User Guide

pnGate PA EX

Version: EN-062022-1.00

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Softing Industrial Automation GmbH

Richard-Reitzner-Allee 6
85540 Haar / Germany
https://industrial.softing.com

+ 49 89 4 56 56-340

info.automation@softing.com
support.automation@softing.com

https://industrial.softing.com/support/support-form

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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 pnGate PA EX 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*

WARNING
WARNING indicates a hazardous situation which, if not avoided, may result in serious injury or death.

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
Dieses Symbol weißt auf ein Video zum entsprechenden Thema hin.

1.4 Document history

Document version	Changes since last version
1.00	First version

1.5 Related documentation and videos

The following links provide additional product information:

- **Documents**
- **Videos**

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 pnGate PA EX

The pnGate PA EX is a 2-channel gateway integrating 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.

Engineering systems and asset management systems

The gateway 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 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 Specifications8 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
- PC with web browser
- GSD file for each PROFIBUS device on your network
- Javascript must be activated

2.3 Supported features

The pnGate PA EX 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 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 15 for the maximum ambient temperature depending on the mounting position)
Storage temperature	-40 °C...+85 °C
Relative humidity	10 %...95 % (non-condensing)
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

The pnGate PA EX is an electrical equipment with degree of protection Ex ec, approved for use in Zone 2 hazardous areas or in the safe area.

The pnGate PA EX is only approved for intended and appropriate use. In case of noncompliance, the warranty and manufacturer’s liability do no longer apply!

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 pnGate PA EX. 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 Installation in hazardous locations

The pnGate PA EX may be used in hazardous locations and is certified according to ATEX.

WARNING

Use only according to operating conditions from instructions! Use the pnGate PA EX in accordance with its designated use only! Otherwise, the manufacturer's liability and warranty will expire. The device is only to be used according to the operating conditions described in these instructions.

WARNING

Do not connect or disconnect energized conductors! Be aware that energized conductors are not to be connected or disconnected! This can lead to danger of life if potentially explosive atmosphere is present there at that time!

3.1.1.1 General requirements

Following general requirements must be observed when installing the pnGate PA EX in hazardous locations:

- The details of this document must be observed along with the conditions for use and the applicable details stated on the marking and type labels of each.
- Any selection and operation of the device must be done as per the technical rules.
- Adequate precautions must be taken to prevent unintended actuation or impairment of the device.
- Connectors must not be connected or disconnected when area is known to be hazardous. This can be life threatening in a potentially explosive atmosphere. Open or not securely closed sockets shall not be energized in the Ex-atmosphere!
- Ensure the installed equipment comply with the types of protection applicable to the corresponding zones.
- All connected electrical equipment must be suitable for the respective intended use.
- The operator must ensure protection against lightning in compliance with the locally applicable regulations.
- Electrostatic aspects must be considered when mounting the bus-modules. Electrostatic charges have to be prevented.

- In explosion group IIC and Zone 2 no protected plastic surfaces > 20 cm^2 are allowed; in IIB or dust-Ex, 100 cm^2 may be reached.
- The hazard of any objects falling onto the bus-module must be prevented.
- The pnGate PA EX does not meet the requirements of impact protection and IP54 (according to IEC 60529). It must be installed in a protective enclosure which meets the requirements for resistance to impact and IP as stated in section 26.4 of IEC/EN 60079-0. This enclosure must be fully mounted and intact. If the enclosure is damaged, the operation is not permitted.
- Transient protection must be provided at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment.
- When removing the packaging ensure that no dirt can enter the enclosure or the plugs.
- If any vibration during the operation may cause parts of the plugs to loosen, then the plugs have to be provided with a light firm varnish used for securing screws. An extraction force of 0.5 Nm has to be achieved at an equivalent thread.
- To circuits of Zone 2 only such equipment may be connected that is suitable for operation in this zone and has been certified accordingly.
- Components may only be replaced by original spare parts which are also approved for the use in Ex-atmospheres. Spare parts are ordered as complete units giving the material number stated on the device (marking, type label).
- Only such auxiliary components may be used in potentially explosive atmospheres which meet all requirements of European and national directives and legislation.
- The environmental conditions specified in the manual have to be followed strictly.
- The pnGate PA EX is not to be used in systems where cathodic systems for corrosion protection are in place. Although special precautions may allow the use in such systems (additional earthing bridges), the manufacturer has to be consulted in each case.
- The operator has to provide measures for protection against lightning.
- According to the local conditions and in compliance with the environmental rules, the operator is responsible to visually inspect the system and to remove dust settlements in a regularly interval (every 6 months).
- The company installing the device has to ensure that the transient characteristic is limited to 40% above the service voltage.
- Additional precautions have to be taken, if the presence of hydrosulfide, ethylene oxide and/or carbon monoxide is to be expected: those substances are of a vary low ignition energy.
- Icing is not permitted.

CAUTION

Make sure that the sum of power supply voltage and fieldbus supply voltage does not exceed 60 VDC!

Explosion hazard

Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

Observe relevant national regulations, standards and directives

This manual does not supersede the relevant national regulations, standards and directives. These must be observed and have to be applied according to the national conditions!

3.1.1.2 Hazardous Location - European and International Approval (ATEX)

The equipment has been assessed based on the following standards and editions:

- EN IEC 60079-0:2018
- EN IEC 60079-7:2015+A1:2018

If indicated on the device label or by technical documentation, the pnGate PA EX is suitable for use in gas-Ex atmospheres of Zone 2 in the explosion groups IIA, IIB and IIC in temperature class T4, if accommodated in a tested enclosure.

The pnGate PA EX complies with the applicable standards and regulations and meets the requirements of Directive 2014/35/EU. The requirements for erecting the device as part of the system in potentially explosive atmospheres (e.g. IEC / EN 60079-14) must be strictly adhered.

3.1.2 Mounting and dismounting

Note

Make sure the pnGate PA EX 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 15 for details.

Installation and inspection

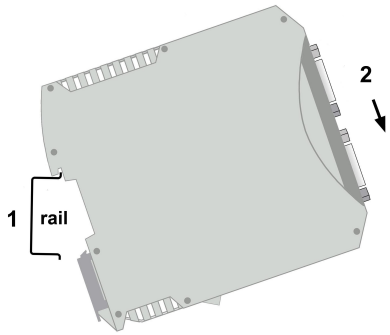
Installation and inspection must be carried out by qualified personnel only (personnel qualified according to the German standard TRBS 1203 - Technical Regulations for Operational Safety). The definition of terms can be found in IEC 60079-17.

Mounting

1. Hook the upper notch of the cut-out on the back of the pnGate PA EX into a 35 mm DIN rail.

2. Press the device down towards the rail until it slides into place over the lip of the locking bar.

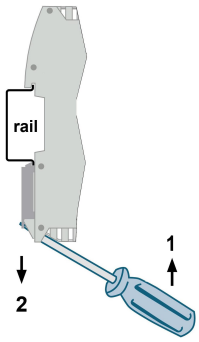
   Note
   Do not put stress on the system by bending or torsion.



Dismounting

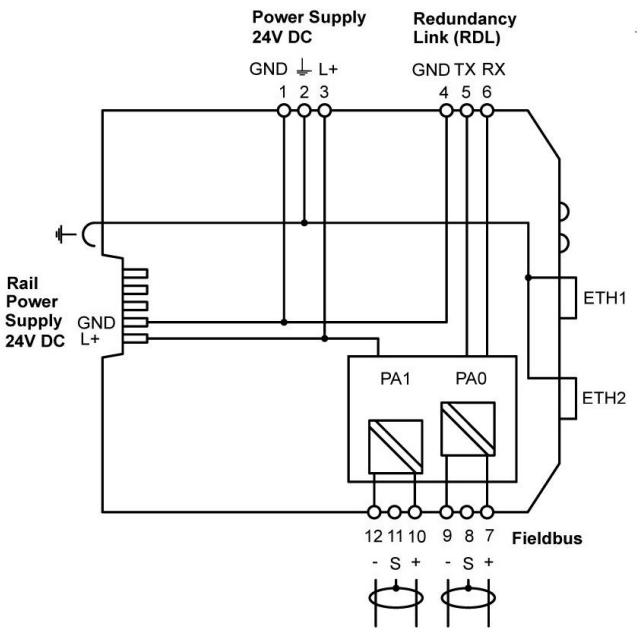
1. Slide a screwdriver diagonally under the housing into the locking bar.

2. Lever the screwdriver upwards, pull the locking bar downwards - without tilting the screwdriver - and move the gateway upwards off the rail.



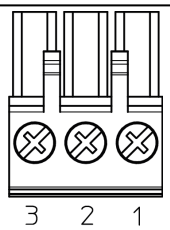
3.1.3 Connection diagram

The following diagram shows the input and output interfaces of the pnGate PA EX with its 2 physical PROFIBUS segment connections (PA0 to PA1).



3.1.4 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.

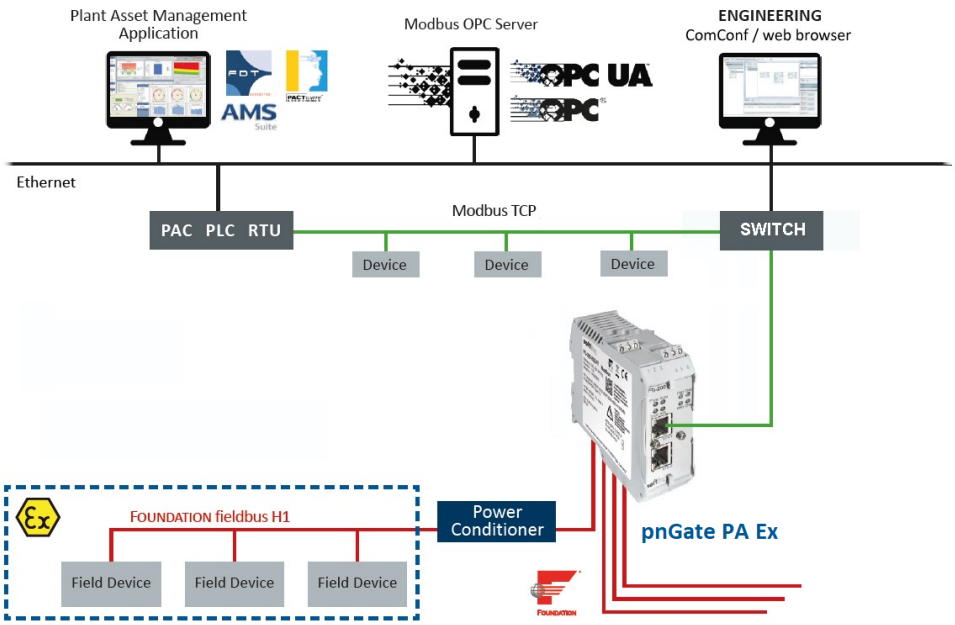
Note

See also the maximum ambient temperatures in the Section Installation positions 15 .

3.1.5 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 EX network topology



3.1.6 Installation positions

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

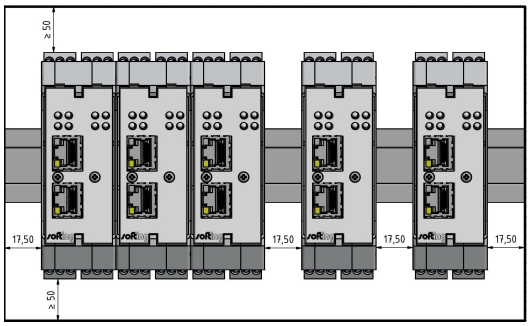
Minimum distance

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

Rotated installation position

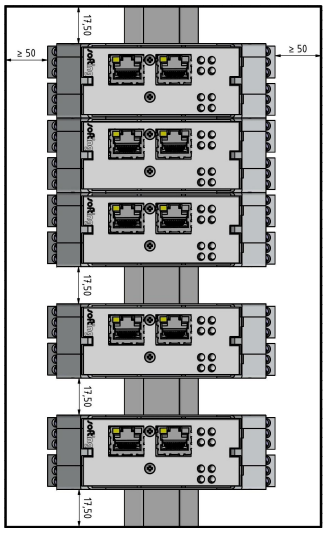
The maximum permissible ambient temperature values also apply to a 180° rotated installation position.

Horizontal installation position and maximum temperatures



Number of PA channels	Max PA fieldbus voltage	Min distance	Max ambient temperature T_a
0 - 2	24VDC	0 mm	55 °C
0 - 2	24VDC	17.5 mm	60 °C

Vertical installation position and maximum temperatures



Number of PA channels	Max PA fieldbus voltage	Min distance	Max ambient temperature T_a
0 - 2	24VDC	0 mm	45 °C
0 - 2	24VDC	17.5 mm	55 °C

3.1.7 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 45 .

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 **Softing Industrial Products → Gateways → Gateways for multi-protocol process control** and 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 pnGate PA EX 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 pnGate PA EX 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 pnGate PA EX is connected to the PROFIBUS PA segment.
- The pnGate PA EX 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 PROFINET devices are connected to the PROFINET PA segment.

pnGate PA EX 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

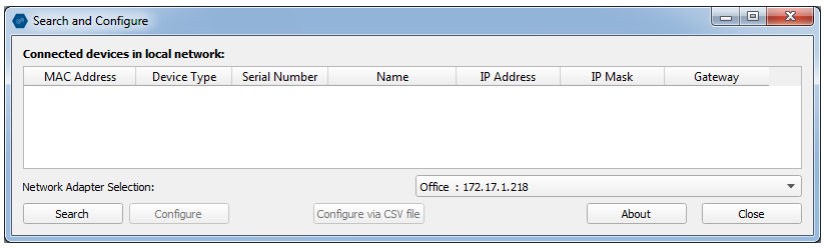
4.2 Changing the IP address of the pnGate PA EX

Before you can configure the connected pnGate PA EX 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.

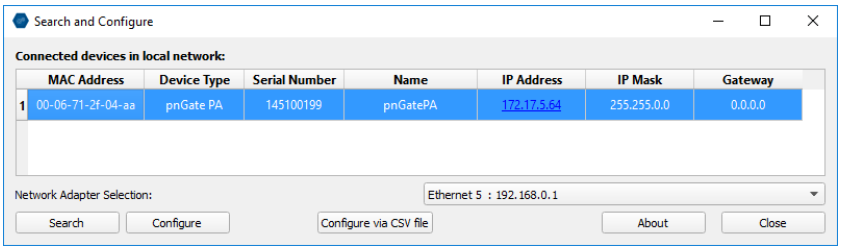
1. Click **Start → Softing → Search and Configure**.
   The application window is opened.



2. Open the **Network Adapter Selection**.

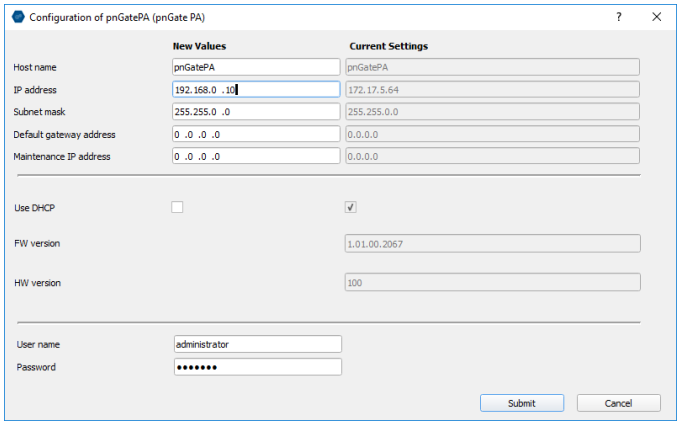
3. Select the network on which you want to search for the connected gateway.
   This selection menu shows all networks you can access from your PC.

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 pnGate PA EX 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 pnGate PA EX as described in the previous Section 19 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.

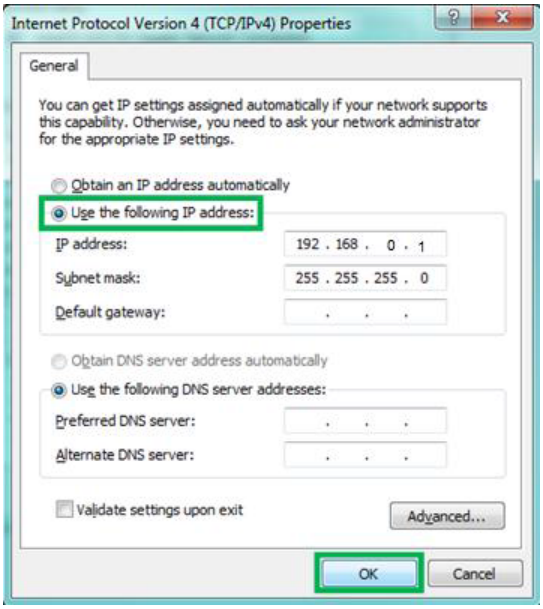
1. Click **Start → Windows System → Control Panel** from your task bar.

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-Adresse: 192.168.0.1
   Subnet mask: 255.255.255.0

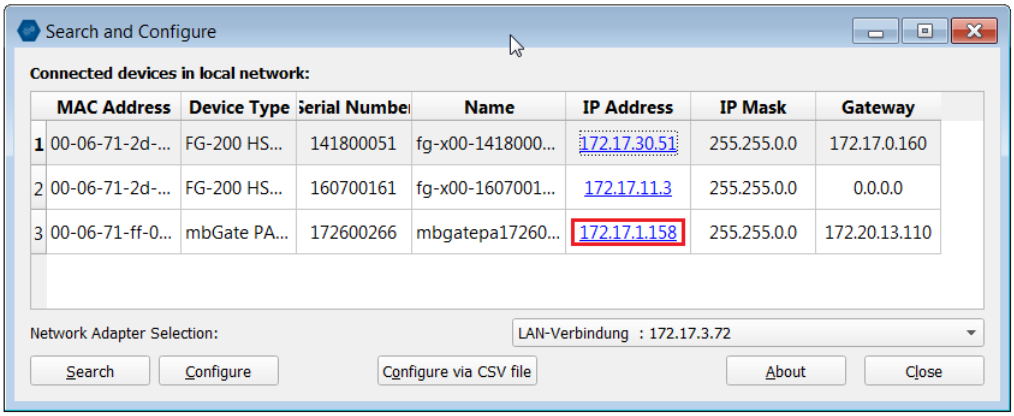
7. Click **[OK]** to confirm.

4.4 Login to user interface

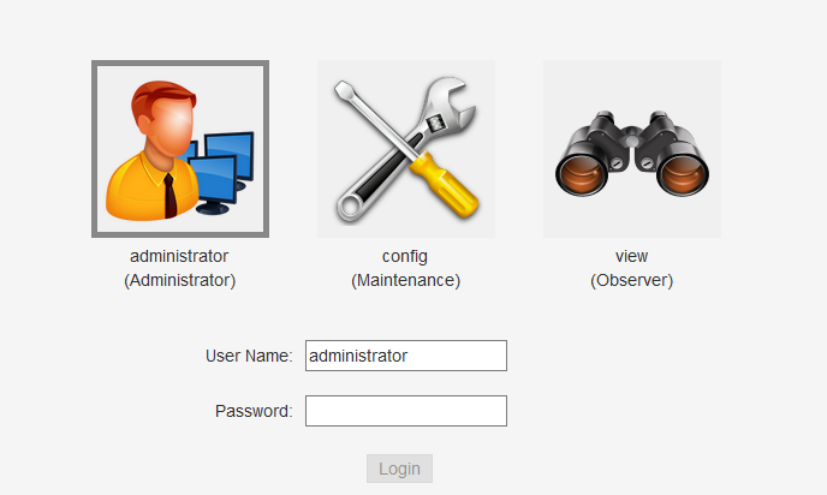
1. Open your Internet browser and enter the IP address of your gateway.

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.

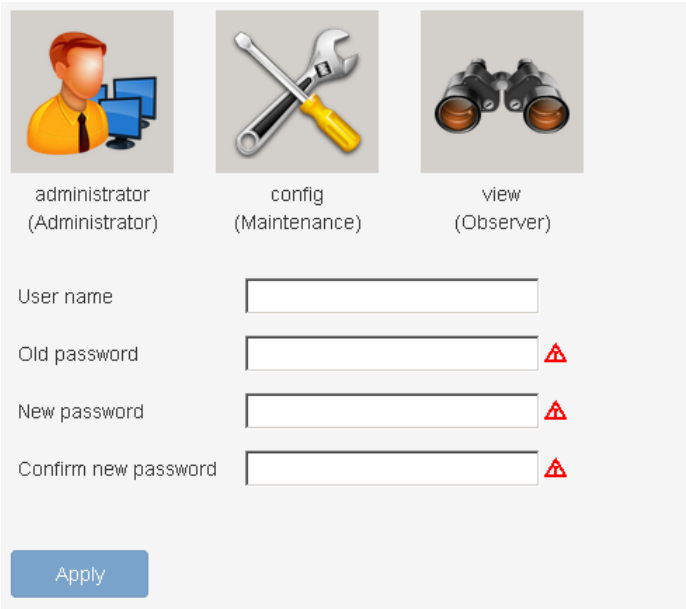


The gateway's web-based interface opens with the information page.

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.



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 pnGate PA EX 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 pnGate PA EX can be accessed remotely with the user roles **Diagnostics** (psw: `?<fJ#\/$eB2qtGd*)` and **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	☑		
Configuring gateway	☑	☑	
Reading configuration	☑	☑	☑
Reading diagnostics	☑	☑	☑
Updating firmware	☑		
Resetting gateway	☑		
Installing HTTPS certificates	☑		

4.6 Updating the firmware

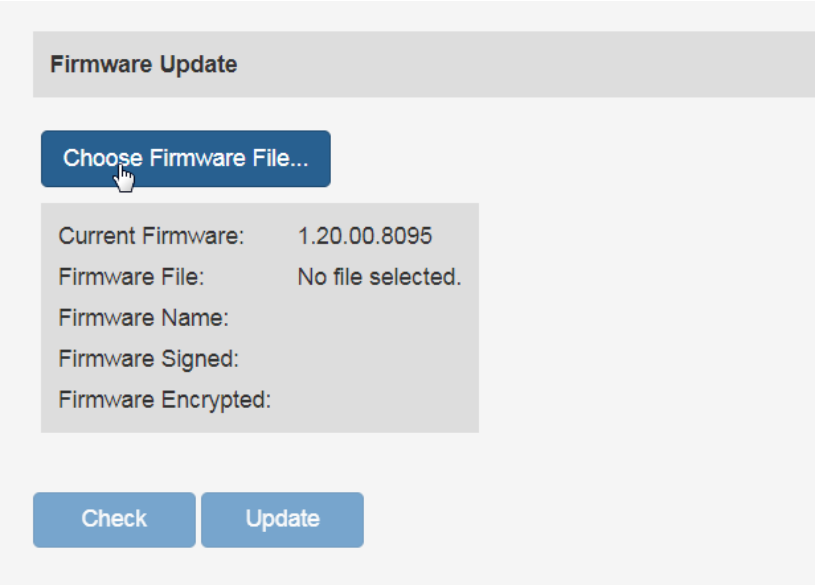
The gateway comes with pre-installed firmware which is maintained and updated to continuously enhance the functionality of the device. To ensure that your pnGate PA EX is always running the most recent version check the Softing Download Center for the most recent firmware update.

Note
You need to be logged in as administrator 22 .

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.



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 EX 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 EX 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 EX.

4.7 PROFINET configuration in the TIA Portal

The following chapter describes how to convert the GSD file of a PROFIBUS PA 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

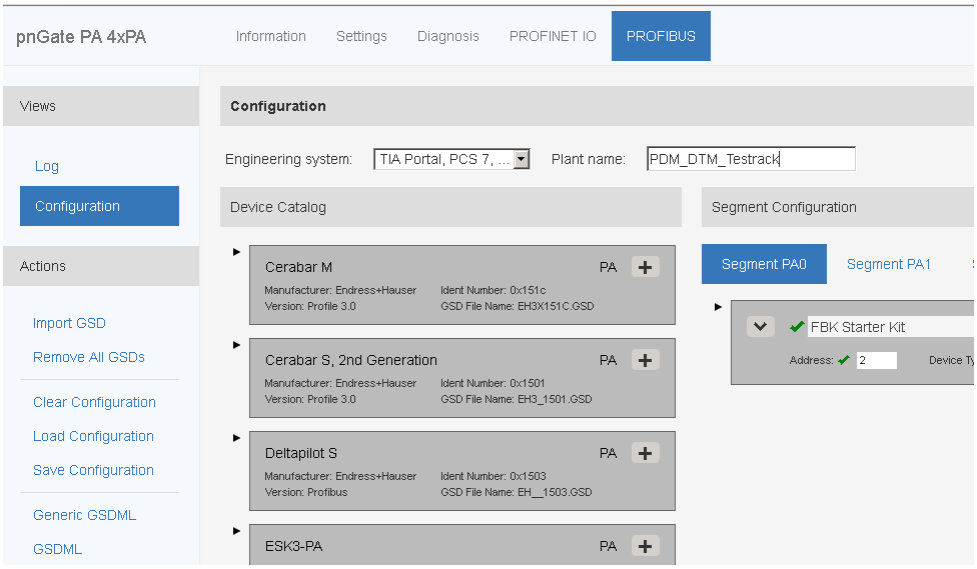
See also the videos Conversion from PROFIBUS GSD to PROFINET GSDML and PROFINET configuration in the TIA Portal.

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 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 Segement configuration.

Note

By selecting **[Generic GSDML]** you will generate a GSDML file from all the devices in the device catalogue. 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.

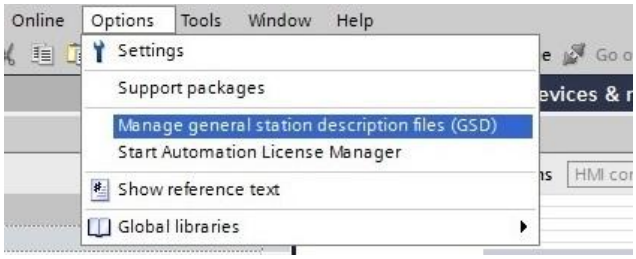
2. Click **[Create new project]**.

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**.

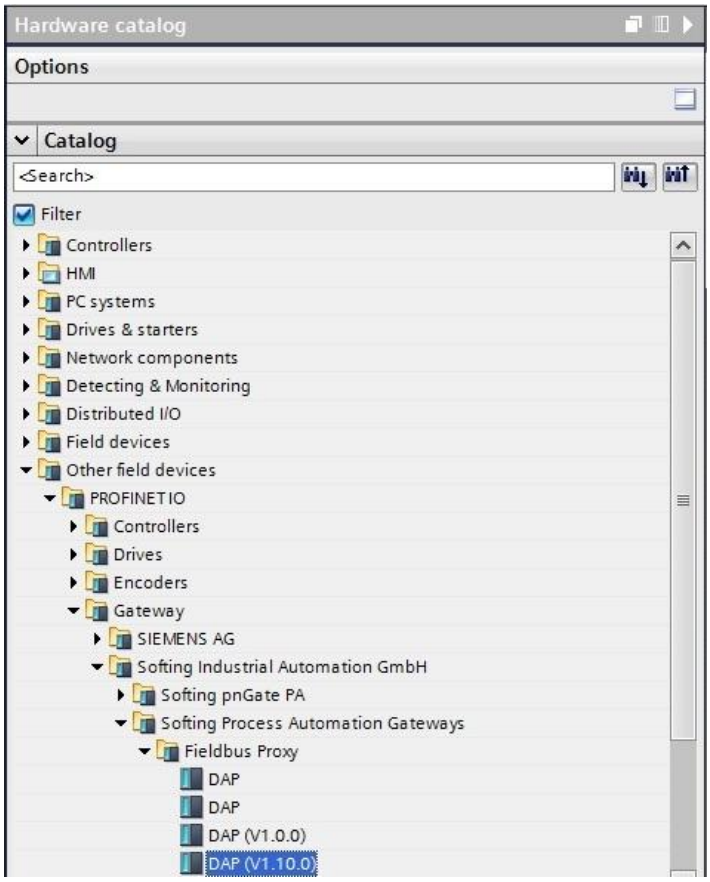
6. Select **Options → Manage general station description files (GSD)**.



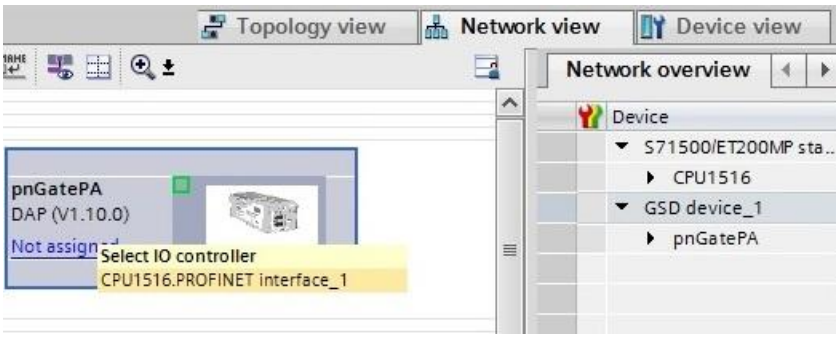
7. Navigate to the folder where the generated GSDML (see Creating a GSDML import file 26) is stored, tick the check mark of the file and click **[Install]**.

8. Click **[Close]**.
   The Hardware Catalog is updated.

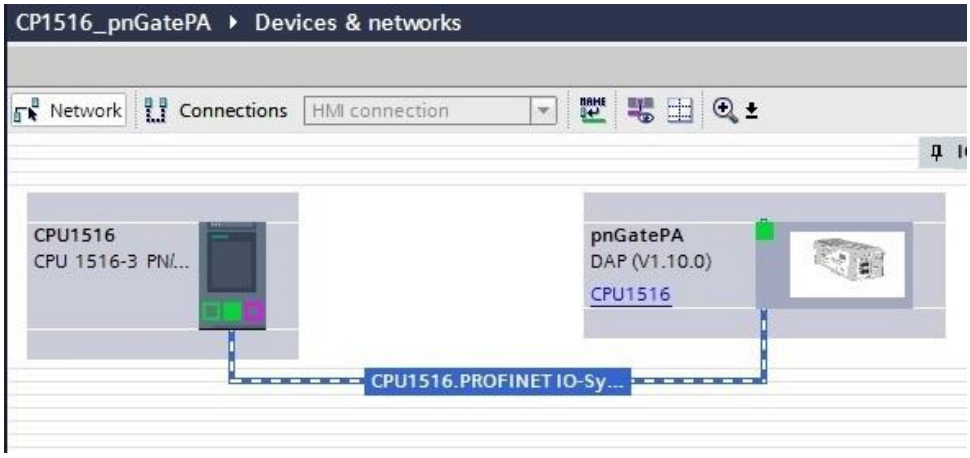
9. Double-click **[Devices & Networks]** to open the **Network View**.
10. Open the **Hardware Catalog**.
11. Select **Other field devices → PROFINET IO → Gateway → Softing Industrial Automation GmbH → Softing Process Automation Gateways**.
12. Select the project name you entered in Step 3.
13. Select **DAP**.



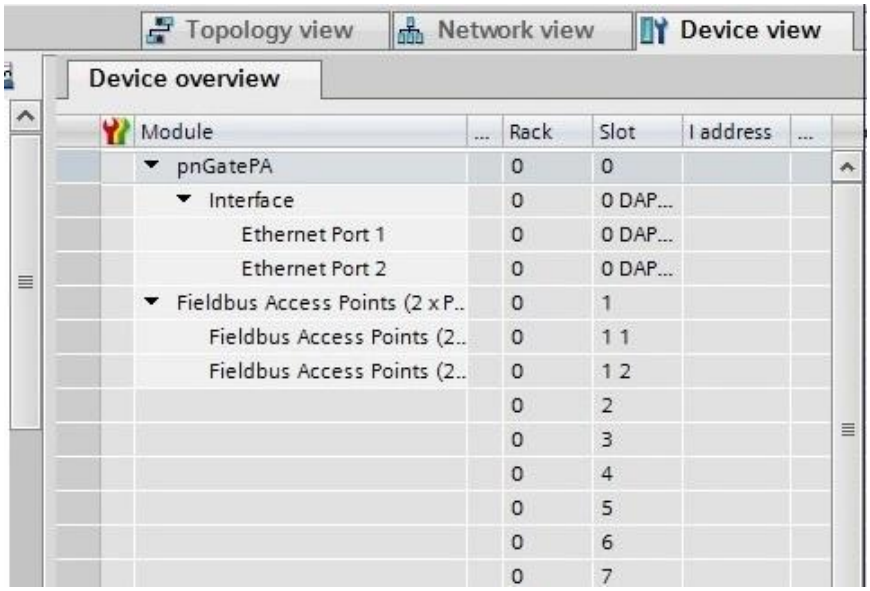
14. Select **Version** in the information dialog to identify the correct GSDML by date and time stamp.
15. Select the gateway, drag it from the **Hardware Catalog** and drop it into the **Network View**.
16. Click **[Not assigned]** in **Network View**.
17. Select the controller.



Now the gateway is assigned to the controller

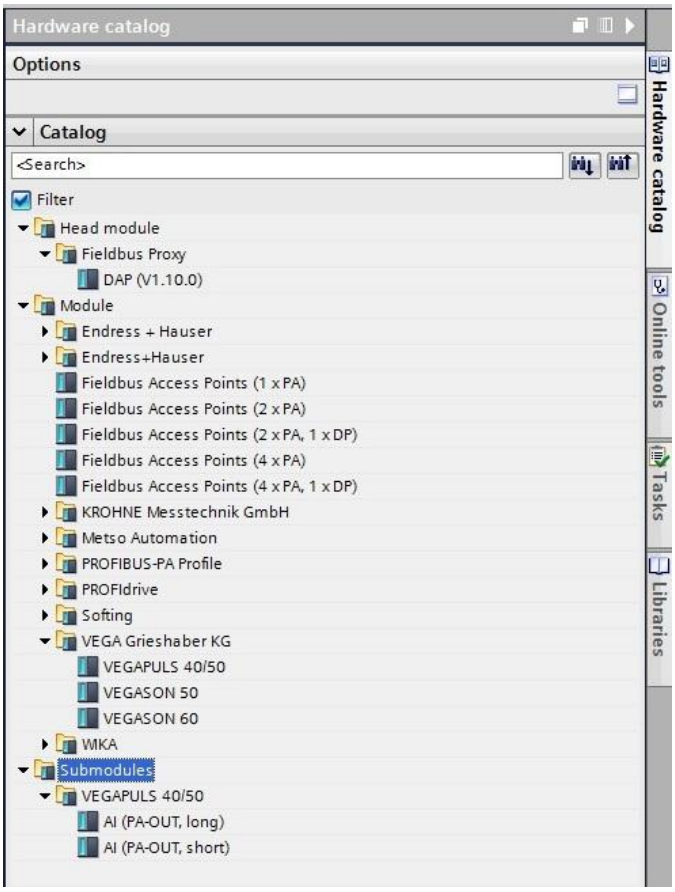


18. Double-click the gateway icon to open the **Device View**.



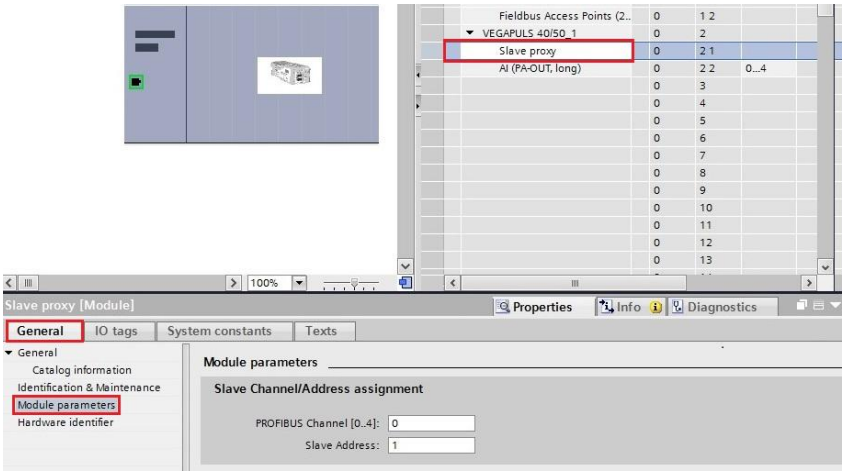
19. Drag a module to a free slot. The supported submodules are shown under **Submodules.**

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).



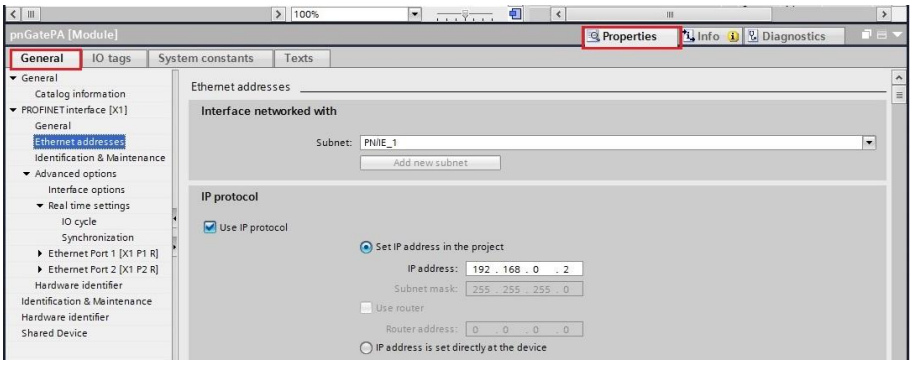
21. Select **Slave Proxy → General → Module parameters** and set the PROFIBUS master channel to the channel to which the PROFIBUS device is connected.

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**.

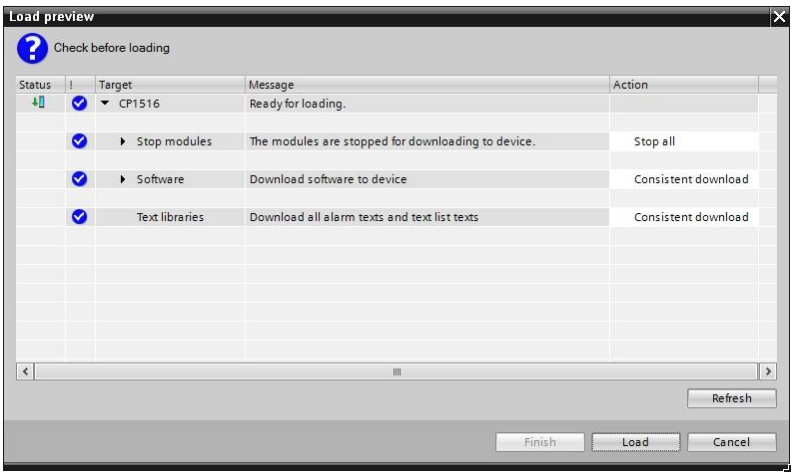
Note
Do **NOT** to use the same IP address for the gateway and the device's web server. Example: 192.168.0.10 is the web server's default address. Use a different IP address for the PROFINET. For information on how to change the web server's address refer to Changing the IP address of the pnGate PA EX 19 .



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 26).

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.

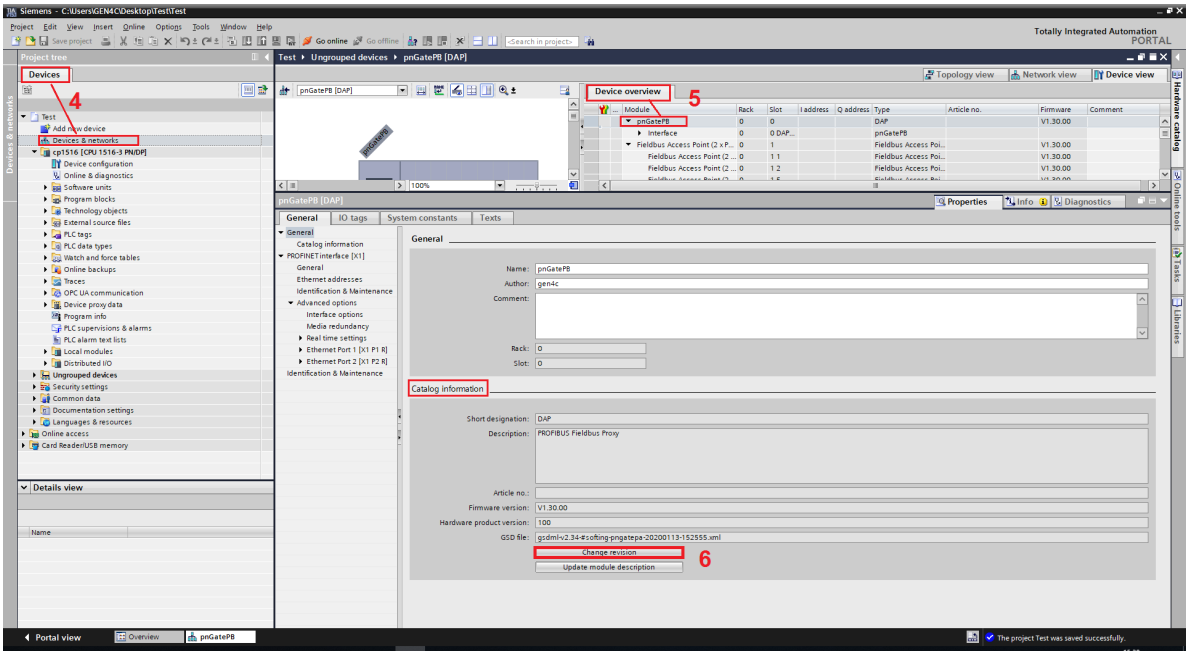
4.7.4.2 GSDML

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.

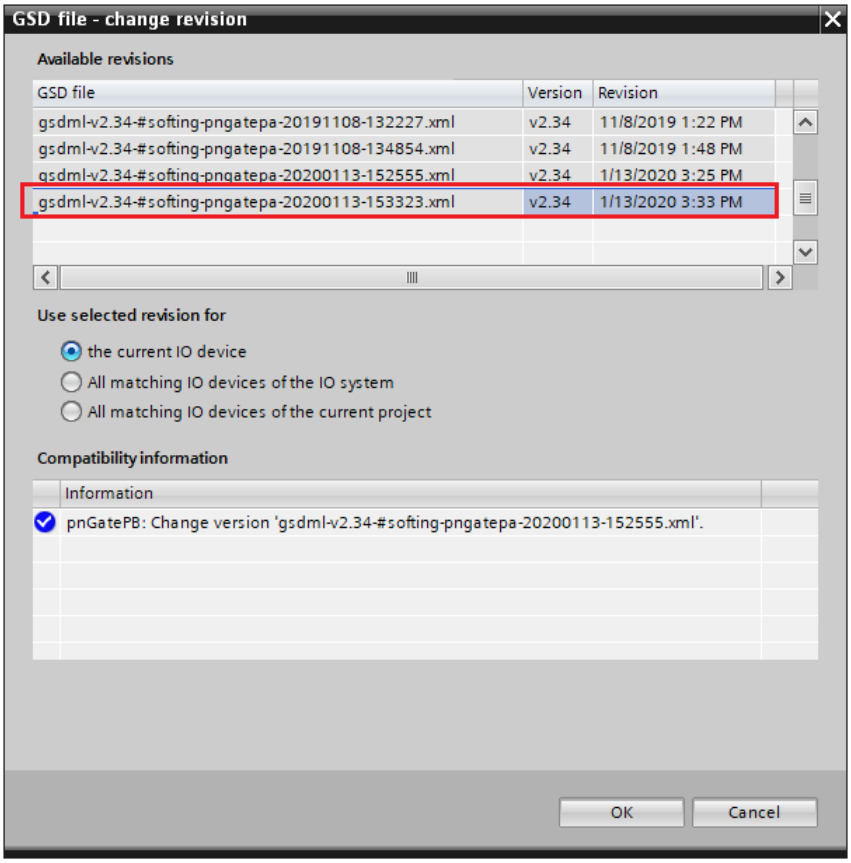
4.7.4.3 Device catalog update in TIA portal

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 → Devise overview** window.



6. Click the **[Change revision]** button in the **Catalog information** window.

7. Select the GSDML file imported in Step 3 (check date and time string) in the new window that appears.



8. 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 32).

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

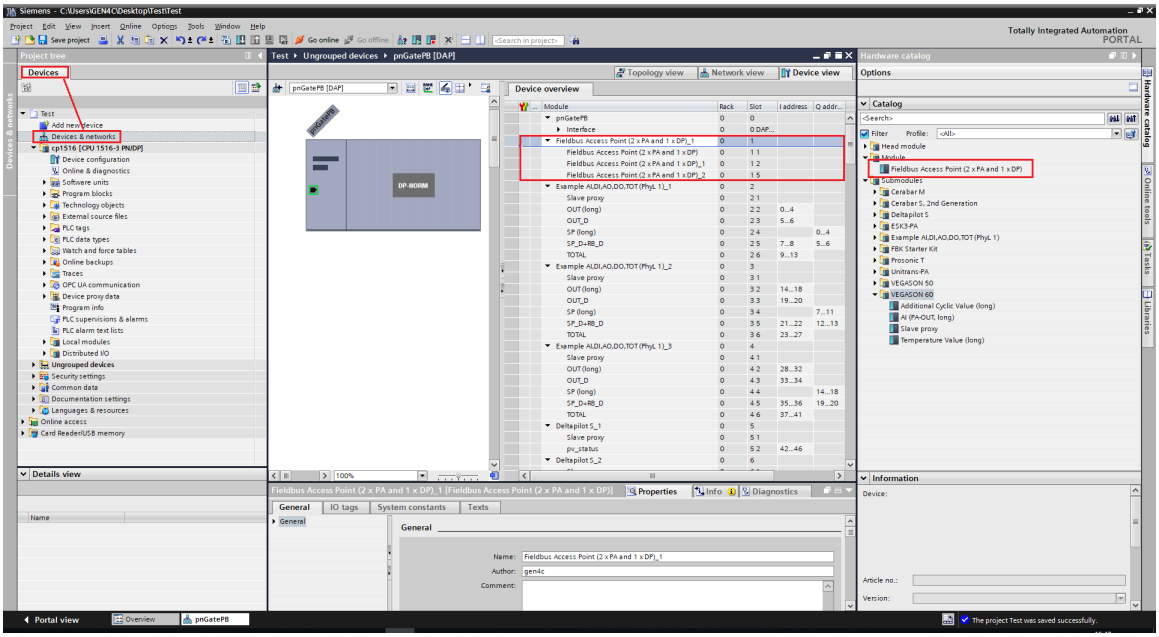
The following steps describe how to switch from a 2-channel to a 4-channel gateway and how to update the GSDML (see also the video Conversion from PROFIBUS GSD to PROFINET GSDML).

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

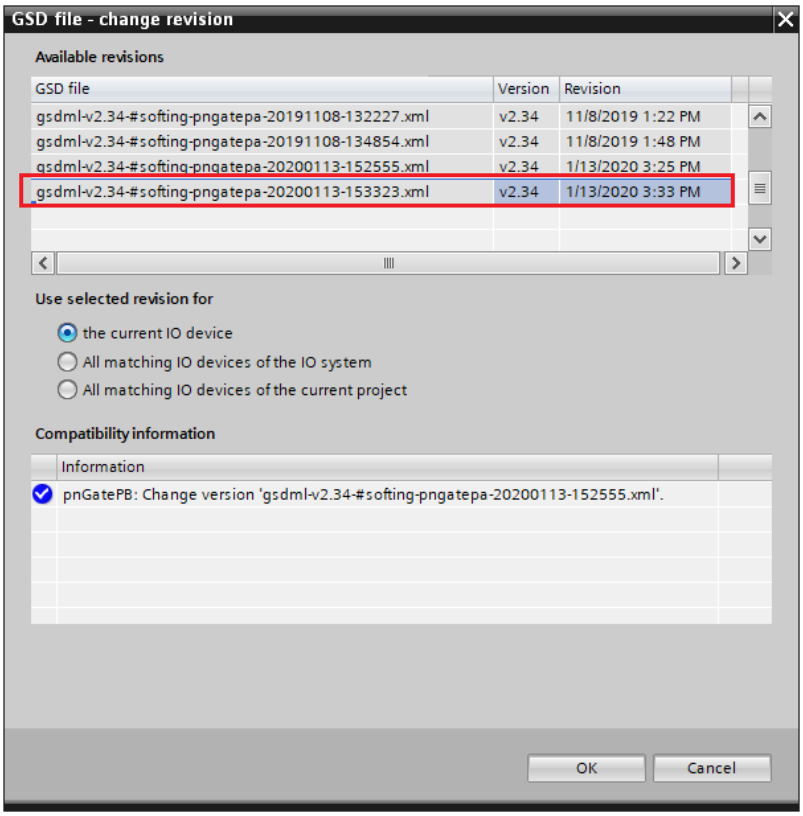
1. Open the TIA portal project.
2. Select the existing PROFINET gateway device in the **Hardware Catalog** under **Other field devices → PROFINET IO → Gateway →Softing Industrial Automation GmbH → Softing Process Automation Gateways.**
3. Import the new GSDML file which you can identify by the date and 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 → Devise 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.

4.8 PROFIBUS parameterization with PACTware

The following chapter describes how to configure a PROFIBUS driver and parameterize PROFIBIUS devices in PACTware using the Device Type Manager PROFIdtm.

Video

See also the video PROFIBUS parameterization in PACTware.

4.8.1 Prerequisites

- If you are working on Windows 7 and you have disabled the automatic update service you must check if Microsoft hotfix KB3033929 is installed.
  Open a command line, click **[Start]**, type **cmd** and in the command window that opens, type **wmic qfe|find "3033929"**.
  The answer contains information about the time, date and Internet address of the installation.The Search and Configure tool is installed as described in the Section Software installation 17 .

- The default IP address of the built-in web server has been changed to an address on your network or the DHCP address on your PC has been changed to a static 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 21 .

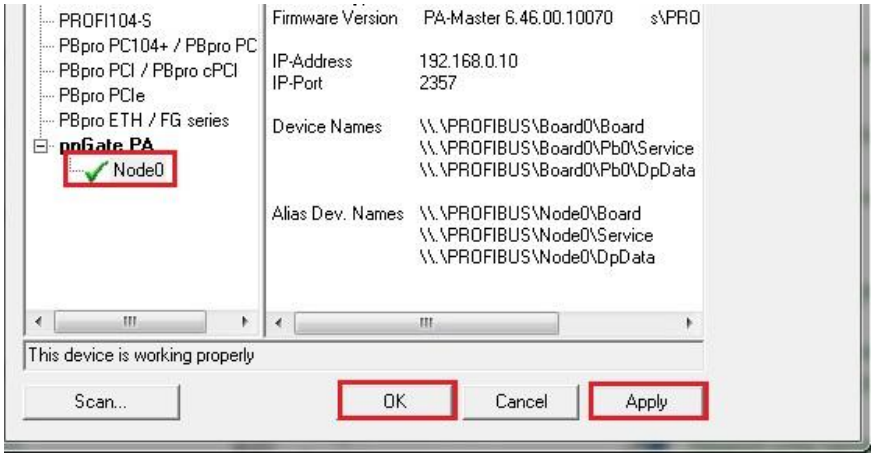
- An FDT frame application (e.g. PACTware) is installed.

- PROFIdtm is installed.

4.8.2 Configuring the PROFIBUS driver

1. Select **Start → Control Panel**.
2. Click **PROFIBUS** to configure the PROFIBUS driver.

3. Allow Windows User Account Control (UAC) to modify settings.
   The PROFIBUS Control Panel is opened.
4. Select a pnGate PA EX.
5. Click **[Add...]** and enter a symbolic node name (default value is Node0).
6. Click **[Next]** and enter the IP address of the pnGate PA EX in interface name field of the next window.
7. Select a bus segment (e.g. PA0) and click **[Next]**.
   Currently segment 1 or segment 2 are supported.
8. Click **[Next]** and set the timeouts (Timeout for Connect and Max Idle Time).
   In most cases you can keep the default settings.
9. Click **[Finish]**.
10. Click **[Apply]** and confirm saving all settings with **[Yes]**.
    The device node is shown with a green check mark.

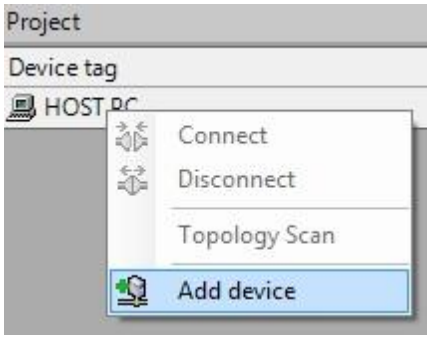


11. Click **[OK]** to close the PROFIBUS Control Panel.

4.8.3 Creating a project in PACTware

1. Start PACTware.

2. Right-click **Host PC → Add Device** in the device tag column of the project view.



A new window appears with the available devices.

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

Note
Before you start a topology scan make sure the corresponding device DTM is installed.

4. Right-click **PROFIdtm** and select **Topology Scan** from the list.
The topology scan window is opened.

5. Click the arrow in the scan window to start the topology scan.

PROFIdtm connects to the network and starts the scan. The device detected is displayed together with its corresponding device information.

PROFIdtm and the PA devices are displayed in the project view.

4.9 PROFIBUS parameterization with SIMATIC PDM

The following chapter describes how to configure a PROFIBUS driver and connect a device type in the Siemens SIMATIC Process Device Manager (PDM).

Video

See also the video PROFIBUS parameterization in SIMATIC PDM.

4.9.1 Prerequisites

- If you are working on Windows 7 and you have disabled the automatic update service you must check if Microsoft hotfix KB3033929 is installed.
  Open a command line, click **[Start]**, type **cmd** and in the command window that opens, type **wmic qfe|find "3033929"**.
  The answer contains information about the time, date and Internet address of the installation.
- The PDM libraries of the Softing PROFIBUS must have been downloaded from the pnGate product website and must be installed.
- EDD files and libraries of the PA devices must be imported in the PDM Device Integration Manager.
  If not available, download them from the Siemens support website and import them in the DIM.

4.9.2 Configuring the PROFIBUS driver

See the description Configuring the PROFIBUS driver 37 in the previous chapter.

4.9.3 Connecting the SIMATIC Manager

This Chapter describes how you connect your pnGate PA EX with the SIMATIC Manager:

1. Select **Start → All Programs → Siemens Automation → SIMATIC → SIMATIC Manager** to create a new project.

2. Click **Options → Select PG/PC Interface**.
   A new window with a dropdown menu opens.

3. Select from the dropdown menu **Interface Parameter Assignment used → Softion PROFIBUS Interface PROFIBUS.1**.

4. Click the **[Properties...]** button.
   A new window opens.

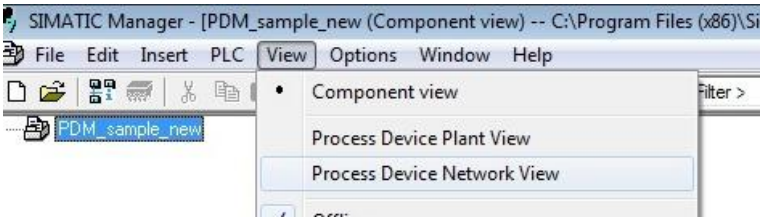
5. Verify that the board number corresponds to the node number in Step 4 of the previous section 39.
   This is typically the default node name "**Node0**".

6. Close both windows with **[OK]**.
   You will return to the main window (Component View).

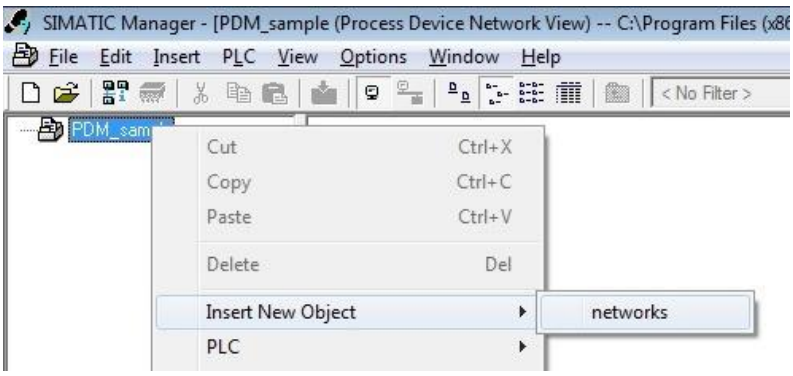
Note

A logical connection has been established between the pnGate PA and the SIMATIC Manager.

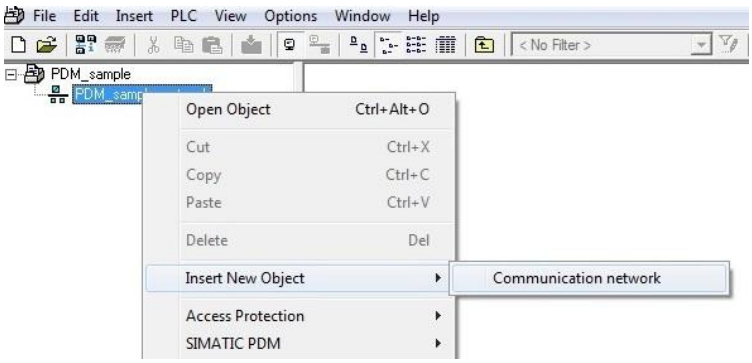
7. Go to **View → Process Device Network View**.



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

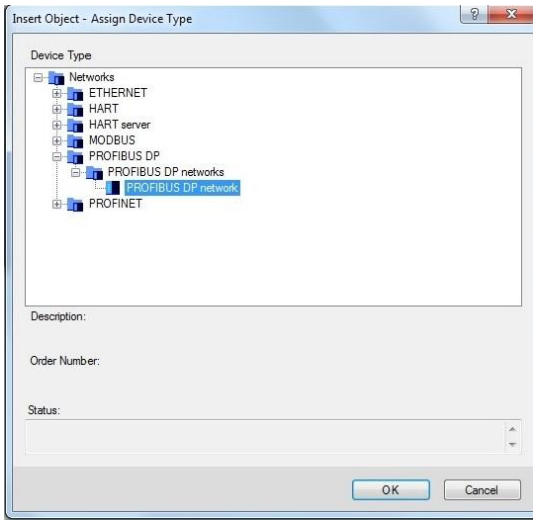


9. Right-click on the network symbol and select **Insert New Object → Communication networks**.



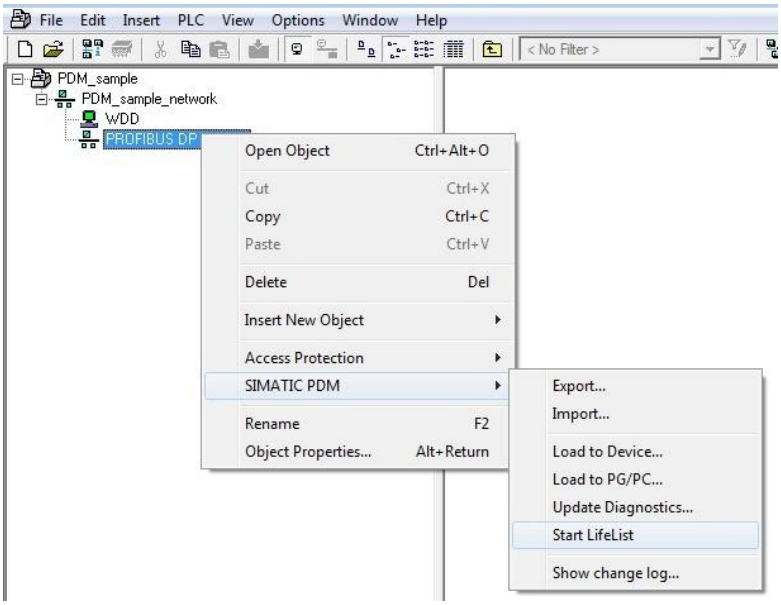
10. Click the **[Assign Device Type...]** button.
    The Assign Device Type window is opened.

11. Select **PROFIBUS DP network** in the new window.

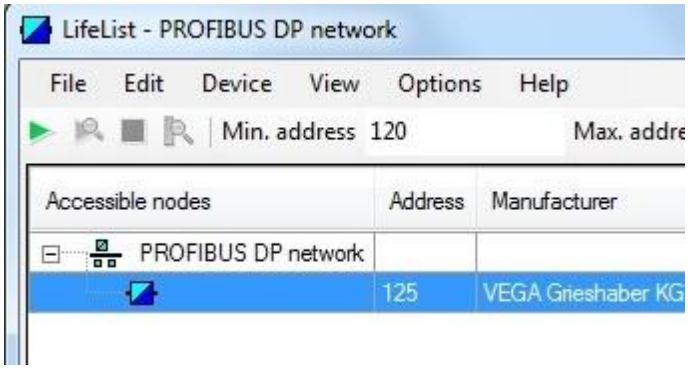


12. Click **[OK]** in both windows.
    You are back in the Process Device Network View.

13. Right-click in the left column **PROFIBUS DP network → SIMATIC PDM → Start LifeList**.

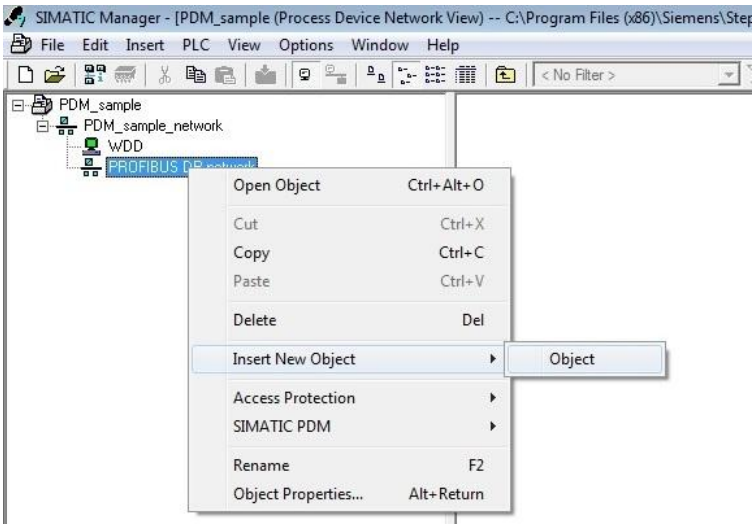


14. Click the **Start Scan** icon ( ) in the top left corner under the menu bar.
    This will run a network scan to verify that the PA device can be reached.
    The icon ( ) indicates that a device can be reached to read and write process parameters.

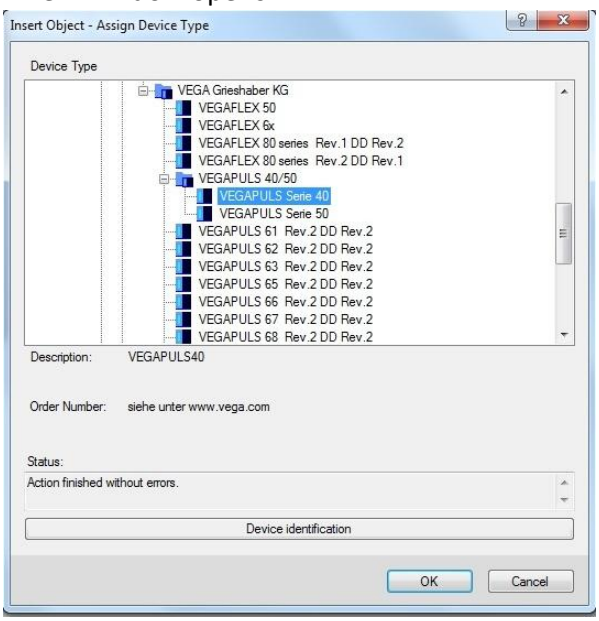


15. Close the window in the top right corner ( )

16. Right-click in the PROFIBUS DP network view and select **Insert New Object → Object**.



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

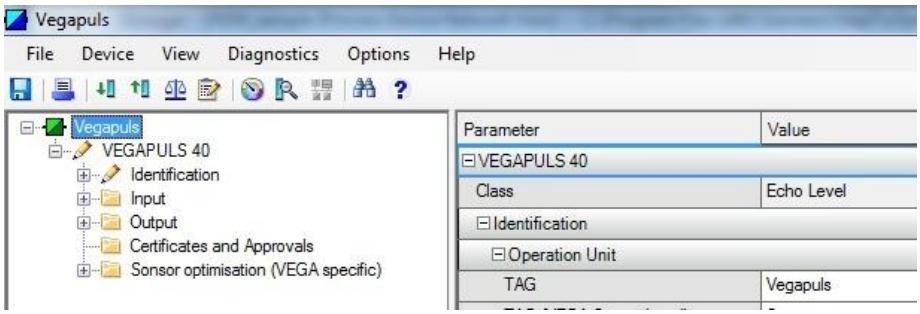


18. Select the device you want to access from the device type list and click **[OK]**.

19. Enter the PROFIBUS address.

20. Click **[OK]** to confirm.
    The window closes.

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.

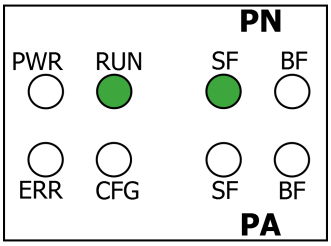


22. Click the Measured Value Display icon ( ) underneath the menu bar to import the parameter values of the PA device to the Process Device Manger.

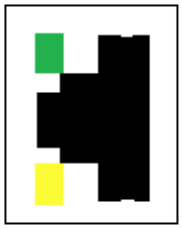
5 LED status indicators

The pnGate PA EX 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 46

RUN = running - refer to next section 46

ERR = error - refer to next section 46

CFG = configuration - displays configuration upload - refer to next section 46

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

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

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

5.2 PROFINET device LEDs (PN)

LEDs	Meaning
SF ⊗ BF ●	**No connection to controller** Possible causes: PROFINET name is missing on the gateway or the physical connection to the gateway is interrupted.
SF ⊗ BF ◔	**Connection establishment** Time period the system needs to establish a connection; devices cannot yet communicate with each other.
SF ⊗ BF ●	**Connected to controller** All devices are exchanging data.
SF ◔ BF ●	**Configuration error or diagnosis** Read errors from PROFINET engineering system.
SF ⊠ BF ● / ⊗	**PROFINET signal function active**
SF ● BF ●	**Error in the PROFINET part of the device** An error such as a software error 46 or a license error has occurred.

5.3 PROFIBUS master LEDs (PA)

LEDs	Meaning
⊗ ● SF BF	**All channels offline**
⊗ ● SF BF	**All devices exchange data on all channels**
⊗ / ⊠ ⊠ SF BF	**At least one used channel is not online**
⊠ ● / ⊠ SF BF	**At least one slave is not in data exchange** (BF: green - all channels are online; red: not any channel is online.)
● ● SF BF	**Error in the PROFIBUS part of the device** An error such as a software error 46 or a license error has occurred.

6 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.

7 Glossary

Terms & Abbreviations	Definition
DC	Direct Current - electric current flowing in only one direction
DIN	*Deutsches Institut für Normung*
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	*General Station Description*. 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	*General Station Description Markup Language*. 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

Softing Industrial Automation GmbH

Richard-Reitzner-Allee 6
85540 Haar / Germany
https://industrial.softing.com

+ 49 89 45 656-340
+ 49 89 45 656-488
info.idn@softing.com