2 System requirements

These gateways require the use of a PROFINET engineering system such as the Siemens TIA portal (version 15 or higher) and STEP 7 (version 5.5 SP 4 or higher). Engineering systems from other PLC vendors can also be used, provided they support PROFINET GSDML files. Further requirements include:

- 24V power supply
- one power conditioner per PROFIBUS PA segment
- field barrier (for Ex environment)
- PC with web browser
- GSD file for each PROFIBUS device on your network
- Javascript must be activated

2.3 Supported features

The PROFINET Gateway maps PROFIBUS devices to PROFINET networks. All gateways support the conversion of PROFIBUS GSD files into a single PROFINET GSDML using an integrated web-based conversion tool. Other supported features include:

- Simple connection to PROFIBUS PA and PROFIBUS DP devices using PROFINET controllers
- Integration in FDT frame applications
- Integration in Siemens SIMATIC PDM
- Configuration of the gateway in a web browser
- Integrated configurator to start up the PROFIBUS devices
- Detailed display of the operation state by LEDs
- Two Ethernet interfaces (switched internally)
- Power supply by connectors or rail connectors

2.4 Specifications

Power supply	18 VDC...32 VDC; SELV/PELV supply mandatory Typical input current is 200 mA; maximum is 1 A (considering the rush-in current at switch-on).
Ethernet	IEEE 802.3 100BASE-TX/10BASE-T
Minimum ambient operating temperature	-40 °C (see section Installation positions ¹⁴ for the maximum ambient temperature depending on the mounting position)
Storage temperature	-40 °C...+85 °C
Altitude	Must not exceed 2,000 m
Location	Indoor use only; no direct sunlight
Safety standard	IEC/EN/UL 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements and IEC/EN/UL 61010-2-201 Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements for control equipment (both with CB scheme).

2.5 Safety precautions



CAUTION

During operation, the device's surface will be heated up. Avoid direct contact. When servicing, turn off the power supply and wait until surface has cooled down.



Note

Do not open the housing of the PROFINET Gateway. It does not contain any parts that need to be maintained or repaired. In the event of a fault or defect, remove the device and return it to the vendor. Opening the device will void the warranty!

3 Installation

3.1 Hardware installation



Note

With an ambient temperature above 55 °C at the place of installation connecting cables may heat up strongly if they are installed in an unfavourable position. In such cases, ensure that the permissible service temperature of the cables (i.e. 80 °C) is not exceeded or use cables sustaining high temperatures of at least 90 °C.

3.1.1 Mounting and dismantling



Note

Make sure the PROFINET Gateway is mounted in such a way that the power supply can be easily disconnected.



Note

Depending on the installation position, the maximum ambient operating temperature may differ. See Section [Installation positions](#) ¹⁴ for details.



Installation and inspection

Installation and inspection must be carried out by qualified personnel only (personnel qualified according to the German standard TRBS 1203 - Technical Regulations for Operational Safety). The definition of terms can be found in IEC 60079-17.

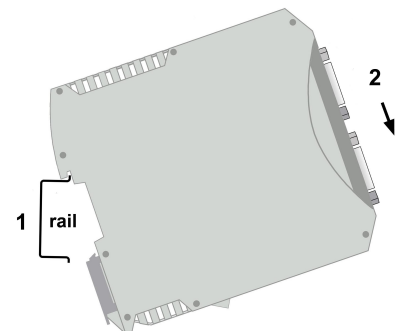
Mounting

1. Hook the upper notch of the cut-out on the back of the PROFINET Gateway into a 35 mm DIN rail.
2. Press the PROFINET Gateway down towards the rail until it slides into place over the lip of the locking bar.



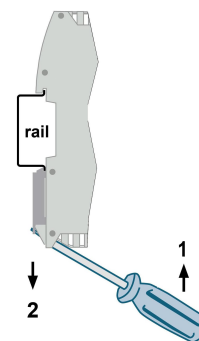
Note

Do not put stress on the system by bending or torsion.



Dismounting

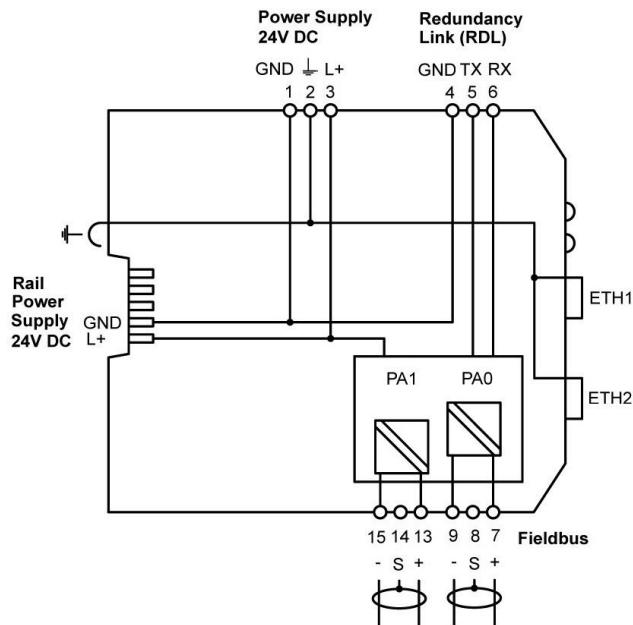
1. Slide a screwdriver diagonally under the housing into the locking bar.
2. Lever the screwdriver upwards, pull the locking bar downwards - without tilting the screwdriver - and move the gateway upwards off the rail.



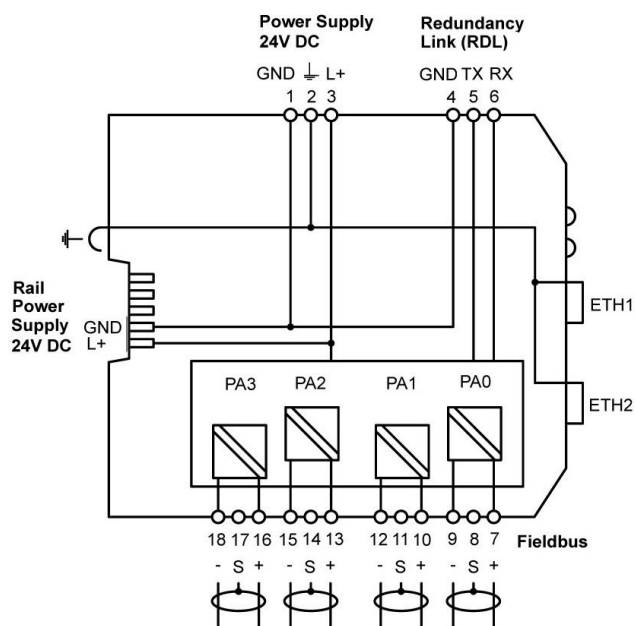
3.1.2 Connection diagrams pnGate PA

The following diagram shows the input and output interfaces of the pnGate PA. The 2-channel model has 2 physical PROFIBUS segment connections (PA0 to PA1), while the 4-channel model has 4 physical PROFIBUS segment connections (PA0 to PA3).

2-channel model

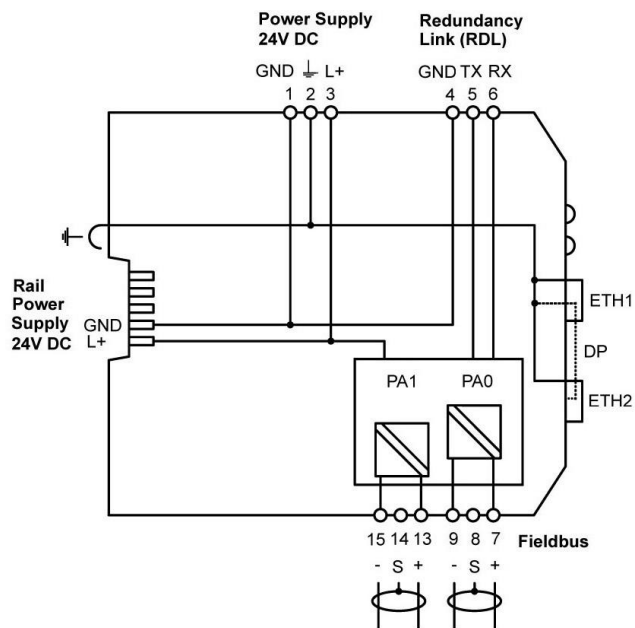


4-channel model



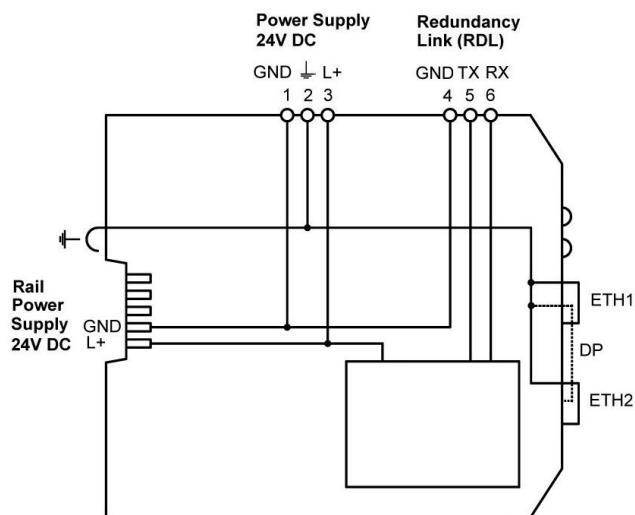
3.1.3 Connection diagram pnGate PB

The following diagram shows the input and output interfaces of the pnGate PB. The gateway has 2 physical PROFIBUS PA segment connections (PA0 to PA1) and supports on RS-485 link for PROFIBUS DP data communication.



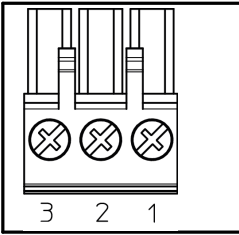

3.1.4 Connection diagram pnGate DP

The following diagram shows the input and output interfaces of the pnGate DP. The gateway has two 10/100 Base-T Ethernet ports (ETH1/ETH2) and one RS-485 link for PROFIBUS DP data communication. The RJ45 ports correspond to IEEE 802.3 and are connected to an internal switch for line topologies.



3.1.5 Connecting the power supply

Connect the gateway to a 24 V DC power supply (not included in the delivery). The supply voltage (18 VDC 32 VDC) is connected by a 3-pole terminal block. The power supply is connected to the plug connector via flexible wires with a cross section of 0.75 to 1.5 mm². The ground connection wire must have a cross section of 1.5 mm².

	Pin	Signal	Description
	1	GND	Ground
	2		Functional earth
	3	L+	Positive supply voltage



CAUTION

The Functional Earth (FE) connection of the device has to be connected at low inductance with the Protective Earth (PE) of the system.



Note

As the connection diagrams show, the power can also be applied by a special DIN rail connector (Rail Power Supply). For further information contact Softing Industrial Automation GmbH.



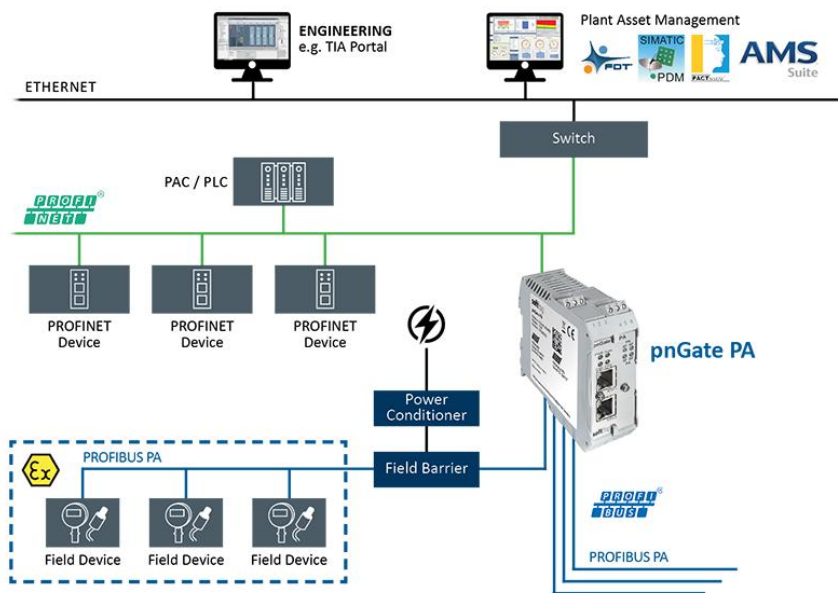
Note

See also the maximum ambient temperatures in the Section [Installation positions](#)¹⁴.

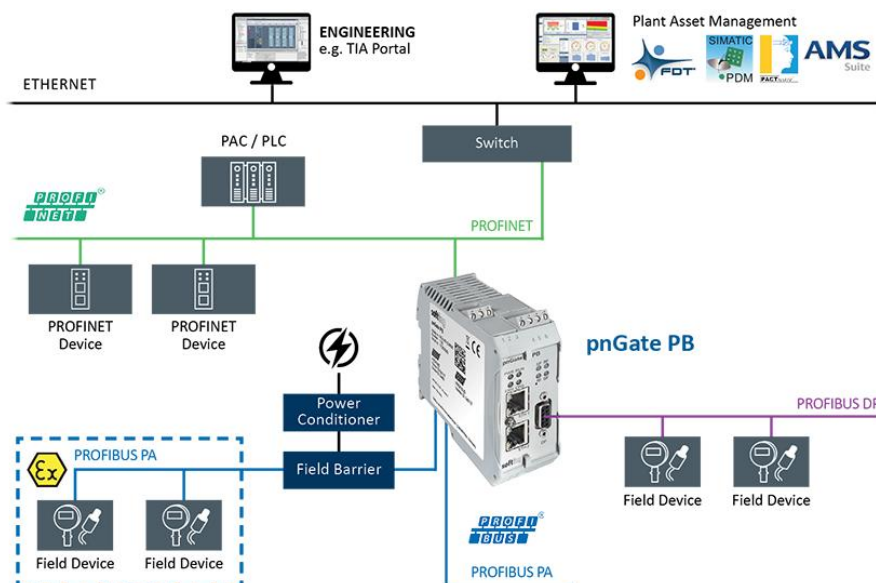
3.1.6 Connecting to the network

1. Connect each segment of your PROFIBUS network to a port of your gateway. Be sure that each segment is powered by a power conditioner. If you connect to field devices in explosive atmospheres ensure that you also connect a field barrier in between.
2. Connect the gateway from one of the two Ethernet ports with your PROFINET network.
3. Connect your PC running the engineering and asset management tools using the second Ethernet port.

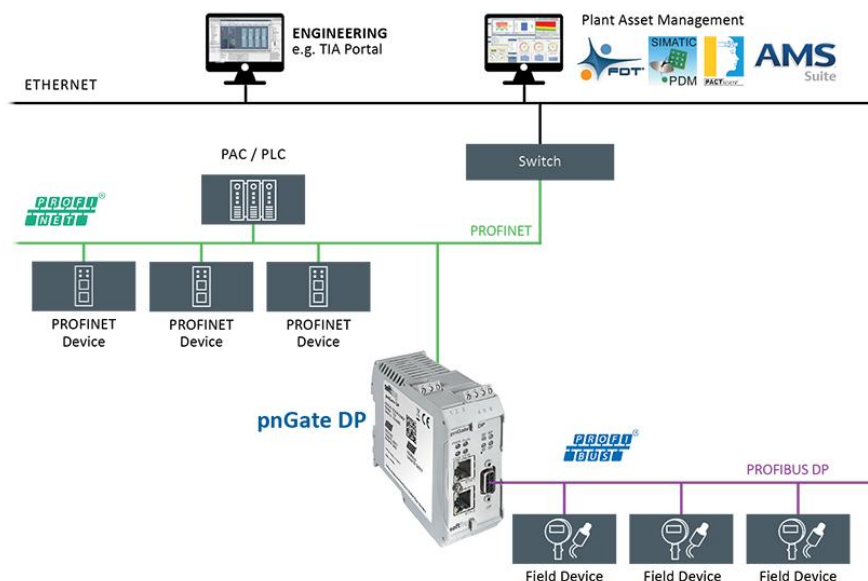
pnGate PA network topology



pnGate PB network topology



pnGate DP network topology



3.1.7 Installation positions

PROFINET Gateways can be mounted horizontally and vertically. Depending on the installation position, different ambient operating temperatures (T_a) are allowed.



Minimum distance

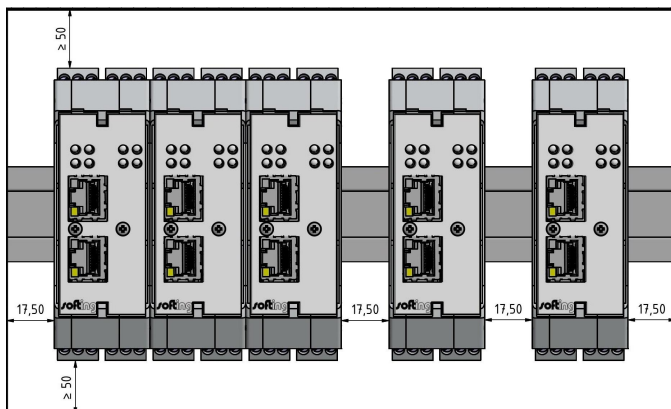
Provide a minimum distance of 50 mm to the air inlet and air outlet to ensure natural convection.



Rotated installation position

The maximum permissible ambient temperature values also apply to a 180° rotated installation position.

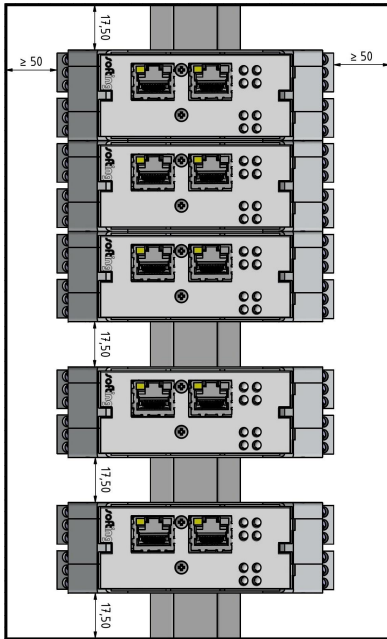
Horizontal installation position and maximum temperatures



Number of PA channels used	Maximum PA fieldbus voltage	Minimum distance	Maximum ambient temperature T_a
0 - 4	32VDC	0 mm	50 °C
0 - 2*	24VDC	0 mm	55 °C
0 - 4	32VDC	17.5 mm	60 °C
0 - 2*	24VDC	17.5 mm	60 °C

* pnGate DP models have no PA channel

Vertical installation position and maximum temperatures



Number of PA channels used	Maximum PA fieldbus voltage	Minimum distance	Maximum ambient temperature T_a
0 - 4	32VDC	0 mm	40 °C
0 - 2*	24VDC	0 mm	45 °C
0 - 4	32VDC	17.5 mm	50 °C
0 - 2*	24VDC	17.5 mm	55 °C

* pnGate DP models have no PA channel

3.1.8 Powering up the device

Turn on the power supply. The boot process will take around 15 seconds. For indication of proper operation refer to [LED status indicators](#)⁵³.

3.2 Software installation



Note

When you install a Softing product for the first time, you will be asked if you trust the publisher. Activate the option **Always trust software from Softing AG** if you do not want to be asked in subsequent installations and select **[Install]** to start the installation.

1. Go to the [pnGate web page](#) to download the latest product software.
2. Start by downloading and installing the **Search and Configure** tool.
3. Follow the on-screen installation instructions.
4. Read the license agreement carefully.
If you have questions, you can **[Cancel]** the installation at this point and contact us. Click **[Print]** if you want to print the license agreement to a PDF or on a printer.
5. Select **I accept the terms in the license agreement** and click **[Next]**.
6. Click **[Install]** to install the selected software application on your PC.
While the installation is in progress, the status bar of the installation wizard shows the different steps that are being executed. If you want to abort the installation, click **[Cancel]** button. The installation wizard will undo all modifications that have been made to your computer up to this point. Otherwise, wait until the installation is completed.
7. Press **[Finish]** to complete the installation and exit the wizard.



Note

Proceed with the installation of the other software packages.

Additional installations

Depending on your use case, install one of the following software packages:

- Install an FDT frame application if you are using FDT technology.
- Install **PROFIdtm** separately if you are not using PACTware but another FDT frame application like FieldCare or FieldMate.
- Install **PDM libraries** for integration into Siemens PDM.

4 Configuration

The PROFINET Gateway connects to an integrated web server to configure the gateway and the connected PROFIBUS devices. One of the functions of the web server is to convert PROFIBUS GSD files into a single PROFINET GSDML file. The configuration is typically done offline in the PROFINET engineering system (e.g. Siemens TIA Portal) meaning that you do not need to be connected to a controller or a gateway.

The default IP address of the integrated web server is 192.168.0.10. To access the PROFINET Gateway from your PC, you either have to change the default IP address of the integrated web server to an address on your network or change the DHCP address on your PC to a static IP address that matches the network address of your gateway (e.g. 192.168.0.1). The following Chapter describes how you have to do one of the two options.

4.1 Prerequisites

- Ensure that you have downloaded and installed the latest firmware.
- The PROFINET Gateway is connected to the PROFIBUS PA or PROFIBUS DP segment.
- The PROFINET Gateway is connected with a PC which runs a standard Internet browser supporting JavaScript.
- The Search and Configure tool is installed.
- GSD files (electronic device descriptions) corresponding to the PROFIBUS devices are available on the PC.
- The PROFIBUS devices are connected to the PROFIBUS PA or PROFIBUS DP segment.

PROFINET Gateway requires the following communication ports to be available:

Application	Port	Port Type
Web Interface	80/443	TCP
Search and configure	1900, 2355, 5353	UDP/Multicast
PDM, DTM	2357	TCP
Modbus Communication	502 (default)	TCP

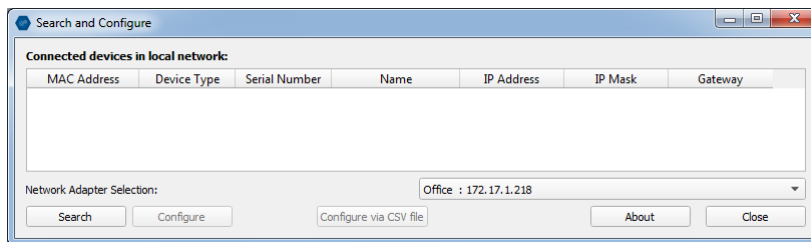
4.2 Changing the IP address of the PROFINET Gateway

Before you can configure the connected PROFINET Gateway you will have to change the preset IP default address of your gateway so that the integrated web server can communicate with your PC over the Local Area Network.

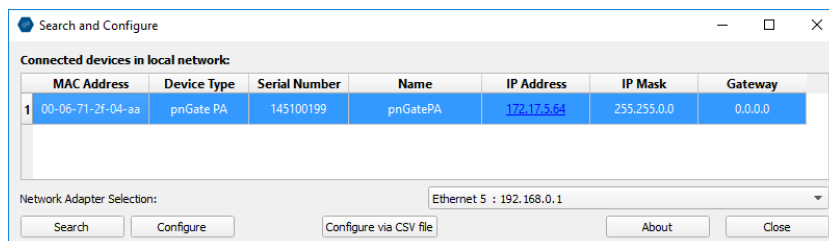
Searching for devices

The following steps apply to Windows 10.

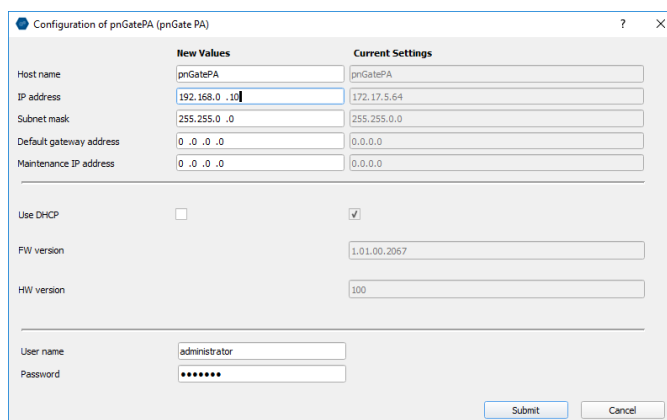
1. Click **Start** → **Softing** → **Search and Configure**.
The application window is opened.



2. Open the **Network Adapter Selection**.
3. Select the network on which you want to search for the connected gateway.
This selection menu shows all networks you can access from your PC.
4. Click **[Search]** to start searching for connected devices.
The search may take some time. The window Connected devices in local network appears.



5. Select the network device you want to configure.
6. Click **[Configure]** or double-click the device.
The configuration window opens. Here you can modify all relevant values.



**Note**

If you are starting the connected PROFINET Gateway for the first time and you have not yet assigned user roles for the gateway, the user name in the configuration window is preset to administrator.

7. Enter the default password **FGadmin!1** for username **administrator**.
8. Click **[Submit]**.
The changed settings are written to the device.

**Note**

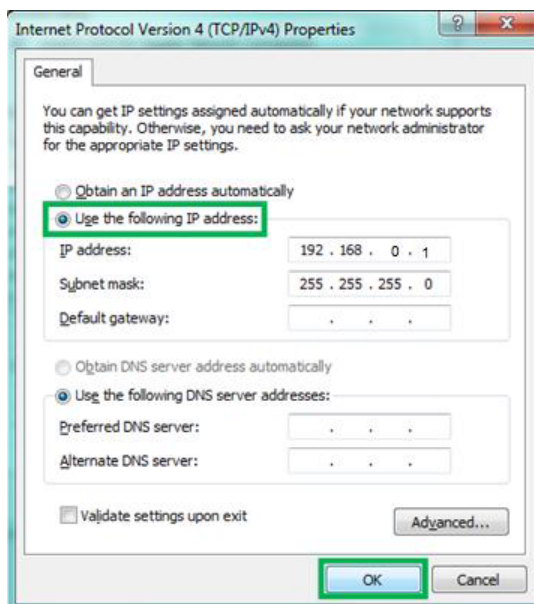
For the PROFINET communication to work properly ensure that the device's web server does not use the same IP address that is used by the PROFINET engineering system (e.g. TIA Portal) for the gateway.

4.3 Setting the IP address of the PC

If you have not changed the IP address of a PROFINET Gateway as described in the previous [Section](#)¹⁸ you will need to configure the IP address of your PC to access the gateway from your PC.

The following chapter describes how to set a static IP address in Windows 10.

1. Click **Start → Windows System → Control Panel** from your task bar.
2. Select **Network and Internet → Network and Sharing Center**.
A new window opens where you can view your basic network information.
3. Click on your Internet connection (either Ethernet or wireless) next to Connections under **View your active networks**.
A new window opens.
4. Click **[Properties]**.
5. Select **Internet Protocol Version 4 (TCP/IPv4)**.
The following window opens.



6. Select **Use the following IP address** and enter a specific IP address and Subnet mask. In our example we use the following settings:
IP Address: 192.168.0.1
Subnet mask: 255.255.255.0
7. Click **[OK]** to confirm.

4.4 Login to user interface

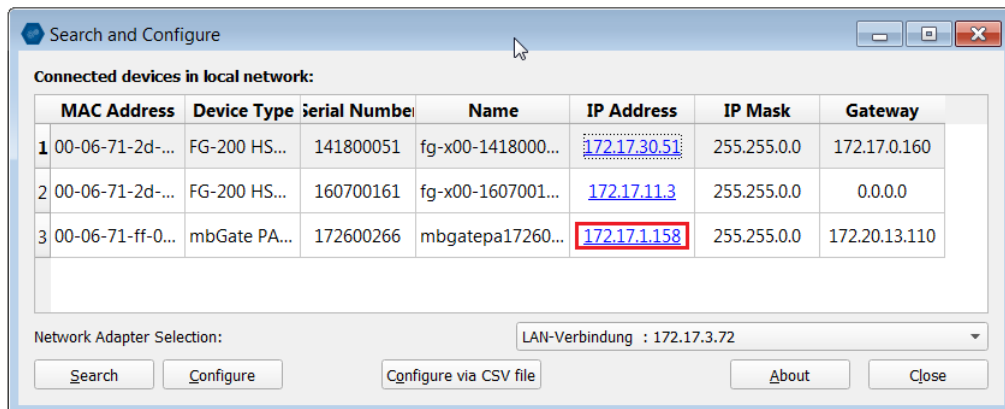
1. Open your Internet browser and enter the IP address of your gateway.



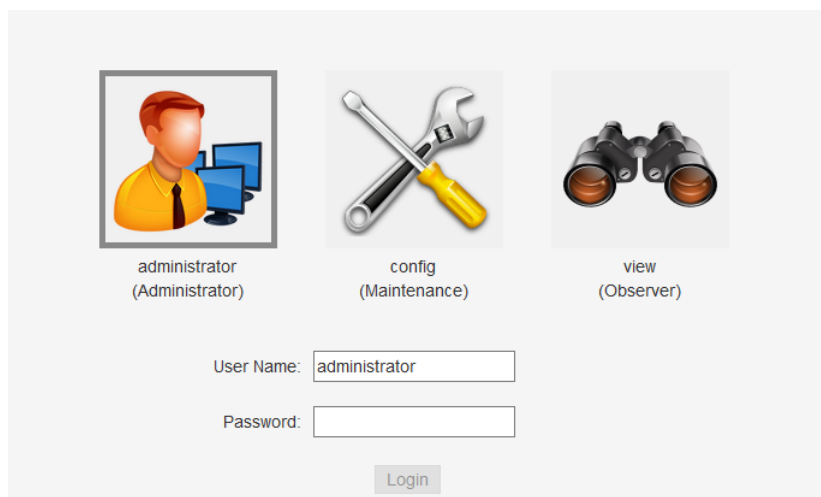
Note

If you don't recall the IP address of your gateway, start the tool to find out what it is (see Step 2 below).

2. Click the IP address of the gateway to launch the login window in your web browser.



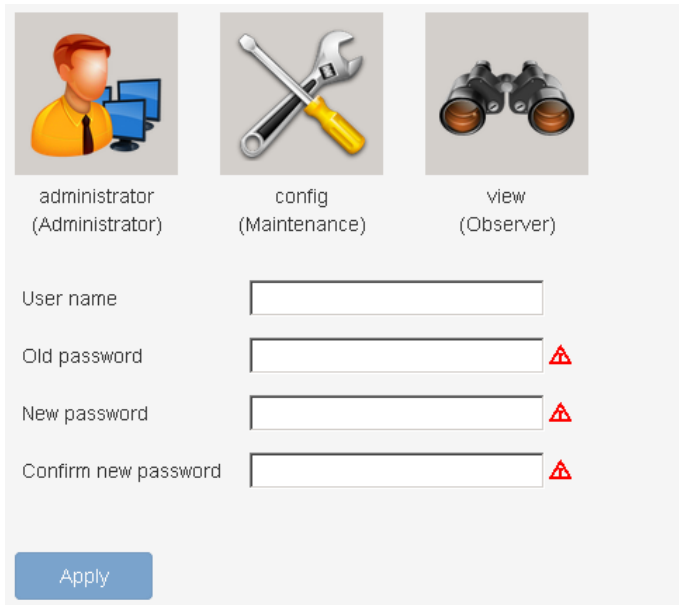
3. Select the administrator symbol and enter **FGadmin!1** in the password field.



The gateway's web-based interface opens with the information page.

4.5 Changing the password

1. Log on to the web interface of the gateway.
2. Select **Settings → User Accounts**.
As administrator you can change and confirm the passwords for different roles.
See details below.



The screenshot shows the 'User Accounts' settings page. At the top, there are three role icons: 'administrator (Administrator)' with a person icon, 'config (Maintenance)' with a wrench and screwdriver icon, and 'view (Observer)' with a binoculars icon. Below each icon are four input fields: 'User name', 'Old password', 'New password', and 'Confirm new password'. The 'Old password', 'New password', and 'Confirm new password' fields have red warning icons next to them. An 'Apply' button is located at the bottom left of the form.

3. Click one of the icons (administrator, config or view) and enter the **Old Password** and the **New Password** in the corresponding fields..
4. Retype the password in the **Confirm new password** field and click **[Apply]** to save the modified password.



Note

Be careful when changing the administrator password! If you lose your changed administrator password, you can no longer make changes to configurations or settings. In this case contact Softing support.

Access to your PROFINET Gateway configuration tool is managed by user roles where each role has certain permissions. The following user roles are available:

Role	Username	Password
Administrator	administrator	FGadmin!1
Maintenance	config	FGconfig!1
Observer	view	FGview!1

Additionally, your PROFINET Gateway can be accessed remotely with the user roles **Diagnostics** (user: *diagnosis*, psw: *?<fJ#\/\$eB2qtGd**) and **Expert** (user: *expert*, psw: *FS-QsHnc7BWa{6w<*). Both user roles are reserved strictly for Softing Support purposes.

**Note**

It is strongly recommended to change the Diagnostics and Expert passwords immediately by entering the user name in the input field instead of selecting one of the icons above.

The following table shows the permissions/actions of each user role:

Permission	Administrator	Service Engineer	Observer
Setting password	<input checked="" type="checkbox"/>		
Configuring gateway	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Reading configuration	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reading diagnostics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Updating firmware	<input checked="" type="checkbox"/>		
Resetting gateway	<input checked="" type="checkbox"/>		
Installing HTTPS certificates	<input checked="" type="checkbox"/>		

4.6 Updating the firmware

The gateway comes with pre-installed firmware which is maintained and updated to continuously enhance the functionality of the device. To ensure that your PROFINET Gateway is always running the most recent version check the Softing [Download Center](#) for the most recent firmware update.



Note

You need to be logged in as [administrator](#)²¹.

1. Download the firmware update to your computer.
When you are downloading from this site for the first time you will have to register yourself in a few steps.
2. Log on to the web interface of the gateway.
3. Select **Settings** → **Firmware** in the side bar navigation.

Firmware Update	
Choose Firmware File...	
Current Firmware:	1.20.00.8095
Firmware File:	No file selected.
Firmware Name:	
Firmware Signed:	
Firmware Encrypted:	
Check	Update

4. Click [**Choose Firmware File...**] to select the firmware file you want to download.
5. Click [**Update**] to download the firmware file and to reboot the system.
The system performs a firmware file check. The download starts automatically. When the download is completed the pnGate PA/pnGate PB/pnGate DP will be rebooted. When the boot process is completed, the RUN LED is ON.



Note

Do not access the web server of the pnGate PA/pnGate PB/pnGate DP before the "Success" message is displayed in the browser window. Otherwise you will have to clear the cache of your web browser after the boot process has finished and reconnect to the web server of the pnGate PA/pnGate PB/pnGate DP.

4.7 PROFINET configuration in the TIA Portal

The following chapter describes how to convert the GSD file of a PROFIBUS PA or PROFIBUS DP field device to a GSDML using the built-in PROFIBUS configurator and how to use this file to configure a PROFINET device in the Siemens TIA Portal (*Totally Integrated Automation Portal*).



Video

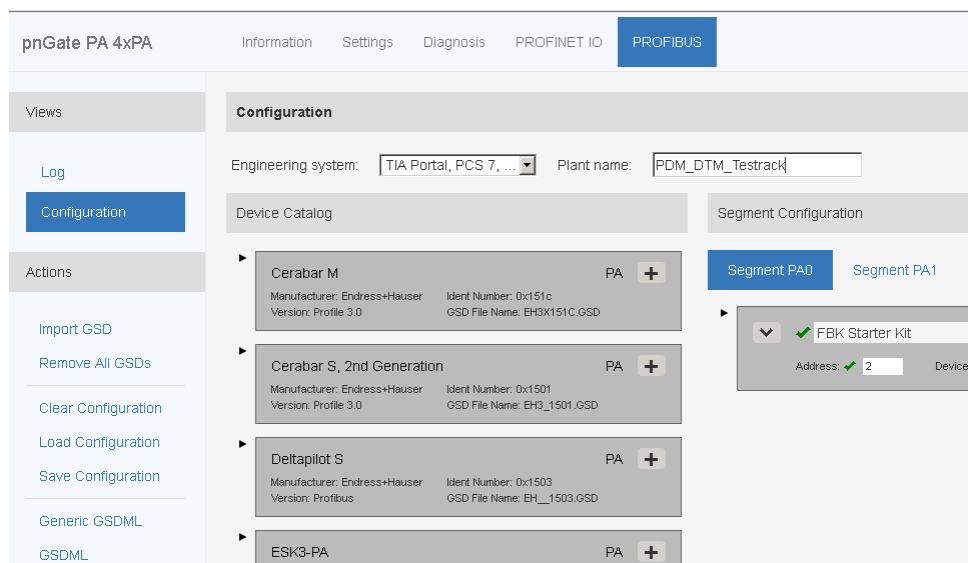
See also the videos [Conversion from PROFIBUS GSD to PROFINET GSDML](#) and [PROFINET configuration in the TIA Portal](#).

4.7.1 Prerequisites

- You must have installed the Siemens TIA Portal on your PC to optimize the PROFINET configuration routines.
- You must know how to create and manage projects in the TIA Portal.

4.7.2 Creating a GSDML import file

1. Log on to the user interface of the gateway with your username and password.
2. Select **PROFIBUS** → **Configuration**.



3. Determine for which engineering system and for which installation (plant name) you want to generate a GSDML import file. The engineering system in the configuration page is set by default to the TIA Portal.



Note

As each engineering system often only supports a specific GSDML format, it is recommended that you select the engineering system you are using before converting the imported GSD files.

4. Click **[Import GSD]** in the side menu.

5. Select the file(s) you want to import in the **File Upload** window and confirm the upload to the Device Catalog of your application clicking **[Open]**. You can add up to 64 files for conversion. The selected file appears under Device Catalog.
6. Click **[Generic GSDML]** in the side menu to generate a single GSDML file from the GSD files in the Device Catalog. If the GSMDL file is not automatically saved, save it manually to your PC.
7. Alternatively, click **[GSDML]** in the side menu to generate a single GSDML file from the GSD files used in the Segment configuration.

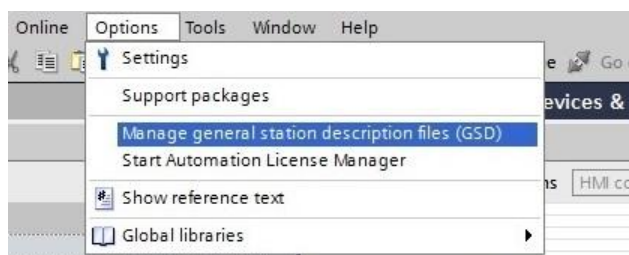
**Note**

By selecting **[Generic GSDML]** you will generate a GSDML file from all the devices in the device catalog. Remember that the PROFIBUS configuration of the segments is not stored in the GSDML which implies that the assignment of the devices to the PROFIBUS channels and the parameters of the devices must be done in the PROFINET engineering system (e.g. TIA portal). If you choose to convert the GSD files to a static GSDML file using the **[GSDML]** function the PROFIBUS devices and the used IO modules cannot be manually altered later in the PROFINET engineering system (e.g. TIA portal).

4.7.3 Creating a new project in Siemens TIA Portal

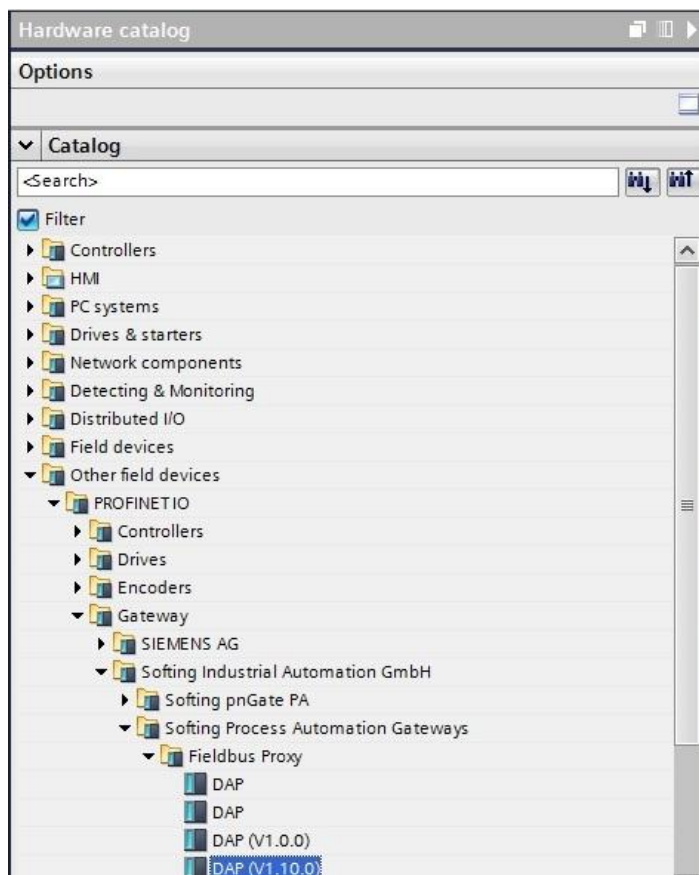
Open or create a new project in the TIA Portal using the PROFINET Controller.

1. Start the TIA Portal.
2. Click **[Create new project]**.
3. Enter a project name and path.
4. Click **[Create]** to create a new project.
The project is created and will open automatically.
5. Select **Open Project view**.
6. Select **Options → Manage general station description files (GSD)**.

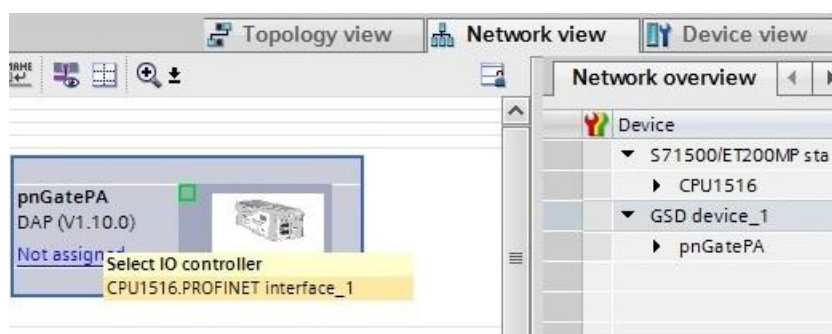


7. Navigate to the folder where the generated GSDML (see [Creating a GSDML import file](#)^{□25}) is stored, tick the check mark of the file and click **[Install]**.
8. Click **[Close]**.
The Hardware Catalog is updated.
9. Double-click **[Devices & Networks]** to open the **Network View**.

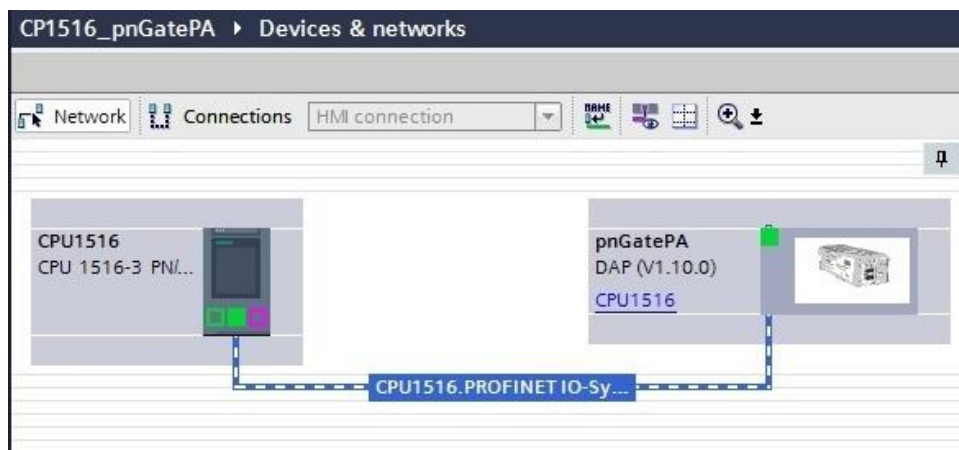
10. Open the **Hardware Catalog**.
11. Select **Other field devices** → **PROFINET IO** → **Gateway** → **Softing Industrial Automation GmbH** → **Softing Process Automation Gateways**.
12. Select the project name you entered in Step 3.
13. Select **DAP**.



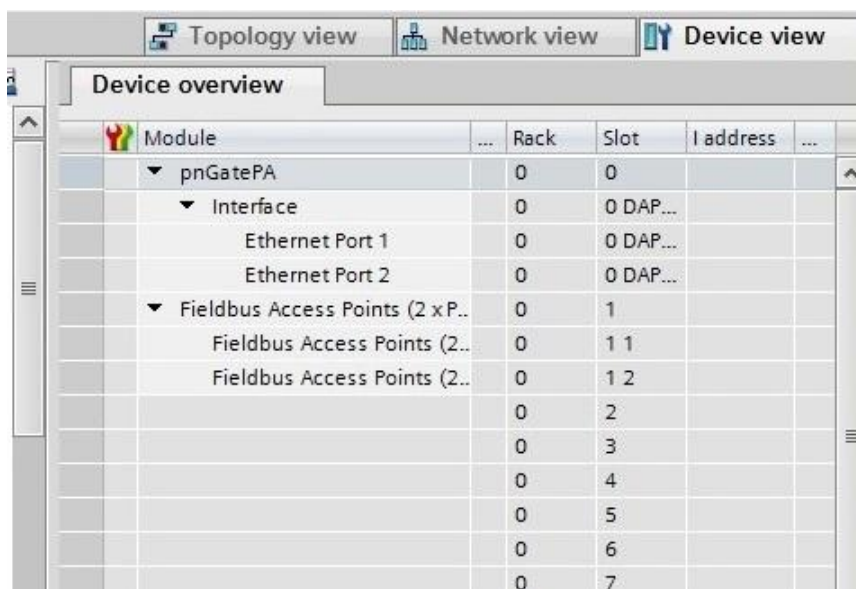
14. Select **Version** in the information dialog to identify the correct GSDML by date and time stamp.
15. Select the gateway, drag it from the **Hardware Catalog** and drop it into the **Network View**.
16. Click **[Not assigned]** in **Network View**.
17. Select the controller.



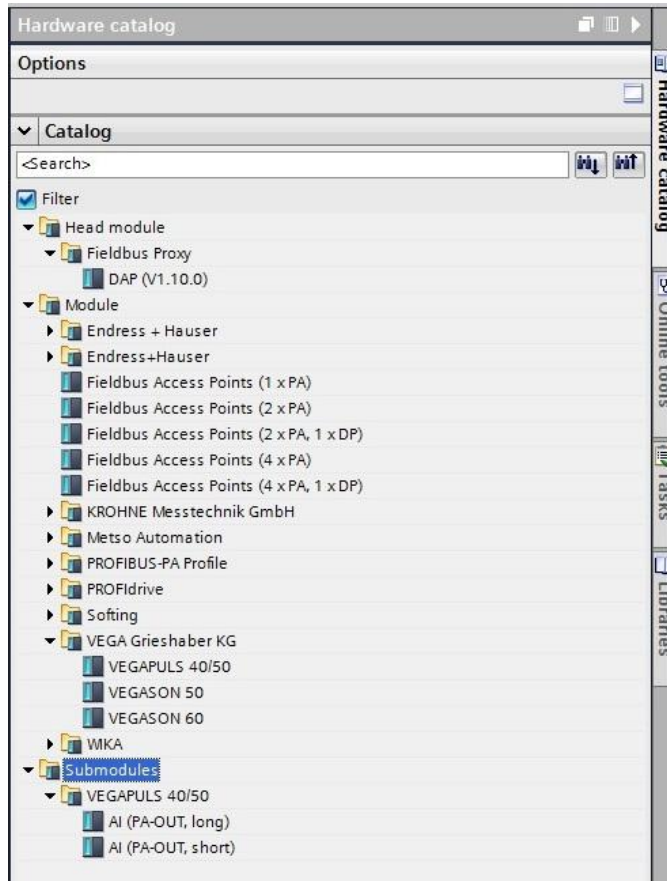
Now the gateway is assigned to the controller



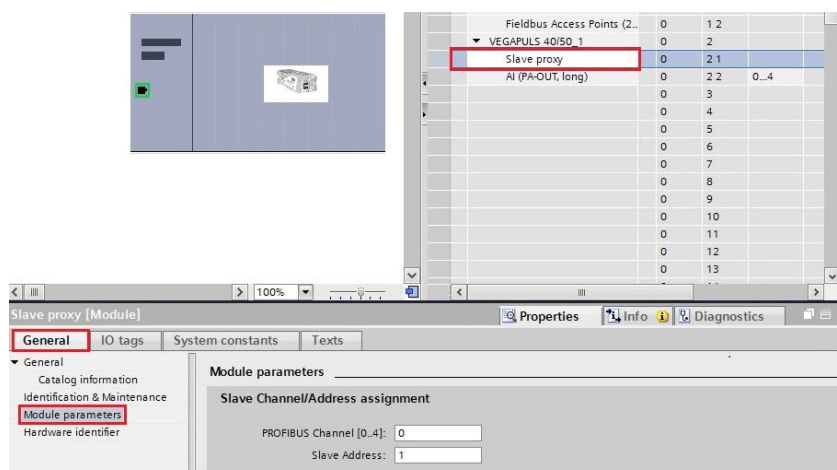
18. Double-click the gateway icon to open the **Device View**.



19. Drag a module to a free slot. The supported submodules are shown under **Submodules**.
20. Click the gray device symbol and select a submodule (e.g. temperature value) from the catalog to open the corresponding Properties dialog (configure the parameters of the submodule if required - similar to PA Function Block).



21. Select **Slave Proxy** → **General** → **Module parameters** and set the PROFIBUS master channel to the channel to which the PROFIBUS device is connected.
22. Enter the Slave Address.
If required, you can configure the parameters of a submodule in this dialog window after selecting it (corresponding to PA Function Block).

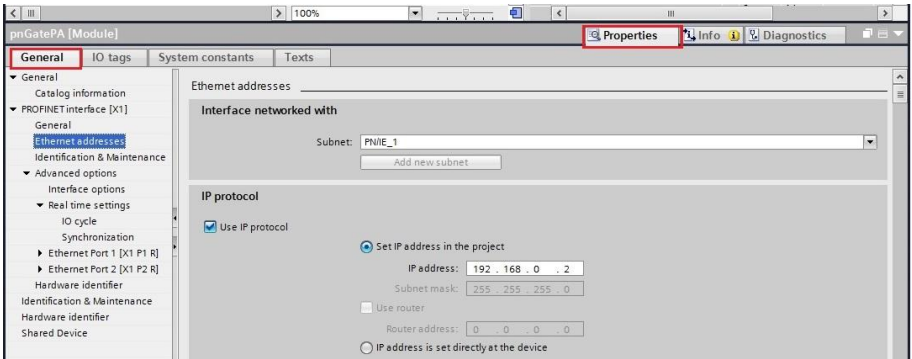


23. Select the default PROFINET IP address settings or click the gateway to configure these settings in **Properties** → **General**.

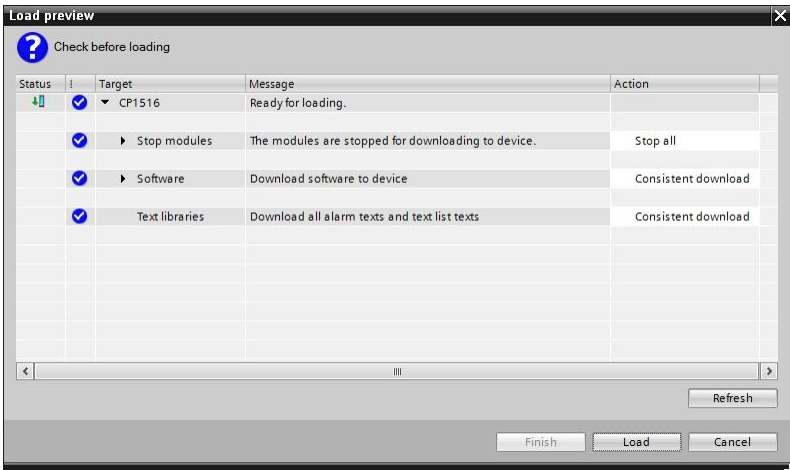


Note

Do **NOT** to use the same IP address for the gateway and the device's web server. Example: 192.168.0.10 is the web server's default address. Use a different IP address for the PROFINET. For information on how to change the web server's address refer to [Changing the IP address of the PROFINET Gateway](#)¹⁸.



24. Save the project and download it to the device.
25. Select the corresponding PC network interface where the controller is connected.
26. Click **[Load]** and **[Finish]** to complete the setup.



A confirmation window appears displaying the message **Downloading to device completed without error**.

4.7.4 Updating and uploading a GSDML file

If you add new PROFIBUS device to a segment in the gateway user interface you will need to update the GSDML and upload it to the PROFINET engineering tool (TIA portal) using the update feature of the TIA portal to avoid the loss of I/Q address parameter.

4.7.4.1 Generic GSDML

The following steps describe how to add a new PROFIBUS device and update the generic GSDML (see also Chapter [Generating a GSDML import file](#)^{□25}).

1. Log on to the the user interface of the gateway with your username and password.
2. Select **PROFIBUS → Configuration**.
3. Import the GSD file of the PROFIBUS device to the **Device Catalog** in the gateway user interface.
4. Click [**Generic GSDML**] to generate the new GSDML file.

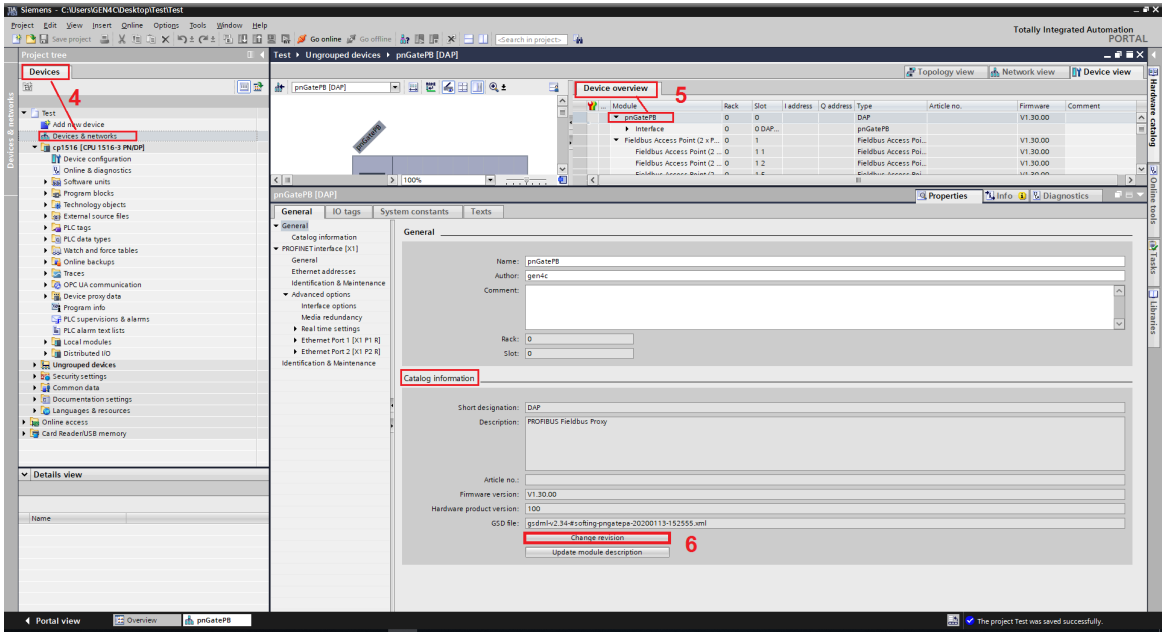
4.7.4.2 GSDML

See also the videos [Conversion from PROFIBUS GSD to PROFINET GSDML](#).

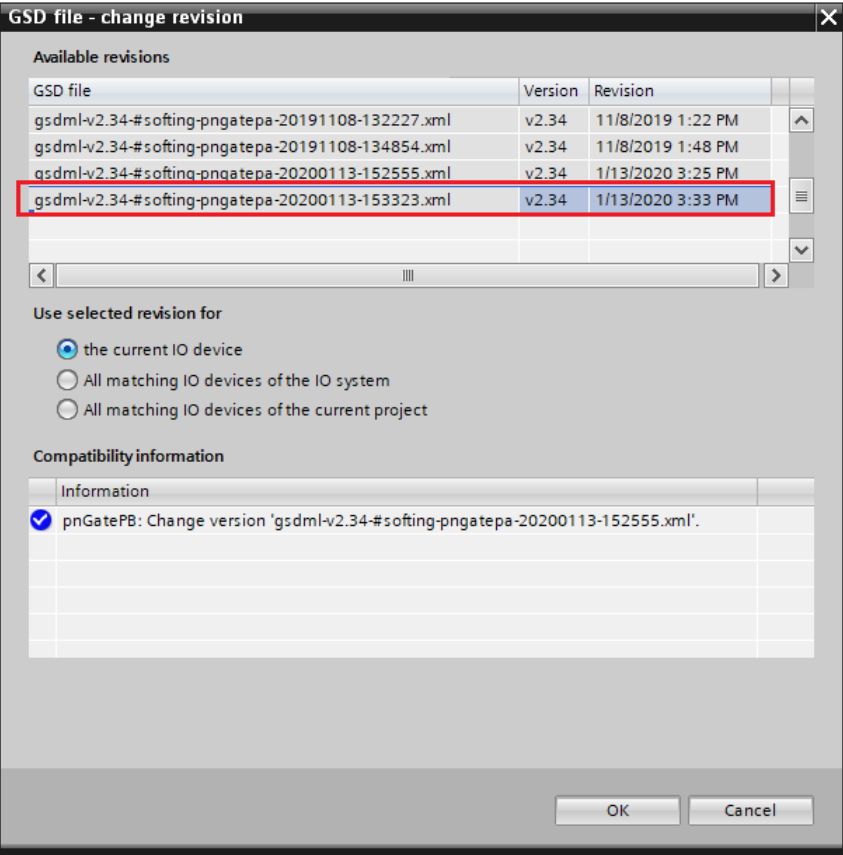
1. Log on to the the user interface of the gateway with your username and password.
2. Select **PROFIBUS → Configuration**.
3. Import the GSD file of the PROFIBUS device into the Device Catalog in the gateway user interface.
4. Assign the device to the PROFIBUS segment(s) in the **Segment Configuration**.
5. Add the IO modules.
6. Set the PROFIBUS address.
7. Click [**GSDML**] to generate the new GSDML file.

4.7.4.3 Device catalog update in TIA portal

1. Open the TIA portal project.
2. Select the existing PROFINET gateway device in the **Hardware Catalog** under **Other field devices → PROFINET IO → Gateway → Softing Industrial Automation GmbH → Softing Process Automation Gateways**.
3. Import the new GSDML which you can identify by the date and time string in the file name.
4. Select in the left side menu **Devices → Devices & network**.
5. Select the gateway you want to update in the **Device view → Device overview** window.



- Click the **[Change revision]** button in the **Catalog information** window.
- Select the GSDML file imported in Step 3 (check date and time string) in the new window that appears.



- Instantiate the new PA device module and assign the correct parameter to the new device if you imported a generic GSDML.

4.7.5 Switching from a 2-channel to a 4-channel gateway

You can switch from a 2-channel to a 4-channel gateway to support more PROFIBUS devices in your network. To do this it is recommended to use the Change Revision in the TIA portal feature.

4.7.5.1 Generic GSDML

The following steps describe how to switch from a 2-channel to a 4-channel gateway and how to update the generic GSDML (see [previous chapter](#)³¹).

1. Log on to the the user interface of the gateway with your username and password.
2. Select **PROFIBUS → Configuration**.
3. Import all GSD files of the PROFIBUS devices from the 2-channel gateway into the device catalog of the 4-channel gateway.
4. Click [**Generic GSDML**] to generate the new GSDML file.

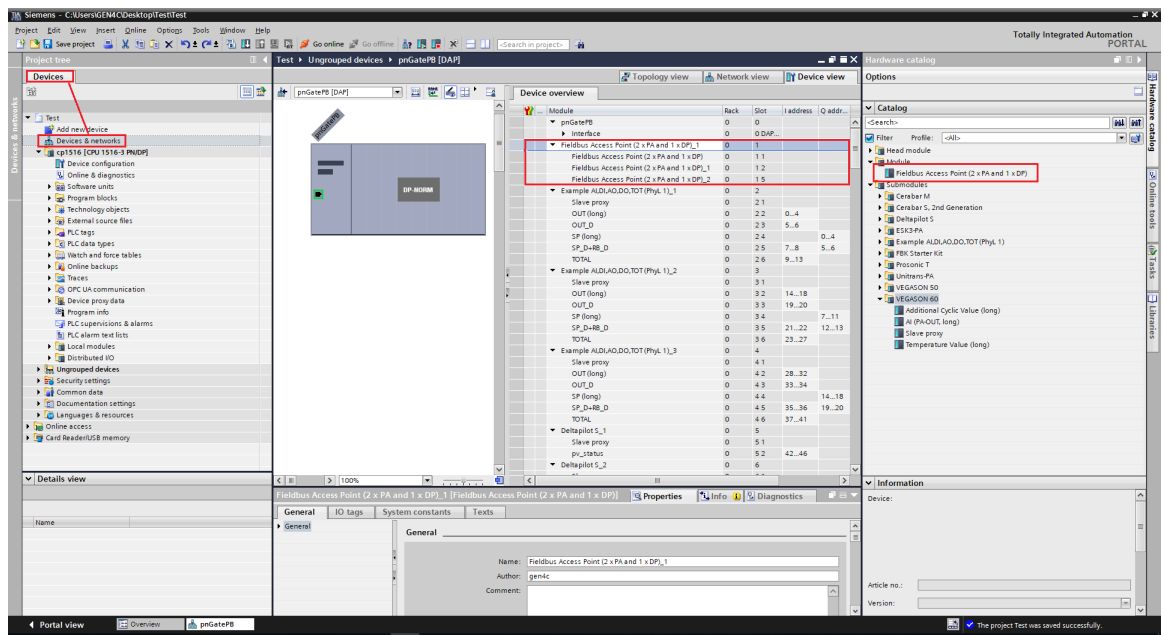
4.7.5.2 GSDML

The following steps describe how to switch from a 2-channel to a 4-channel gateway and how to update the GSDML (see also the video [Conversion from PROFIBUS GSD to PROFINET GSDML](#)).

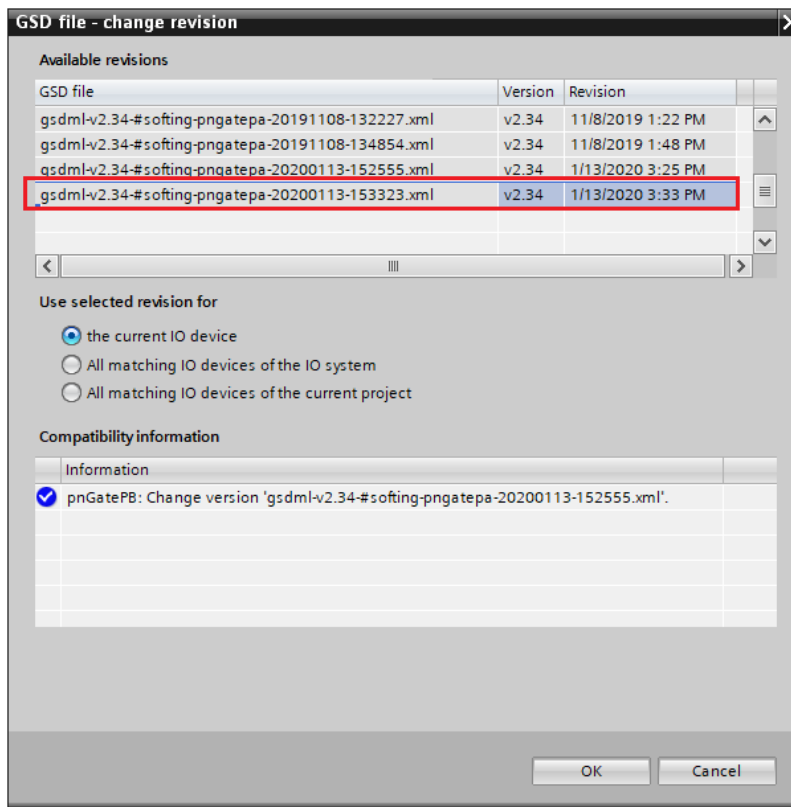
1. Log on to the the user interface of the gateway with your username and password.
2. Select **PROFIBUS → Configuration**.
1. Load the existing PROFIBUS configuration project of the 2-channel gateway into the 4-channel gateway.
2. Click [**GSDML**] to generate the new GSDML file.

4.7.5.3 Device catalog update in TIA portal

1. Open the TIA portal project.
2. Select the existing PROFINET gateway device in the **Hardware Catalog** under **Other field devices → PROFINET IO → Gateway → Softing Industrial Automation GmbH → Softing Process Automation Gateways**.
3. Import the new GSDML file which you can identify by the date and time string in the file name.
4. Select in the left side menu **Devices → Devices & network**.
5. Select the gateway you want to update in the **Device view → Device overview** window.



6. Remove the 2-channel **FAP** module (*Fieldbus Access Port*) from the selected gateway. The FAP module is always located in slot 1.
7. Click the **[Change revision]** button in the **Catalog information** window.
8. Select the GSDML file imported in Step 3 (check date and time string) in the new window that appears.



9. Instantiate the new PA device module and assign the correct parameter to the new device if you imported a generic GSDML.

5 Asset management

According to ISO 55001, asset management deals with the entire life cycle of assets an organization requires to achieve its objectives. But what is an asset? In the broader sense of the term, an asset is a physical or non-physical entity, item or thing that has the potential or actual value to an organization. Seen in the context of process automation, asset management involves controlling and governing physical assets (device assets) to lower costs and improve plant performance.


The following chapter describes the tools and technologies of the Asset Management System which use PROFINET Gateway to manage (configure, parametrize, troubleshoot and maintain) connected field devices.

5.1 Preparing for asset management

Installation

- Install the most recent version of PROFIdtm or PDM library from the PROFINET Gateway product website.

PROFIBUS Configuration for PROFIdtm and PDM

1. Click the Windows **Start**  button to open the start menu.
2. Select Softing **PROFIBUS → Driver Configuration** to configure the PROFIBUS driver.
3. Allow Windows **User Account Control** (UAC) to modify settings.
The PROFIBUS Control Panel is opened.
4. Select the PROFINET Gateway and click **[Add...]**.
5. Enter a symbolic name and click **[Next]**.
6. Enter the IP address of your PROFINET Gateway and click **[Next]**.
7. If required, change the timeout settings (Timeout for Connect and Max Idle Time).
In most cases default settings can be used.
8. Click **[Finish]**.
The configuration wizard is closed. In the Control Panel the node name is shown on the left side underneath the PROFINET Gateway. The question mark on a yellow background means that the connection to the PROFINET Gateway has not yet been tested.
9. Confirm your settings with **[Apply]** and **[OK]**.
The PROFIBUS Control Panel tests the connection to the PROFINET Gateway. After a short while, the yellow question mark is replaced by a green check mark. If a red cross appears instead, check the network cables and the IP settings of your PC and the gateway. Ensure that the PC and the PROFINET Gateway are on the same IP subnet.
10. Continue with Chapter Creating a project in PACTware.

5.2 Asset management with PACTware

PACTware is an FDT frame application which allows you to view field devices of different suppliers in a graphical interface similar to a browser window. To manage the information of these devices, PACTware uses a Device Type Manager (DTM) within the frame application. The DTM is a software which allows you to access a field device similar to a device driver. It contains the complete logic (data and functions) of the field device. Using DTMs the same device setting procedures can be used in any FDT environment.

For details on how to set PROFIBUS device parameters see the online manual integrated in the most recent PROFIdtm application you downloaded and installed from the product website.

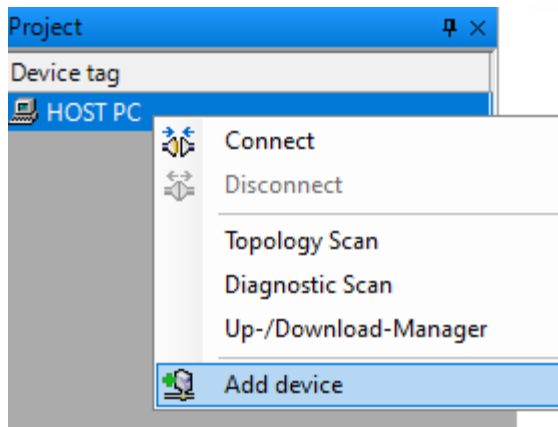
5.2.1 Prerequisites

The default IP address of the built-in web server has been changed to an address on your network or the IP address of your PC has been changed to an IP address corresponding to the network address of your gateway (e.g. 192.168.0.1). See Chapter Setting the IP address of the PC .

- PACTware 4.1 or any other FDT frame application is installed.
- PROFIdtm is installed.

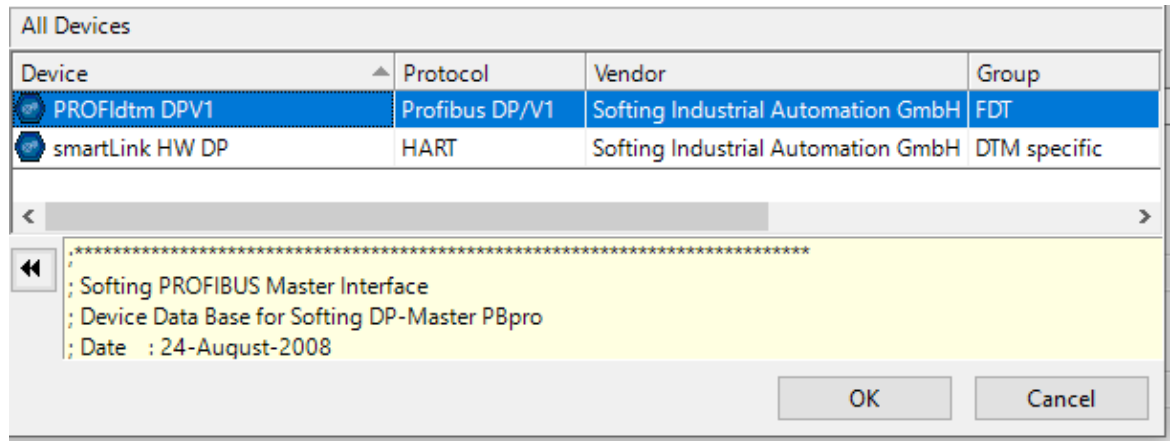
5.2.2 Creating a project

1. Start PACTware.
2. Create a new Project and save the project.
3. Right-click **Host PC** → **Add Device** in the device tag column of the project view.



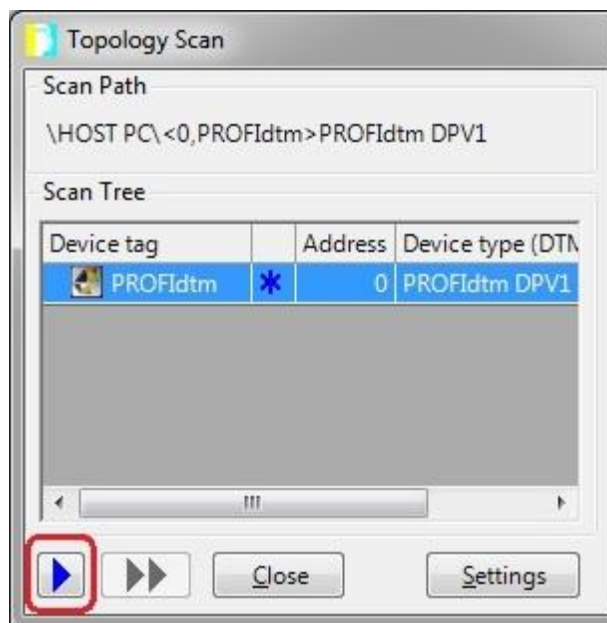
A new window appears with the available devices.

4. Select **PROFIdtm DPV1** from the list and confirm with **[OK]**.
The device is displayed in the project view.

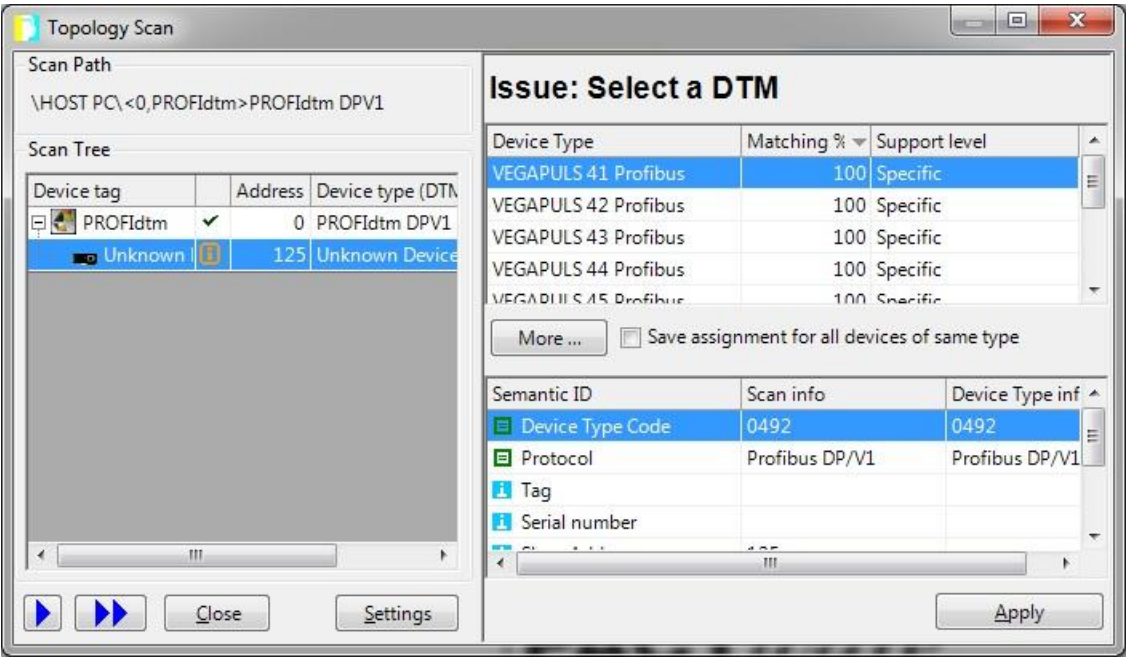
**Note**

Before starting a topology scan ensure that suitable Device DTMs are installed for the connected PROFIBUS devices.

5. Right-click **PROFIdtm** and select **Topology Scan**.
6. Click the **arrow** in the scan window to start the topology scan.



PROFIdtm and the detected PROFIBUS devices are displayed in the scan window.



7. **Close** the scan window. The detected PROFIBUS device has been added to the project view.

5.3 Asset management with Simatic PDM

With the SIMATIC PDM, Siemens provides a framework for managing more than 4,500 field devices regardless of what type of automation and control system is used. SIMATIC PDM is an open software tool for devices from over 200 manufacturers. To integrate a field device in a framework you need to import its Electronic Device Description (EDD), a file containing all relevant device data. This file is typically available for download on the device manufacturer website.

5.3.1 Prerequisites

- The default IP address of the built-in web server has been changed to an address on your network. Alternatively, the IP address of your PC has been changed to an IP address corresponding to the network address of your gateway (e.g. 192.168.0.1). See Chapter [Setting the IP address of the PC](#) ²⁰.
- EDD files and libraries of the PA devices have been imported into the PDM Device Integration Manager (DIM). If not available, download these files from the Siemens support website and import them into the DIM.
- The PDM libraries of the Softing PROFIBUS have been downloaded from the product website and are installed.

5.3.2 Connecting to SIMATIC PDM

Connecting the SIMATIC Manager with the smartLink HW-DP device:

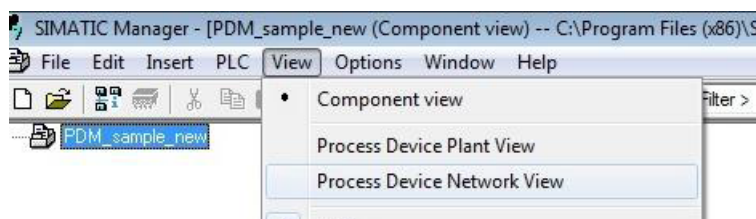
1. Start the SIMATIC Manager from the Windows start menu to create a new project: **Start → All Programs → Siemens Automation → SIMATIC → SIMATIC Manager**.
2. Click **Options → Select PG/PC Interface**.
A new window with a dropdown menu is opened.
3. Select from the dropdown menu Interface Parameter **Assignment used → Softing PROFIBUS Interface PROFIBUS.1**.
4. Set the timeout value to 60s and confirm with **[OK]**.
5. Check the board number to ensure that it corresponds to the number in the node name.
See Section [Preparing for asset management](#) ³⁵.
6. Click **[OK]**.
You will return to the main window (Component View).



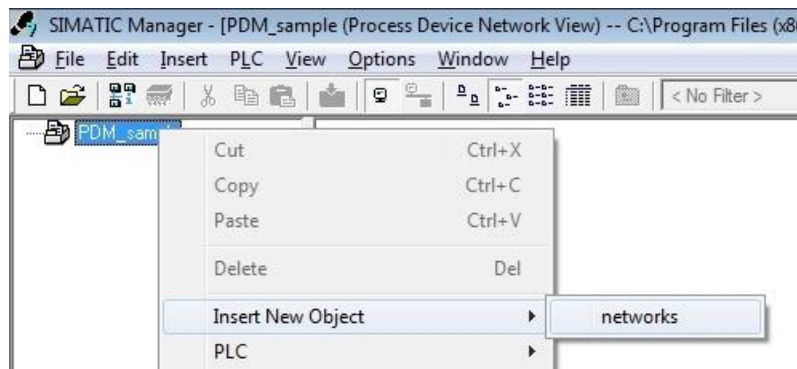
Note

A logical connection has now been established between the smartLink HW-DP and the SIMATIC Manager.

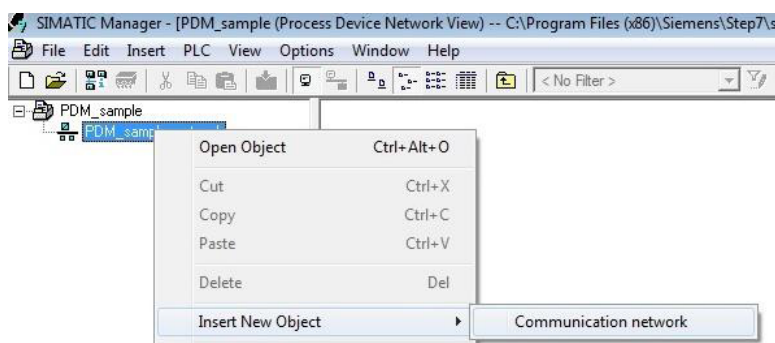
7. Go to **View → Process Device Network View**.



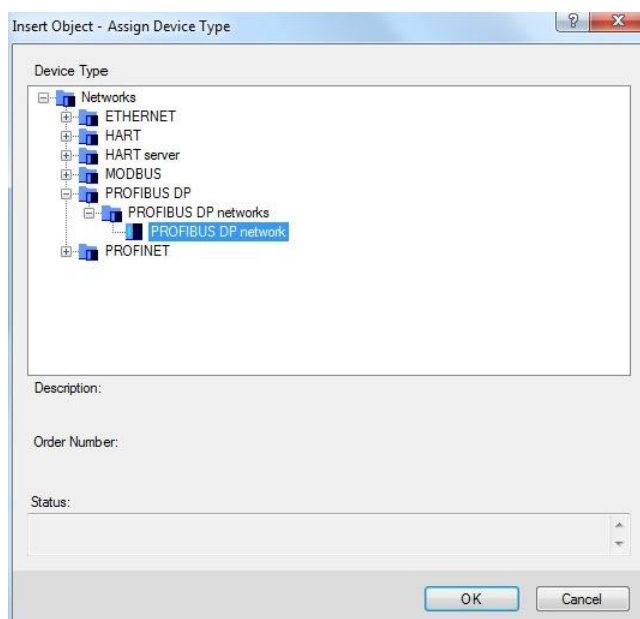
8. Right-click on the configuration symbol in the Process Device Network View and select **Insert New Object → networks**.



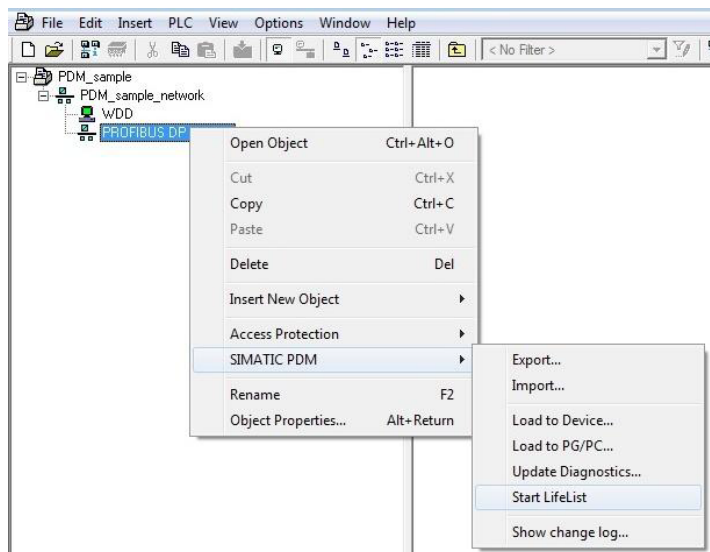
9. Right-click on the network symbol and select **Insert New Object → Communication network**.



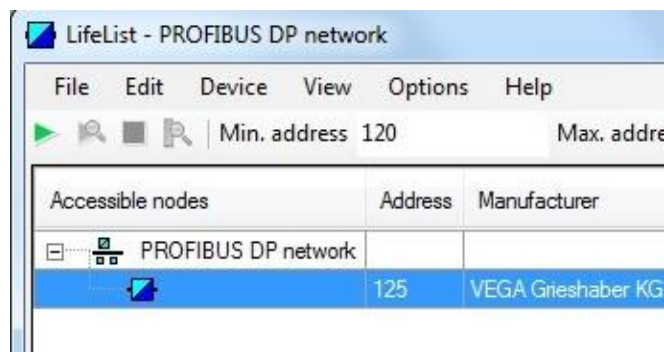
10. Click **[Assign Device Type...]**.
The Assign Device Type window is opened.
11. Select **PROFIBUS DP network**.



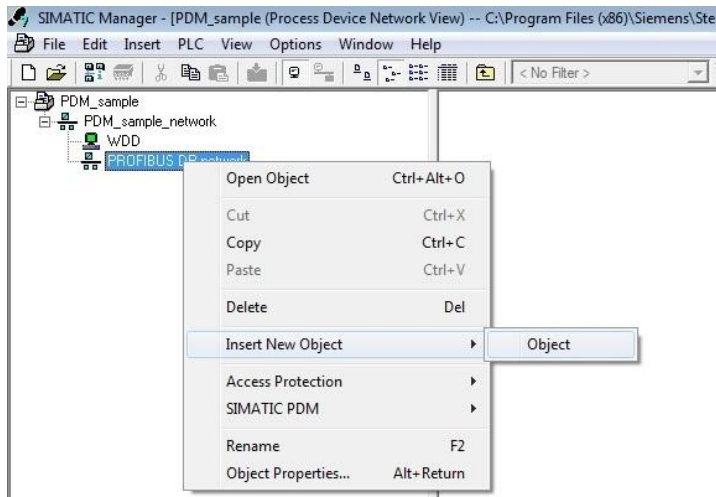
12. Click **[OK]** to continue.
You are back in the Process Device Network View.
13. Right-click **PROFIBUS DP network** → **SIMATIC PDM** → **Start LifeList** in the left column.



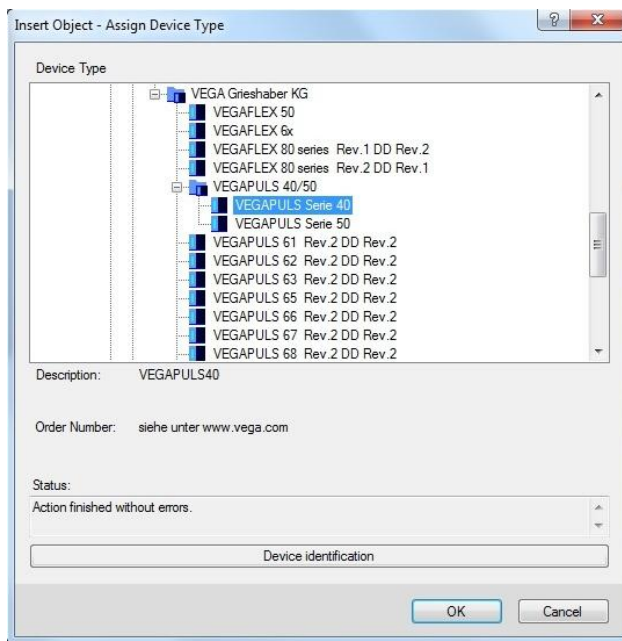
14. Click the **Start Scan** (▶) icon in the top left corner under the menu bar.
This will run a network scan to verify that the PROFIBUS device can be reached.
The icon (▶) indicates that a device can be reached to read and write process parameters.



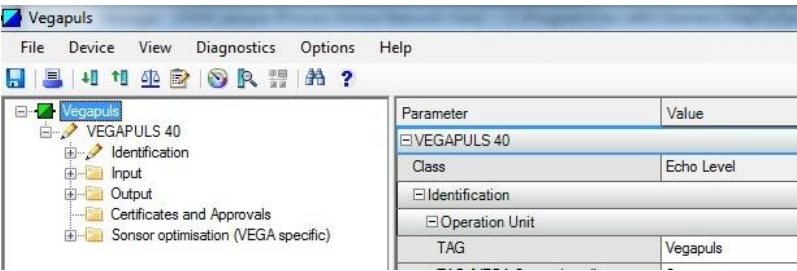
15. Close the window in the top right corner (✕).
16. Right-click PROFIBUS DP → **Insert New Object** → **Object** in the network view.



17. Click **[Assign Device Type...]**.
A new window opens.



18. Select the device you want to access from the device type list and click **[OK]**.
19. Enter the **PROFIBUS** address.
20. Click **[OK]** to confirm.
The window is closed.
21. Right-click in the Process Device Network View on the device you have just selected and select **Object**.
This opens the SIMATIC PDM view which shows the parameter values of the selected device.
22. Click the **Measured Value Display** (🌐) icon underneath the menu bar to import the parameter values of the PROFIBUS device into the Process Device Manager.



Congrats. You are done.

5.4 Asset management with ABB FIM

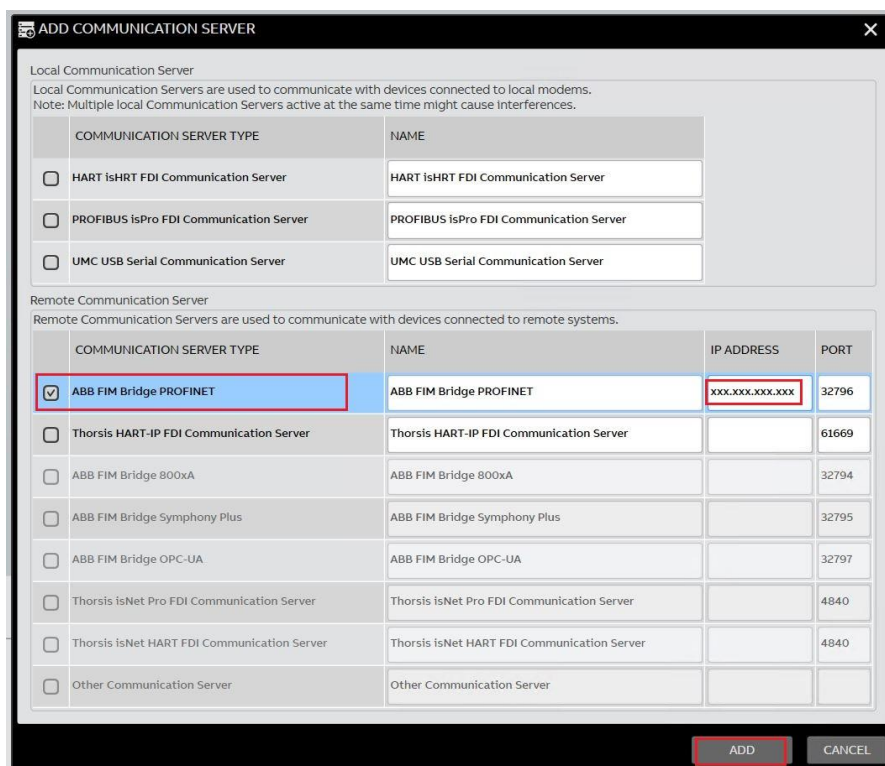
ABB Field Information Manager (FIM) is a device management tool which makes configuration, commissioning, diagnostics and maintenance of fieldbus instruments easier and quicker than ever before.

This chapter describes how to connect and use the communication server ABB FIM Bridge PROFINET to access PROFINET devices.

1. Double-click the **ABB FIM** icon  to start the application.



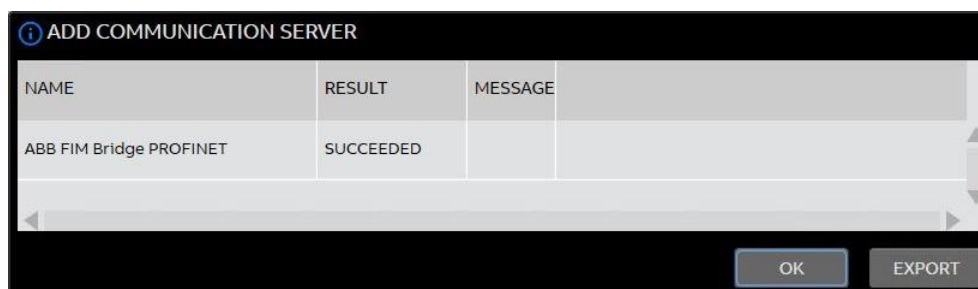
When you start the application for first time, the **ADD COMMUNICATION SERVER** popup window appears. Here you are prompted to select and add a remote **Communication Server**.



Local Communication Server				
Local Communication Servers are used to communicate with devices connected to local modems. Note: Multiple local Communication Servers active at the same time might cause interferences.				
COMMUNICATION SERVER TYPE	NAME			
<input type="checkbox"/> HART isHRT FDI Communication Server	HART isHRT FDI Communication Server			
<input type="checkbox"/> PROFIBUS isPro FDI Communication Server	PROFIBUS isPro FDI Communication Server			
<input type="checkbox"/> UMC USB Serial Communication Server	UMC USB Serial Communication Server			

Remote Communication Server				
Remote Communication Servers are used to communicate with devices connected to remote systems.				
COMMUNICATION SERVER TYPE	NAME	IP ADDRESS	PORT	
<input checked="" type="checkbox"/> ABB FIM Bridge PROFINET	ABB FIM Bridge PROFINET	xxx.xxx.xxx.xxx	32796	
<input type="checkbox"/> Thorsis HART-IP FDI Communication Server	Thorsis HART-IP FDI Communication Server		61669	
<input type="checkbox"/> ABB FIM Bridge 800xA	ABB FIM Bridge 800xA		32794	
<input type="checkbox"/> ABB FIM Bridge Symphony Plus	ABB FIM Bridge Symphony Plus		32795	
<input type="checkbox"/> ABB FIM Bridge OPC-UA	ABB FIM Bridge OPC-UA		32797	
<input type="checkbox"/> Thorsis isNet Pro FDI Communication Server	Thorsis isNet Pro FDI Communication Server		4840	
<input type="checkbox"/> Thorsis isNet HART FDI Communication Server	Thorsis isNet HART FDI Communication Server		4840	
<input type="checkbox"/> Other Communication Server	Other Communication Server			

2. Select the communication server type **ABB FIM Bridge PROFINET** and enter your PROFINET IP address.
3. Click **[ADD]** to continue.
A new window appears. Here you see in the **Results** column if the selected communication server has been added successfully.




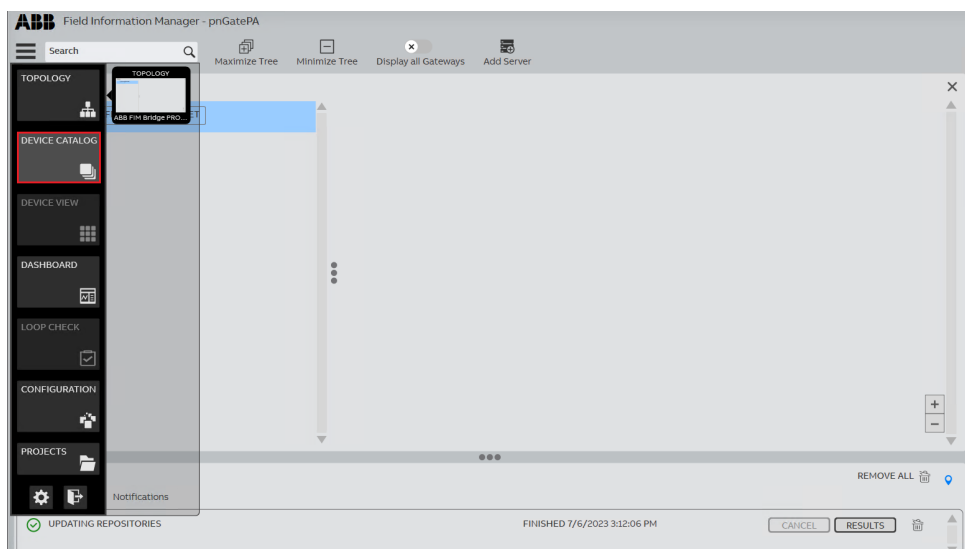
4. Click **[OK]** to continue.
If you managed to connect to the communication server the Topology window appears.

**Note**

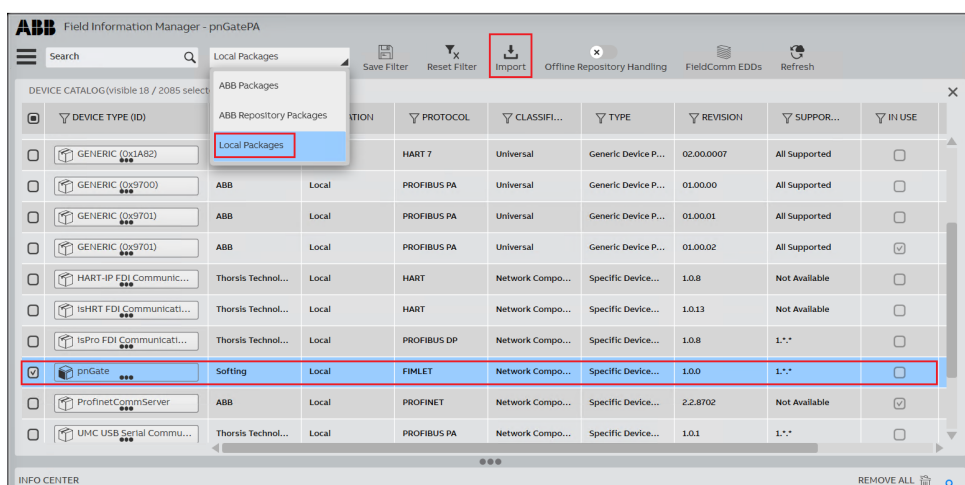
Repeat Step 2 if the connection to the communication server failed in Step 2. Make sure you enter a correct IP address.


5.4.1 Importing a pnGate PA FIMlet

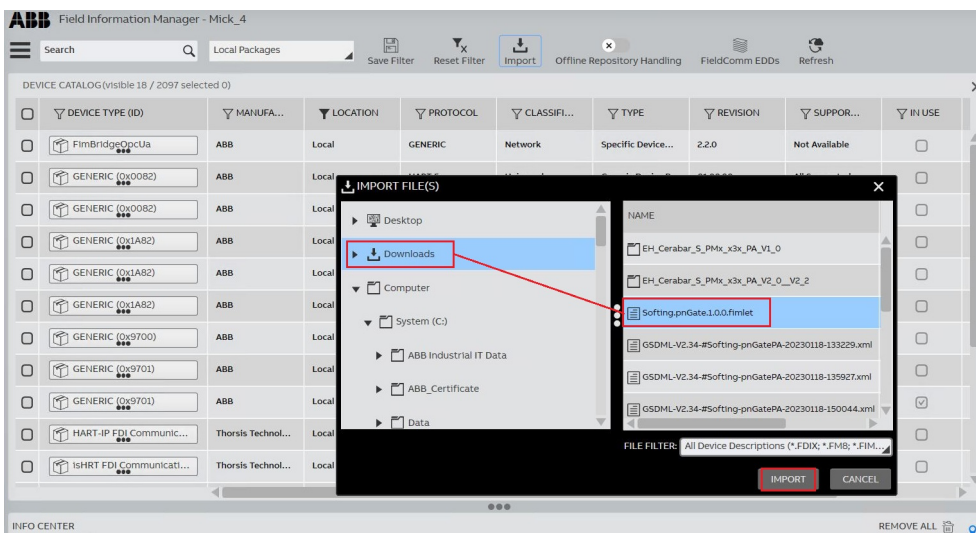
1. Download the pnGate FIMlet file from the PROFINET Gateway [product website](#) to the Downloads folder on your PC.
2. Click the **Menu** icon  in the top left corner.
3. Select **DEVICE CATALOG** from the menu to import the **FIMlet**.



A popup window appears.

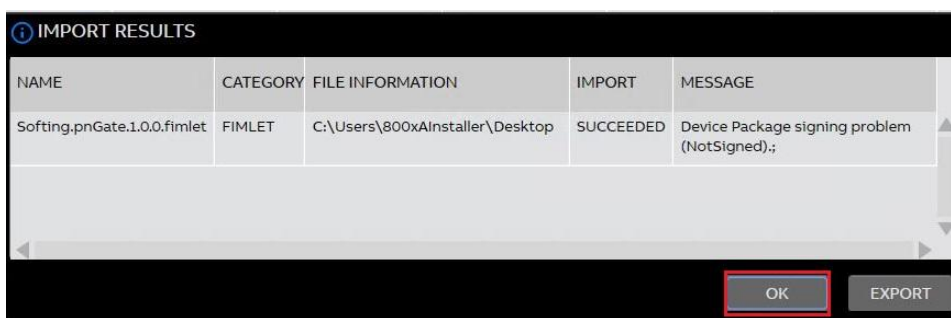


4. Select the filter setting **Local Packages**.
5. Click the **Import**  icon in the menu bar. The **IMPORT FILE(S)** window appears.
6. In the **IMPORT FILE(S)** window scroll to the **Downloads** folder.
7. Select the **Softing pnGate 1.x.x FIMlet** file.
8. Click **[Import]**.

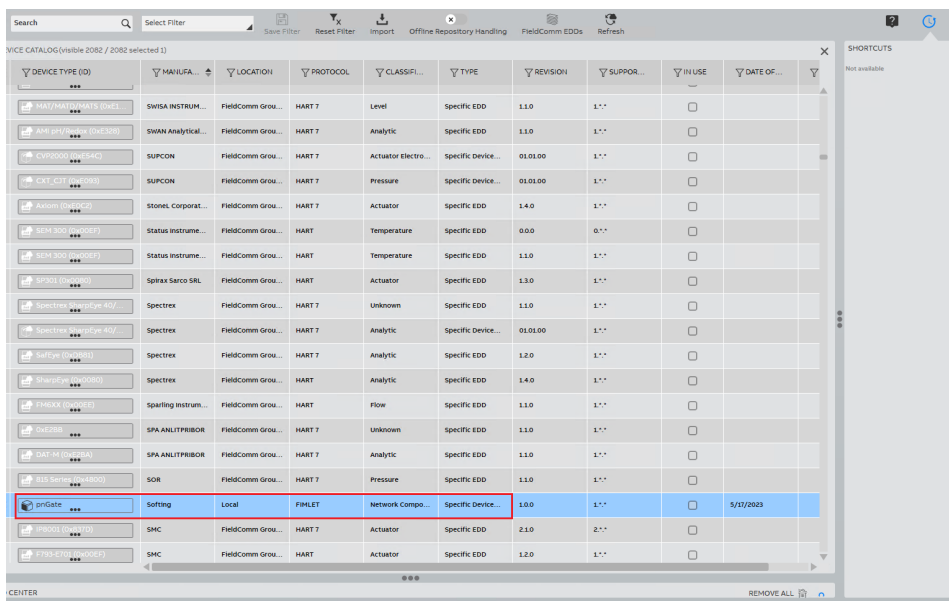


The IMPORT RESULTS window appears. Here you can see if the selected file was imported successfully.



9. Click **[OK]** to continue.

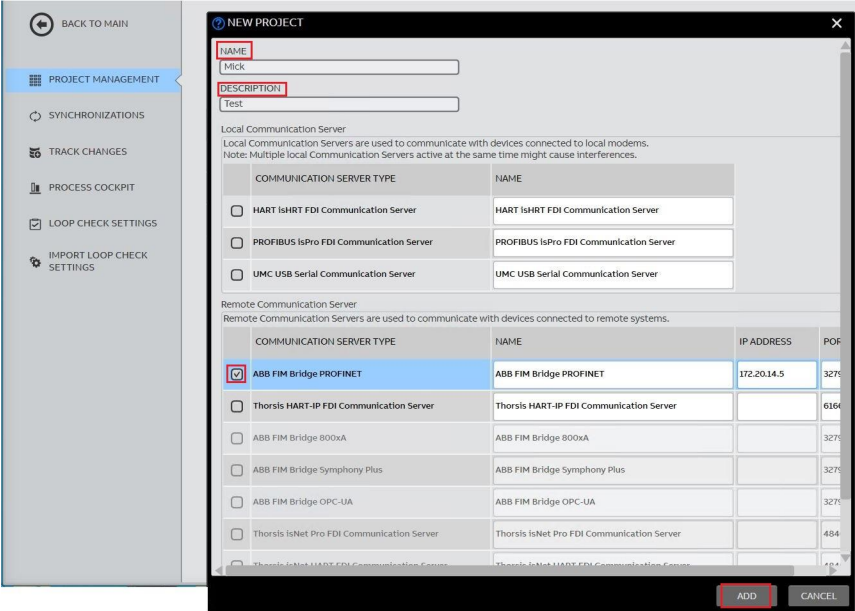


The Softing pnGate FIMlet file is now included in the catalog with the device type name **pnGate**.

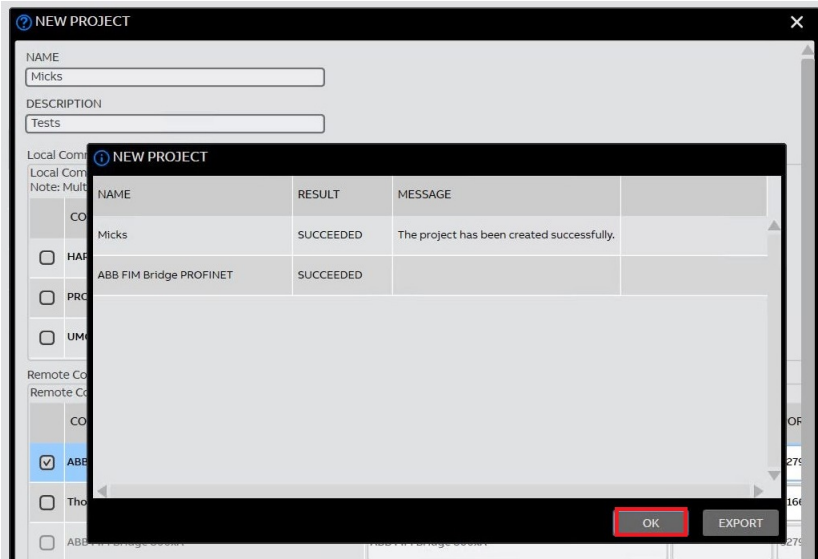


5.4.2 Creating a project

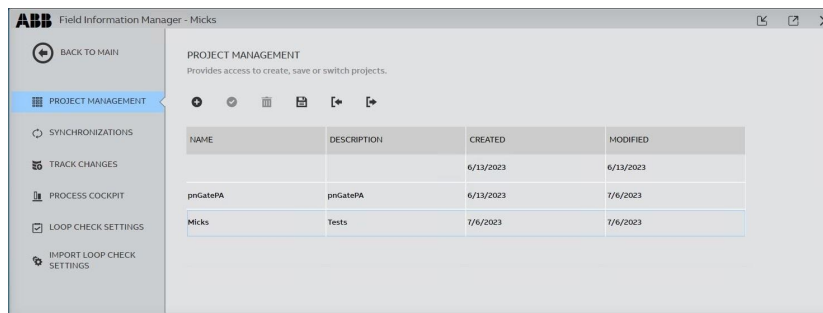
- 1. Click the **Menu** icon  in the top left corner.
- 2. Select the **PROJECTS** menu to create a project.
- 3. Click the plus icon  at the top of the window.
The **New Project** window appears.



- 4. Enter a **Name** and a **Description** in the top two rows.
- 5. Tick the checkbox for **ABB FIM Bridge PROFINET** and enter the IP address of the PROFINET adapter on the PC (e.g.172.20.14.5) in the IP ADDRESS field.
- 6. Click **[ADD]** to continue.
A **NEW PROJECT** popup window appears. In this window, the result and message line next to your project name shows if the project has been added successfully.
- 7. Click **[OK]** to continue.





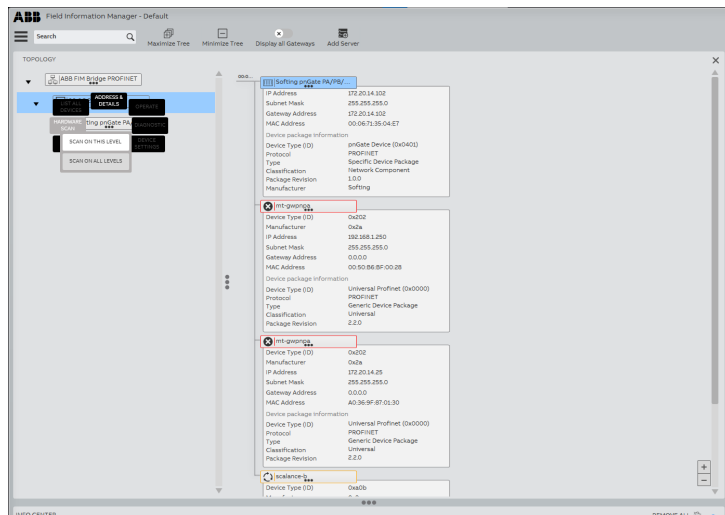
The Project Management window is displayed listing all existing projects.




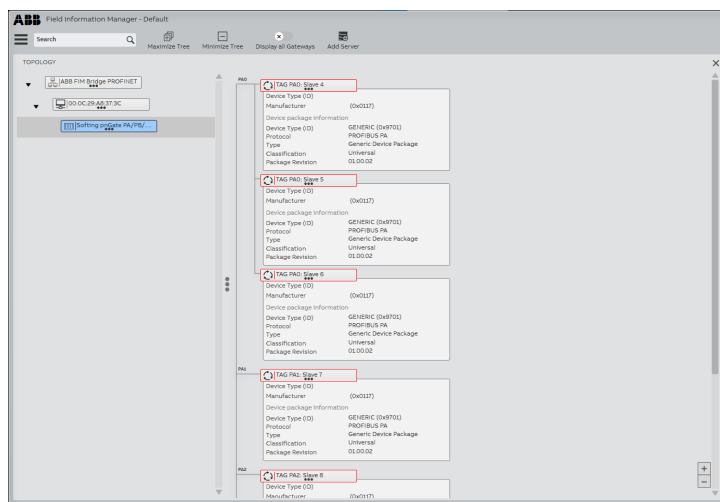
8. Click the **arrow icon** in the top left corner to return to the main menu.

5.4.3 Scanning for a PROFINET device


1. Click the **Menu** icon  in the top left corner.
2. Select the **TOPOLOGY** icon .
3. Select the **Softing pnGatePA** entry in the topology tree view
4. Move your mouse pointer left to **HARDWARE SCAN** and select **SCAN THIS LEVEL**.

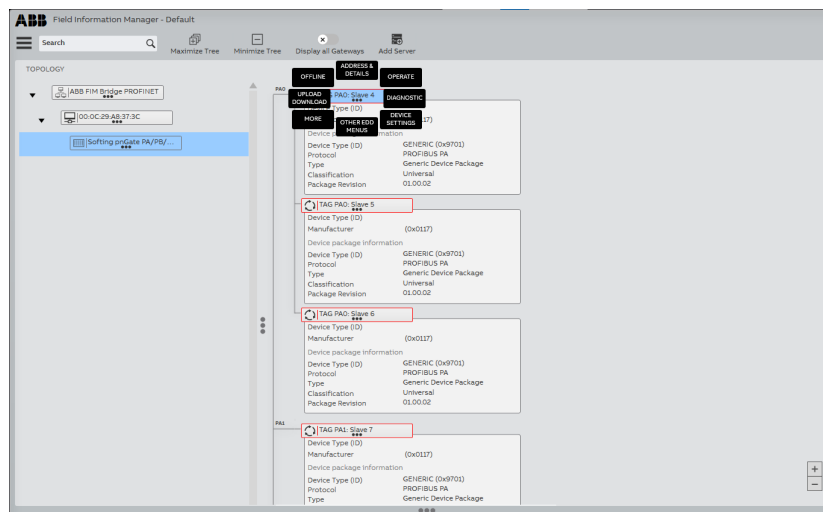


5. In the FIM window to the right the **SOFTING pnGatePA/PA/..** is displayed.
 6. Click the **three dot icon**  beneath the name and select LIST ALL DEVICES.
- All PROFIBUS devices connected to the pnGate are visualized.

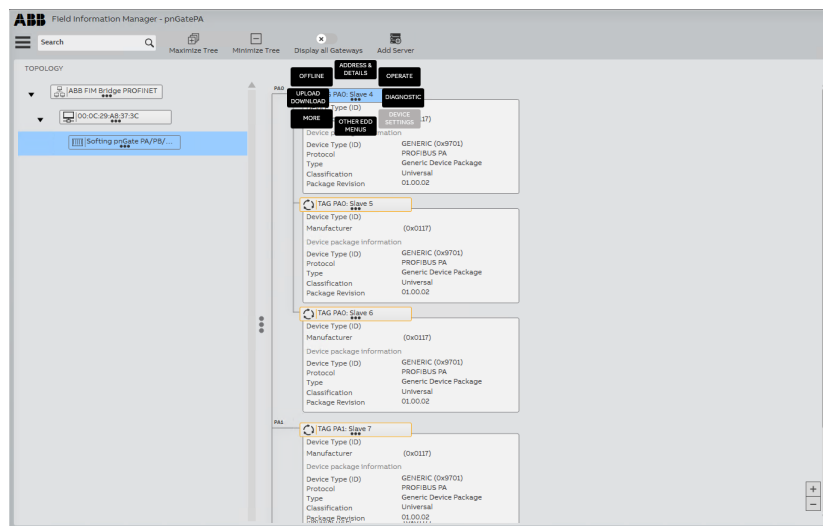


5.4.4 Accessing a PROFIBUS device

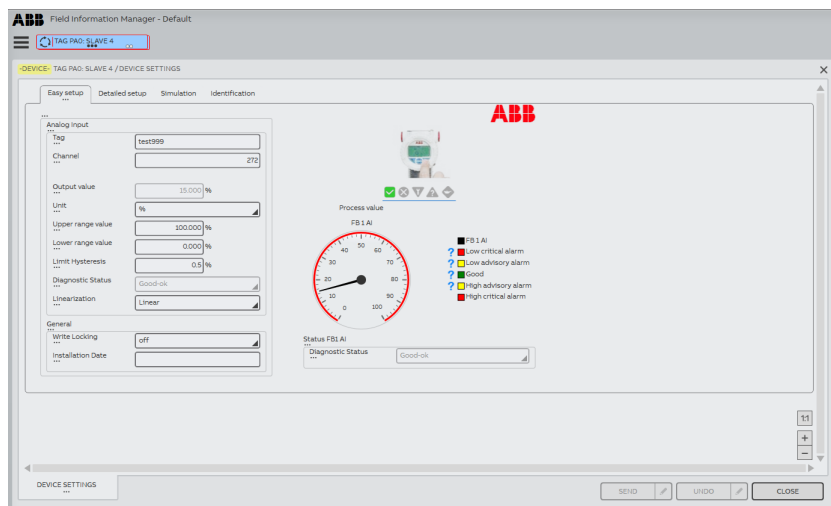
1. Select a PROFIBUS device you want to work with and click the **three dot icon**  inside the device box.



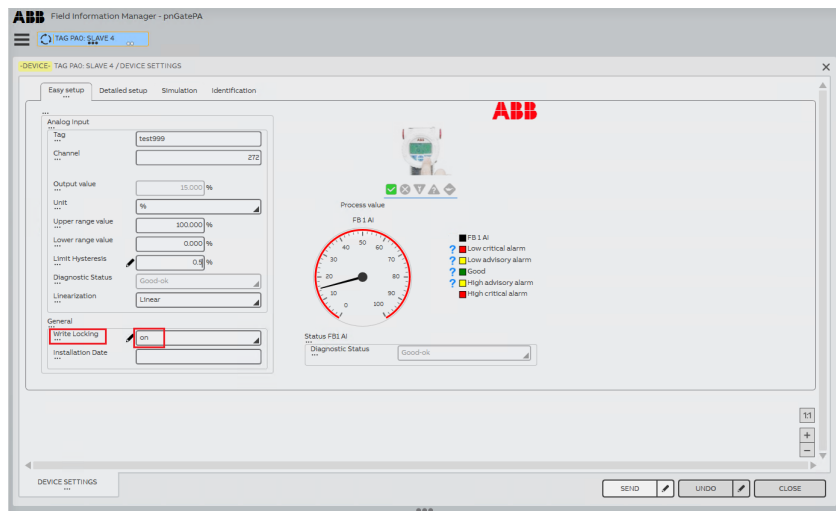
2. Select **DEVICE SETTINGS**.



The **DEVICE SETTINGS** shows the parameter values read from the device.



3. Set the **Write Locking** parameter to **On**.

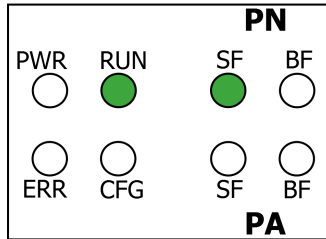


4. Click **[SEND]**.

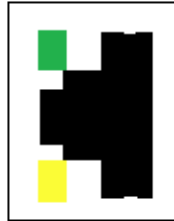
6 LED status indicators

The PROFINET Gateway displays eight device status LEDs and two RJ45 connection status LEDs on the front side:

Device status LEDs



RJ45 status LEDs



PWR	=	power supply - refer to next section ⁵⁴
RUN	=	running - refer to next section ⁵⁴
ERR	=	error - refer to next section ⁵⁴
CFG	=	configuration - displays configuration upload - refer to next section ⁵⁴
SF	=	system faults - displays Modbus/PROFIBUS system faults (wrong configuration, internal error, ...)
BF	=	bus faults - displays Modbus/PROFIBUS bus faults






























The device status LEDs are permanently on or flash in different colors and frequencies as indicated below:

Symbol	Color	Lighting
	none	off
	red	permanent
	green	permanent
	red	flashing (1 Hz)
	red	flashing quickly (5 Hz)
	green	flashing (1 Hz)
	green	flashing slowly (0.5 Hz)
	green	flashing quickly (5 Hz)














The RJ45 status LEDs indicate the following behaviour:

Symbol	Color	Lighting
	green	permanent when Ethernet connection is on
	yellow	flashing when Ethernet connection is active













6.1 Status LEDs (PWR, RUN, ERR and CFG) in stand-alone mode

LEDs	Meaning
<div> <div>PWR</div>  <div>ERR</div> </div> <div> <div>RUN</div>  <div>CFG</div> </div>	Start-up phase (approximately 10 seconds)
<div> <div>PWR</div>  <div>ERR</div> </div> <div> <div>RUN</div>  <div>CFG</div> </div>	Operating system starts (approximately 2 seconds)
<div> <div>PWR</div>  <div>ERR</div> </div> <div> <div>RUN</div>  <div>CFG</div> </div>	Device is running in factory mode (only firmware update is possible)
<div> <div>PWR</div>  <div>ERR</div> </div> <div> <div>RUN</div>  <div>CFG</div> </div>	Device is running/operational
<div> <div>PWR</div>  <div>ERR</div>  </div> <div> <div>RUN</div>  <div>CFG</div>  </div>	Software error A software error occurred. Reboot the device. Refer to error description in web browser (Diagnosis → Logfile → Support Data).
<div> <div>PWR</div>  <div>ERR</div>  </div> <div> <div>RUN</div>  <div>CFG</div>  </div>	Permanent hardware fault detection during startup A fatal error has been detected. Refer to error description in web browser (Diagnosis → Logfile → Support Data).
<div> <div>PWR</div>  <div>ERR</div>  </div> <div> <div>RUN</div>  <div>CFG</div>  </div>	Software error occurred, device has restarted automatically and error is reported in log file Delete log file in web browser (Diagnosis → Logfile → Support Data).
<div> <div>PWR</div>  <div>ERR</div>  </div> <div> <div>RUN</div>  <div>CFG</div>   </div>	Firmware update is running (in factory mode if blinking red)
<div> <div>PWR</div>  <div>ERR</div>  </div> <div> <div>RUN</div>  <div>CFG</div>  </div>	No power on device Check power supply.

6.2 PROFINET device LEDs (PN)

LEDs	Meaning
<div>SF </div> <div>BF </div>	No connection to controller Possible causes: PROFINET name is missing on the gateway or the physical connection to the gateway is interrupted.
<div>SF </div> <div>BF </div>	Connection establishment Time period the system needs to establish a connection; devices cannot yet communicate with each other.
<div>SF </div> <div>BF </div>	Connected to controller All devices are exchanging data.
<div>SF </div> <div>BF </div>	Configuration error or diagnosis Read errors from PROFINET engineering system.
<div>SF </div> <div>BF  / </div>	PROFINET signal function active
<div>SF </div> <div>BF </div>	Error in the PROFINET part of the device An error such as a software error ⁵⁴ or a license error has occurred.

6.3 PROFIBUS master LEDs (PA)

LEDs	Meaning
<div></div> <div>BF </div>	All channels offline
<div>SF </div> <div>BF </div>	All devices exchange data on all channels
<div>SF  / </div> <div>BF </div>	At least one used channel is not online
<div></div> <div>BF  / </div>	At least one slave is not in data exchange (BF: green - all channels are online; red: not any channel is online.)
<div>SF </div> <div>BF </div>	Error in the PROFIBUS part of the device An error such as a software error ⁵⁴ or a license error has occurred.

7 Declaration of conformity

This device is compliant with EC directive 2014/30/EG, "Electromagnetic Compatibility" (EMC directive) and meets the following requirements:

- EN 55011 Industrial, scientific and medical (ISM) devices - radio disturbance - limits and methods of measurement
- EN 55032 Electromagnetic compatibility of multimedia equipment (MME) and interference emission
- EN 61000-6-4 Electromagnetic compatibility (EMC); Part 6-4: generic standard – emission for industrial environments
- EN 61000-6-2 Electromagnetic compatibility (EMC); Part 6-2: generic standard - immunity for industrial environments



Note

To fulfill the EMC requirements, the other components of your installation (DC adapter, Industrial Ethernet devices, etc.) also have to meet the EMC requirements. A shielded cable must be used. In addition, the cable shield must be grounded properly.



CAUTION

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures



CE

The CE marking indicates conformity with the above standards in a Declaration of Conformity which can be requested from Softing Industrial Automation GmbH.



RoHS

This product is compliant the Restriction of Hazardous Substances under Directive 2002/95/EC-



FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, under part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.



VCCI

This Class A product conforms to the regulations of Voluntary Control Council for Interference (VCCI) by Information Technology Equipment.



WEEE

In compliance with Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC, electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime. Packaging material and worn components shall be disposed of according to the regulations applicable in the country of installation.

8 Glossary

Terms & Abbreviations	Definition
DC	Direct Current - electric current flowing in only one direction
DIN	<i>Deutsches Institut für Normung</i>
DTM	Device Type Manager
DP	Decentralised Peripherals
EDD	Electronic Device Description. A file created by the device manufacturer or a service provider. It is shipped together with the device on a data carrier and / or made available for download from the Internet by the manufacturer.
EDDL	Electronic Device Description Language
ETH	Ethernet
Ex	Explosion protection
FDT	Field Device Tool
GND	Ground
GSD	<i>General Station Description</i> . A file containing general data about the configuration of a PROFIBUS field device as provided by the device manufacturer. The GSD file is required so that a PLC can communicate with a PROFIBUS field device.
GSDML	<i>General Station Description Markup Language</i> . A GSDML file contains general and device-specific data for communication with and network configuration of PROFINET I/O devices.
I/O	Input/Output
IP	Internet Protocol
PA	Process Automation
PB	PROFIBUS
PDM	Process Device Manager (sometimes aka Plant Device Manager)
PLC	Programmable Logic Controller
pnGate	PROFINET gateway
RDL	Redundancy Link
T	temperature
TIA	Totally Integrated Automation

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