

User Guide

epGate PN



Disclaimer of liability

The information contained in these instructions corresponds to the technical status at the time of printing of it and is passed on with the best of our knowledge. The information in these instructions is in no event a basis for warranty claims or contractual agreements concerning the described products, and may especially not be deemed as warranty concerning the quality and durability pursuant to Sec. 443 German Civil Code. We reserve the right to make any alterations or improvements to these instructions without prior notice. The actual design of products may deviate from the information contained in the instructions if technical alterations and product improvements so require.

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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 epGate PN 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

Filenames 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 indicates a video on the corresponding topic.

1.4 Document history

Document version	Changes since last version
1.00	first version

1.5 Related documentation and videos

The following documents and videos provide additional product information:

- [EtherNet/IP configuration with epGate PN](#)
- [IP Settings for epGate PN](#)
- [PROFINET Configuration with epGate PN](#)

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 epGate PN

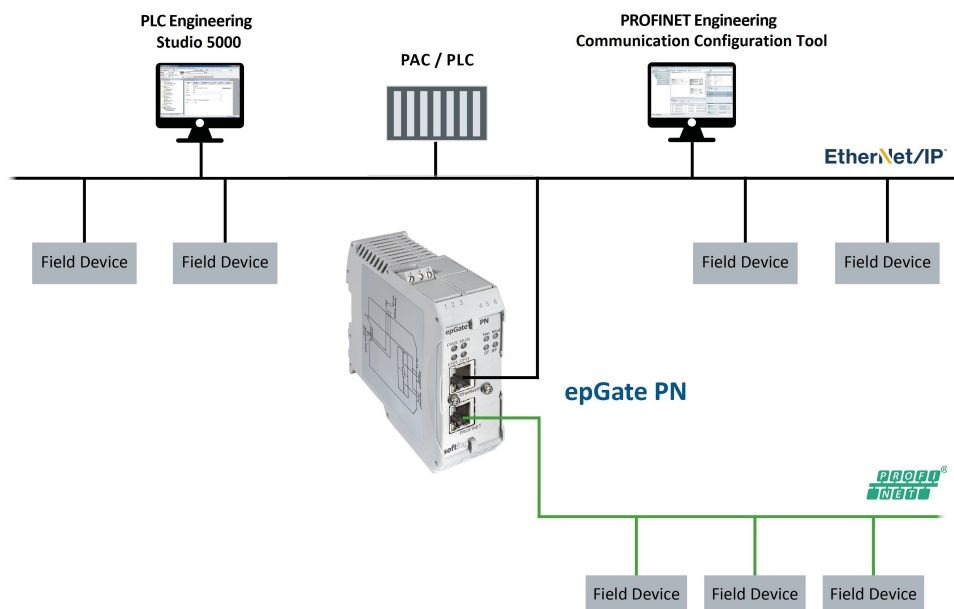
epGate PN is a gateway intended for mapping EtherNet/IP data to PROFINET devices in factory and process automation. The gateway is designed to work on the concept of transferring data cyclically between EtherNet/IP and PROFINET devices. epGate PN collects input data from PROFINET in an EtherNet/IP input assembly and writes PROFINET output data from an EtherNet/IP output assembly. The assembly data is controlled by the programmable logic controller (PLC) or any other connected I/O network devices connected on the EtherNet/IP side.

epGate PN supports two input and two output assemblies. When the field devices have been configured using the Communication Configuration Tool the data is automatically exchanged between the EtherNet/IP and the PROFINET network. However, the amount of data that can be transferred, collected and processed is limited due to a number of reasons explained below:

Data exchange limitations

- epGate PN collects the data of I/O devices in two input and two output assembly objects.
- Each assembly object can hold a maximum of 255 bytes.
- Some PLCs support only one pair of input and output assemblies.
- The overall amount of data that can be exchanged with epGate PN is restricted to 1020 bytes (4 x 255 bytes).
- With the standard epGate PN solution you can connect to a maximum of 16 PROFINET devices. With a software license upgrade your epGate PN can interact with up to 32 field devices.

Network overview



The epGate PN can be managed from your PC with the following tools:

- Search And Configure Tool
- Communication Configuration Tool
- RS Logix 5000/Studio 5000 or any other EtherNet/IP PLC engineering tool

2.1 Intended use

epGate PN has been designed for connecting PROFINET IO devices to EtherNet/IP and PLCs in factory and process automation.



CAUTION

This gateway is not ATEX certified and may not be used in explosive atmospheres or any other hazardous areas. The permissible ambient conditions specified in chapter [Technical data](#) must be observed.

2.2 Scope of delivery

The following parts are delivered with the epGate PN:

- epGate PN device
- CD-ROM including, tools, manuals, sample projects, tutorial videos and additional material
- printed quick startup guide

2.3 Supported features

The Softing epGate PN gateway supports the following features:

- Simple connection to PROFINET devices using EtherNet/IP controllers.
- Access to PROFINET process values (input und output) in the EtherNet/IP control program.
- Access to operation state and Life Sign of the PROFINET devices in the EtherNet/IP control program.
- Detailed display of the operation state by LEDs.
- Power supply by connectors or rail connectors.
- Automatic mapping between PROFINET data and EtherNet/IP data by the Communication Configuration Tool.

2.4 System requirements

Operation of the epGate PN requires the following components:

- At least one PROFINET device and GSDML file
- 24V power supply
- PC with web browser
- Communication Configuration Tool (part of supplied CD-ROM) installed on PC
- Ethernet IP PLC and associated engineering software (e.g. Rockwell Studio 5000)
- DHCP server for EtherNet/IP side of the gateway (e.g. part of the plant network, the PLC or a local PC tool like Rockwell's BOOTP-DHCP Server)
- Ethernet cables and if necessary Ethernet switches

2.5 Safety precautions

**CAUTION**

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

**CAUTION**

Do not use the gateway in explosion hazardous areas. Observe the specification in Chapter [Technical Data](#).

**Note**

Do not open the housing of the epGate PN. 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 it is very likely that the temperatures of connecting cables will increase if the cables are installed in an unfavourable position. In such cases, measure the temperature to ensure that the service temperature of the cables is not exceeded or use cables sustaining high temperatures of at least 90 °C.

3.1.1 Mounting and dismantling

**Note**

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

**Note**

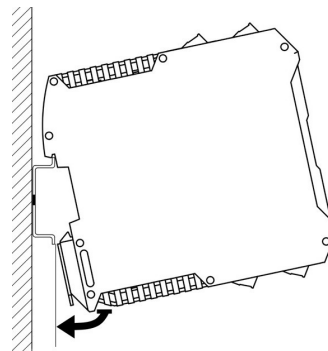
Depending on the installation position, the maximum ambient operating temperature may differ. Refer to [Technical Data](#) for detailed information.

**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

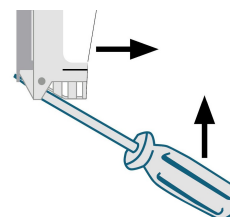
1. For mounting the epGate PN on a DIN rail (35 mm), attach the two upper notches to the rail.
1. Press the device down towards the rail until it locks into place.

**Note**

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

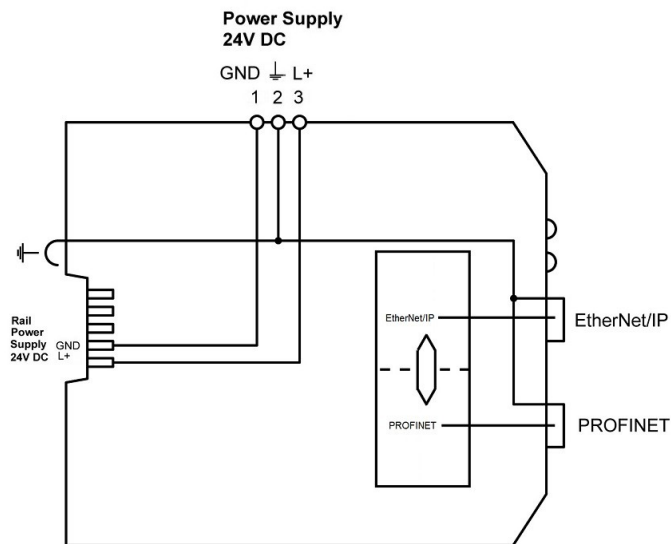
Dismounting

1. Slide a screw driver horizontally underneath the housing into the locking bar.
1. Slide the bar downwards – without tilting the screw driver - and fold the device upwards.



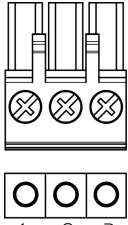

3.1.2 Connection diagram

The epGate PN has two 10/100 Base-T Ethernet ports, one connecting to an EtherNet/IP network and one to a PROFINET network. Both RJ45 ports correspond to specification IEEE 802.3. The following diagram shows the side profile of the epGate PN with its input and output interfaces:



3.1.3 Connecting the power supply

Connect the gateway to a 24 V DC power supply. 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 impedance 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.

3.1.4 Connecting to the network

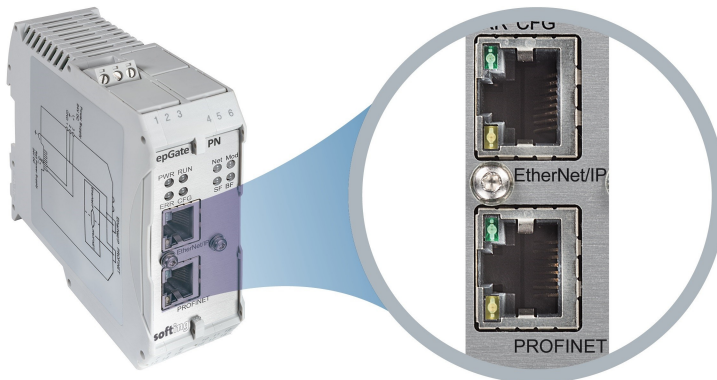
The epGate PN has an EtherNet/IP and a PROFINET network connection.

1. Connect the PROFINET devices to the PROFINET port.
2. Connect the EtherNet/IP devices to the EtherNet/IP port.



Note

We strongly recommend connecting the two Ethernet interfaces to different physical LAN networks (EtherNet/IP communication system and PROFINET communication system).



3.1.5 Powering up the device

Turn on the power supply. The boot process takes a few seconds. For indication of proper operation of a epGate PN refer to [LED status indicators](#).

3.2 Software installation

When you install a Softing product for the first time, you will be asked in a dialogue window if you to 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. Insert the CD "*Gateways for Process Industries*" into the CD drive.

The CD contains the software packages of all Softing gateway products.

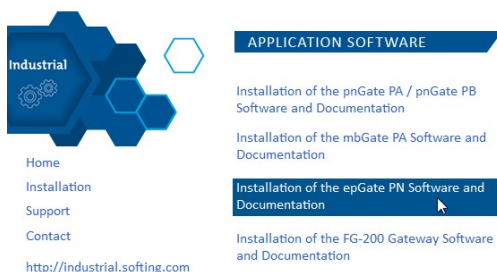
 - a. If Autorun is enabled on your PC, the startup page is opened.
 - b. If Autorun is disabled on your PC, open Windows Explorer, select your CD drive and double-click the file *start.exe* in the CD's root directory.

The installation window appears.

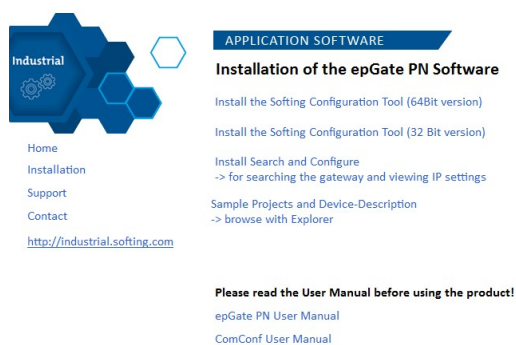


2. Select the installation language (German or English).

A new window appears. Here you will see the software packages listed by gateway.



3. Select the epGate PN installation link.



4. Install the **Search and Configure** tool.
5. Follow the on-screen installation instructions.

6. Read the licence 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.
7. Select *I accept the terms in the license agreement* and click **[Next]**.
8. 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.
9. Press **[Finish]** to complete the installation and exit the wizard.



Note

Proceed with the installation of the other software packages.

10. Install the **Softing Configuration Tool**.
11. Follow the on-screen installation instructions and proceed as with the installation of the Search and Configure tool.

4 Configuration

When you have connected epGate PN on the EtherNet/IP port to your Local Area Network, you can use the integrated web server to manage and configure the gateway and the connected PROFINET devices.

Bearing in mind that the IP address of the epGate PN is dynamically assigned by the DHCP server of your Local Area Network you do not need to configure an IP address for your gateway. However, if you prefer to run your epGate PN on a different network you can use the Rockwell BOOTP utility (available with the RSLogix5000 software) to reconfigure the IP address your gateway.



Video

For more information on how to configure the epGate PN using Rockwell BOOTP watch the video [IP Settings for epGate PN](#).

4.1 Prerequisites

The epGate PN gateway must be connected to a PC which runs a standard Internet browser supporting JavaScript.

4.2 User roles and settings

Access to the epGate PN web server and configuration is managed by user roles where each role has certain permissions. The following user roles, permissions and passwords are available:

Role	Username	Password
Administrator	administrator	FGadmin!1
Maintenance	config	FGconfig!1
Operator	view	FGview!1
Expert*	expert	FS-QsHnc7BWa{6w<
Diagnostics*	diagnosis	?<fJ#/\$eB2qtGd*

* Backdoor accounts for Softing Support access. Currently supporting same features as administrator account.

The tables shows which permissions/actions can be executed by which user role:

Action	Admin / Diagn. / Exp.	Maintenance	Operator
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"/>

4.3 Defining a host name for your epGate PN

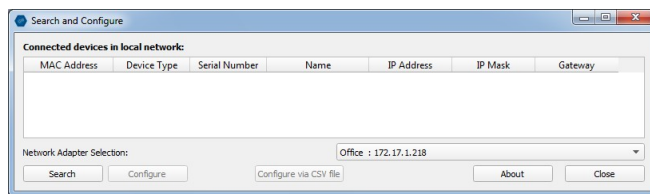
As the IP address of your epGate PN gateway is dynamically assigned by DHCP you will only need to change the host name of your gateway. To do this you must be logged on as administrator.

Prerequisites

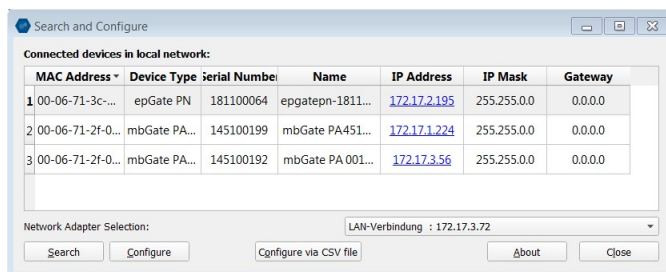
- You have installed the *Search and Configure* tool as described in [Software installation](#).
- Your PC is connected to the EtherNet/IP network.

The following steps apply to Windows 7.

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



2. Open the dropdown list of the **Network Adapter Selection**.
3. Select the network EtherNet/IP 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 a moment.



5. Click **[Configure]** or double-click the device.
This will open the configuration window.
6. Enter an appropriate host name.
All other input fields in this window are write-protected.



Note

You cannot change any IP settings of the epGate PN device.

7. Enter the administrator password.
8. Click **[Submit]**.

4.4 Setting the IP address of your PC

The web server in the EtherNet/IP LAN has a default IP address assigned by DHCP. The default IP address for the Ethernet interface in the PROFINET LAN is 0.0.0.0. The IP address for PROFINET will later be assigned during the [PROFINET configuration](#). Typically it is sufficient for all engineering purposes to connect your PC to the EtherNet/IP side of the epGate PN. When your PC is connected to the DHCP network to which the epGate PN gateway is also connected no further address settings are required.

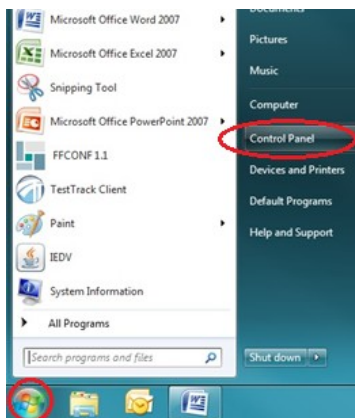


Note

If there is no DHCP server in the Ethernet/IP LAN and you connect the epGate PN gateway for the first time, the epGate PN gateway automatically generates a random **link local address** after about two minutes. The address range is 169.254.1.0 to 169.254.254.255. Use the *Search and Configure* tool to identify the actual IP address of epGate PN.

If you like to connect to an epGate PN that uses a link local address you may want to assign your PC a static IP address that matches the subnet of this link local address. The following chapter describes how to set a static IP address in Windows 7. The steps below may vary slightly for Windows 10.

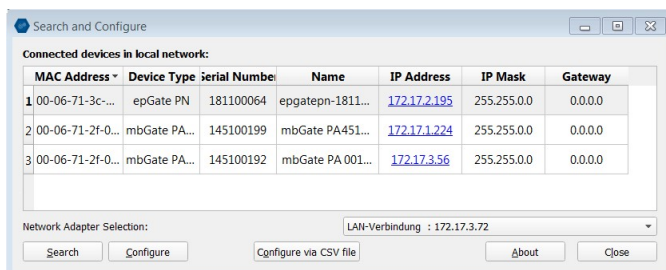
1. Click **Start → Control Panel** from Menu (Windows logo).



2. Select **Network and Sharing Center** (if the control panel opens in the **icon view** or select **Network and Internet → Network and Sharing Center** if you the control panel opens in the **category view**).
3. Click **Local Area Connection** under **View your active networks**.
A new window opens.
4. Click **[Properties]**.
A new window opens.
5. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **[Properties]**.
A new window opens.
6. Select **Obtain an IP address automatically** in your network (EtherNet/IP) environment.
7. Click **[OK]** to confirm.

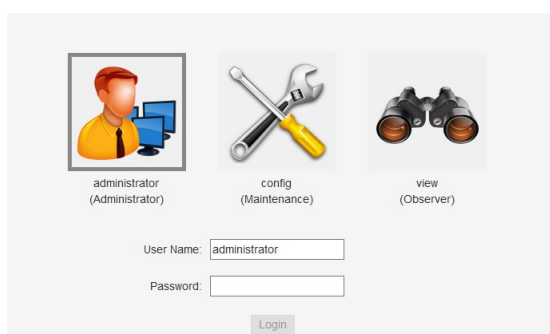
4.5 Login to user interface

1. Start the *Search And Configure* tool on your PC to retrieve the current web server IP address of the epGate PN.
The search will open a new window showing the devices connected to your Local Area Network (LAN).
2. Click on the IP address of your epGate PN in the IP Address column.



This will launch the login window of your epGate PN in your web browser.

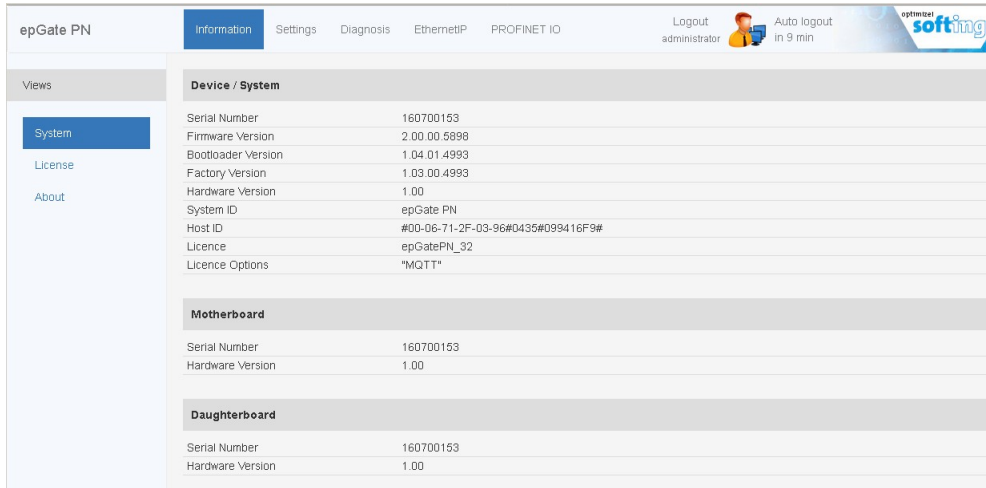
3. Enter **administrator** in the **Username** field and **FGadmin!1** as **password**.



The epGate PN information page is opened.

4.6 General information

The **System** window provides detailed information about the device and the system. The device is identified by hardware version numbers and serial numbers. Additionally, the firmware version, the system ID and a manufacturer-specific identifier for the system and are shown.



The screenshot shows the epGate PN web interface. The top navigation bar includes 'epGate PN', 'Information' (selected), 'Settings', 'Diagnosis', 'EthernetIP', and 'PROFINET IO'. On the right, there are links for 'Logout administrator' and 'Auto logout in 9 min', along with the Softing logo. A left sidebar shows 'Views' with 'System' (selected), 'License', and 'About'. The main content area displays system information under the heading 'Device / System'.

Device / System	
Serial Number	160700153
Firmware Version	2.00.00.5898
Bootloader Version	1.04.01.4993
Factory Version	1.03.00.4993
Hardware Version	1.00
System ID	epGate PN
Host ID	#00-06-71-2F-03-96#0435#093416F9#
Licence	epGatePN_32
Licence Options	"MQTT"

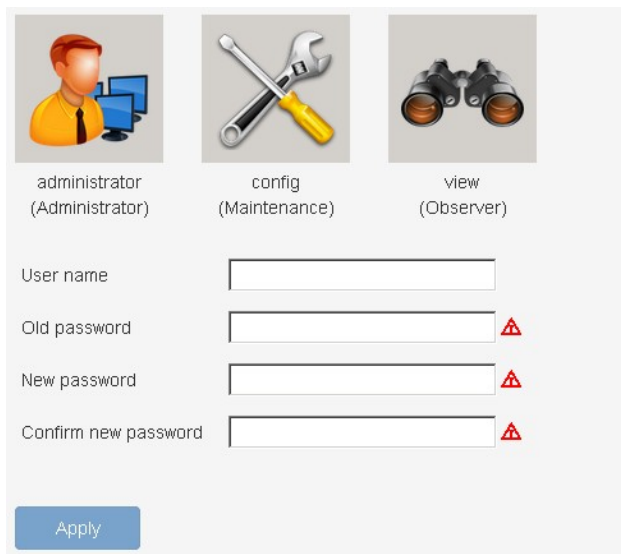
Motherboard	
Serial Number	160700153
Hardware Version	1.00

Daughterboard	
Serial Number	160700153
Hardware Version	1.00

This **License** window shows information about open source declarations and open source software packages used by the epGate PN firmware while the **About** window provides the Softing contact information.

4.7 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 Section [User roles and settings](#).



	administrator (Administrator)	config (Maintenance)	view (Observer)
User name	<input type="text"/>		
Old password	<input type="password"/>	<input type="password"/>	<input type="password"/>
New password	<input type="password"/>	<input type="password"/>	<input type="password"/>
Confirm new password	<input type="password"/>	<input type="password"/>	<input type="password"/>

Apply

3. Enter the name of the user whose password you want to change, 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.

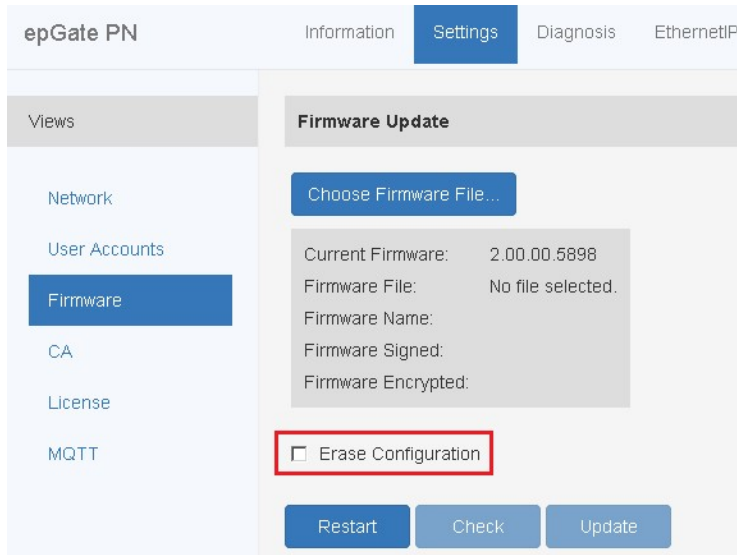


Note

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.

4.8 Updating the firmware

1. Log on to the web interface of the gateway.
2. Select **Settings** → **Firmware** in the side bar navigation.



3. Click **[Choose Firmware File...]** to select the firmware file you want to download.
4. Tick the checkbox in the field **Erase Configuration**.
If you tick the checkbox your current configuration data will be deleted and your password is reset to default.
Optional: Click **[Restart]** to restart the epGate PN device if required.
Optional: Click **[Check]** to validate the selected firmware file.
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 epGate PN will be rebooted. When the boot process is completed, the RUN LED is ON.



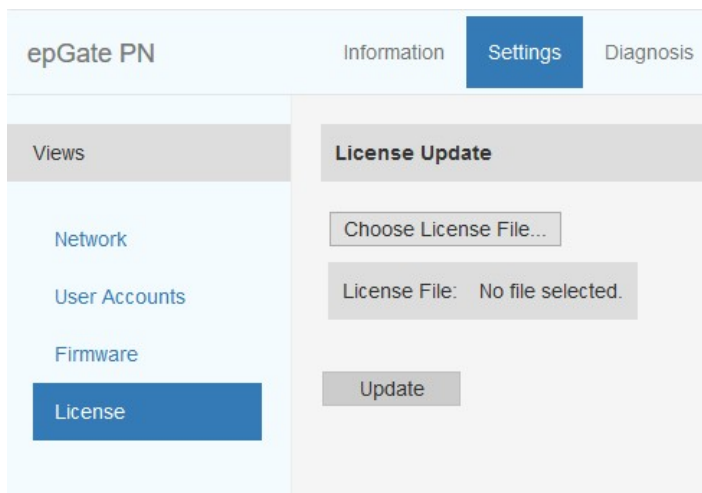
Note

Do not access the web server of the epGate PN 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 epGate PN.

4.9 Updating the license

The default epGate PN software license supports 16 PROFINET IO devices. To expand the software to support up to 32 PROFINET devices contact Softing for a license upgrade and do the following:

1. Log on to the web interface of the gateway.
2. Select **Settings** → **License** in the side bar navigation.
3. Click **[Choose License File..]** and select the license file you want to load from a dropdown list.



4. Click **[Update]** to install the selected license file and reboot the epGate PN device.

5 Configuring PROFINET IO devices

This Chapter describes how to establish a connection of up to 32 PROFINET IO devices to any kind of EtherNet/IP controller using the Softing Communication Configuration Tool.



Video

For further information watch the video [PROFINET Configuration with epGate PN](#).



Note

For more details about PROFINET configuration see the Communication Configuration Tool (ComConf) User Guide on the CD.

5.1 Prerequisites



Note

Before you can perform the steps described in the tutorial video make sure the following prerequisites are met.

- epGate PN is installed and powered up (see [hardware installation](#)).
- GSDML files of your PROFINET IO devices are available.
- The Communication Configuration Tool is installed on your PC (see [software installation](#)).
- Your PC and epGate PN are connected over Ethernet.
- PROFINET devices are connected to the epGate PN.
- A PLC programming tool is available.
- A PLC supporting EtherNet/IP is connected to the gateway and can be programmed.

6 Configuring EtherNet/IP

This Chapter describes how to configure the EtherNet/IP for the Rockwell PLC using Studio 5000 to access to the process data of the PROFINET devices via EtherNet/IP.



Video

For further information watch the video [EtherNet/IP configuration with epGate PN](#).

6.1 Prerequisites



Note

Before you can perform the steps described in the tutorial video make sure the following prerequisites are met.

- Rockwell Studio 5000 is installed.
- The Electronic Data Sheet (EDS file) has been downloaded from the CD to be registered in Rockwell Studio 5000.

6.2 EtherNet/IP mapping

The Communication Configuration Tool creates the mapping definition between PROFINET data and EtherNet/IP data and the Add On Instruction (AOI) that allows to access the data within a PLC program in a convenient way.

The name of the AOI and the UDT (User Defined Data Types) file is derived from the Tag Name of the epGate PN in the Communication Configuration Tool project. This Tag Name can be changed in the project. This results in a new name of the AOI and the UDT and allows you to use different AOIs and UDTs in the same PLC project.

Field names in the UDT file are created by using PROFINET structuring information. A field name starts with:

- State – represents state information of a PROFINET module
- Inputs – represents an input of a PROFINET device
- Outputs – represents an output of a PROFINET device

This is followed by a data type reference. The last three figures denote:

- Device number
- Slot number
- Subslot number

The table below shows an example for some Input bits. Besides the UDT field names already explained above it contains the following information:

- Field type; related to the PLC program
- Offset in the assembly
- Device name of the PROFINET device as defined in the Communication Configuration Tool

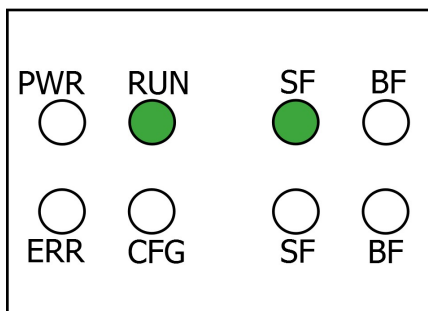
- Tag name of the PROFINET device as defined in the Communication Configuration Tool
- Slot of the device in which the module is plugged
 - These names or values can be changed and adapted to your needs!
- Subslot of the slot
- Channel in the sub slot
- Type related to the PROFINET protocol.
 - These names or values cannot be changed!

The following table below shows a mapping example.

User Defined Type		Assembly	PROFINET Channel					
Field Name	Field Type	Offset	Device Name	Device Tag	Slot	Sub Slot	Channel Name	Channel Type
State_3_5_1	SINT	0	rtem103	Softing PROFINET IO RT Reference Device for RTEM Module	5	1	Provider state	
Inputs_3_5_1	SINT[254]	1	rtem103	Softing PROFINET IO RT Reference Device for RTEM Module	5	1	Inputs	Octetstring
Inputs_3_5_2	SINT	2	rtem103	Softing PROFINET IO RT Reference Device for RTEM Module	5	2	Inputs	Integer16

7 LED status indicators

The epGate PN is equipped with eight LEDs on its front side:
































PWR	power supply , displays status (on/off)
RUN	running , displays status (on/off)
ERR	error (information/mapping application)
CFG	configuration , displays configuration upload
Net	Network , displays EtherNet/IP Network status
Mod	Module , displays EtherNet/IP module status
SF	System Faults , displays PROFINET system faults (wrong configuration, internal error, ...)
BF	Bus Faults , displays PROFINET bus fault











The LEDs may be on permanently or flash in different colors and frequencies. We use the following symbols:

Symbol	Colour	Mode
	none	off
	red	permanently on
	green	permanently on
	red	flashing (1 Hz)
	red	flashing quickly (5 Hz)
	green	flashing (1 Hz)
	green	flashing slowly (0.5 Hz)
	green	flashing quickly (5 Hz)

7.1 Gateway status LEDs (PWR, RUN, ERR and CFG)








LEDs	Meaning
<div> <div>PWR</div>  <div>ERR</div> </div> <div> <div>RUN</div>  <div>CFG</div> </div>	Start-up phase (approximately 10 seconds) 24V DC power supply is ok.
<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.
<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.
<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
<div> <div>PWR</div>  <div>ERR</div>  </div> <div> <div>RUN</div>  /   <div>CFG</div> </div>	Firmware update is running (in factory mode if RUN LED 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.

7.2 PROFINET status LEDs (SF and BF)








LEDs		Meaning
		Not powered
		Operating The network status is ok
		Controller has been successfully configured
		Configuration failed PROFINET protocol has not been configured successfully or Device issue At least one configured device is not in data exchange or Non volatile storage problem or Application watchdog is expired
		Address conflict detected The network communication may be disturbed or Internal error The UDP stack has reported an internal unrecoverable error or Duplicate name error A duplicated name has been detected

7.3 EtherNet/IP status LEDs (Net and Mod)

Network status (Net)

LED	Meaning
	Not powered, no IP address, no Ethernet link The device is powered off, or is powered on with no IP address configured
	No connections An IP address is configured, but no CIP connection is established
	Connected An IP address is configured, at least one CIP connection is established
	Connection timeout An established connection has timed out
	Duplicate IP address For devices that support duplicate address detection, the device has detected that its IP address is already in use
 	Self-test The device is performing its power up testing

Module status (Mod)

LED	Meaning
	No power No power is supplied to the device
	Operating The device is operating correctly
	Standby The device has not been configured
	Major recoverable fault The device has detected a recoverable error Note: An incorrect or inconsistent configuration is considered a major recoverable fault
	Major unrecoverable fault The device has detected a non-recoverable error
 	Self-test The device is performing its power-up testing

8 Technical data

8.1 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 Installation positions for the maximum ambient temperature depending on the mounting position)
Storage temperature	-40 °C...+85 °C
Altitude	must not exceed 2000 m
Location	indoor use only; no direct sunlight

8.2 Installation positions

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



Minimum distance

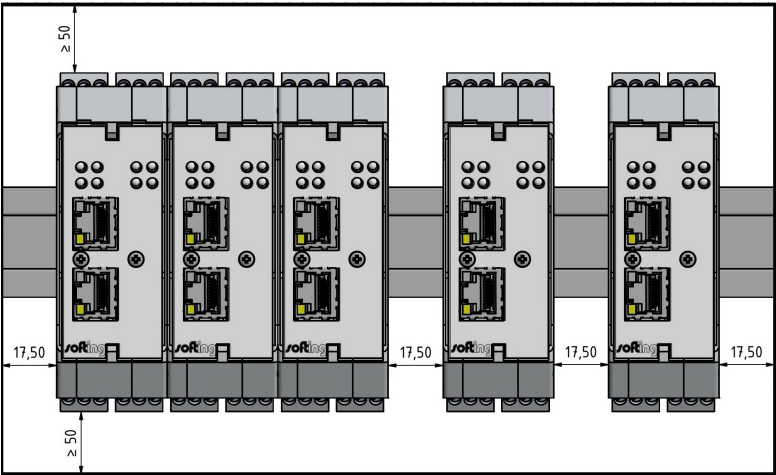
Provide a minimum distance of 50 mm to the air inlet and air outlet to ensure natural convection.



Rotated installation position

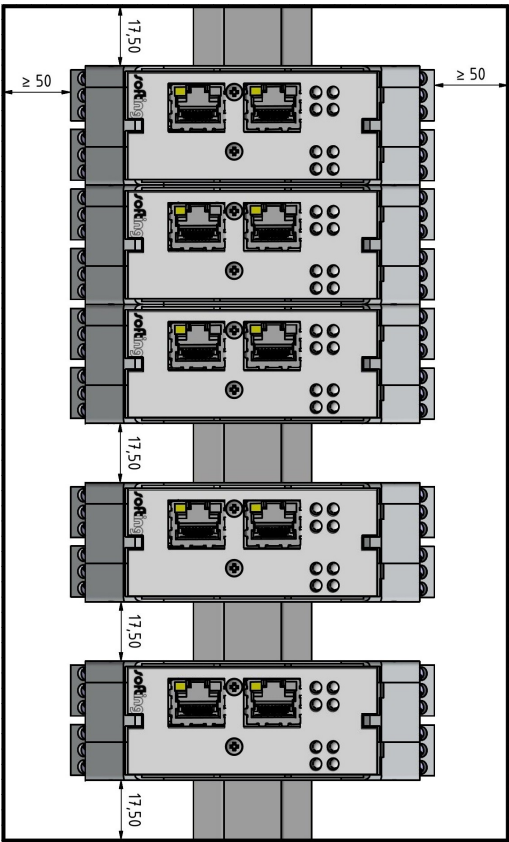
The maximum permissible ambient temperature values also apply to a 180° rotated installation position.

Horizontal installation position



Minimum distance	Maximum permissible ambient temperature T_a
0 mm	55 °C
17.5 mm	65 °C

Vertical installation position



Minimum distance	Maximum permissible ambient temperature T_a
0 mm	40 °C
17.5 mm	50 °C

9 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

A Declaration of Conformity in compliance with the above standards has been made and can be requested from Softing Industrial Automation GmbH.



ROHS

This product is ROHS compliant.



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

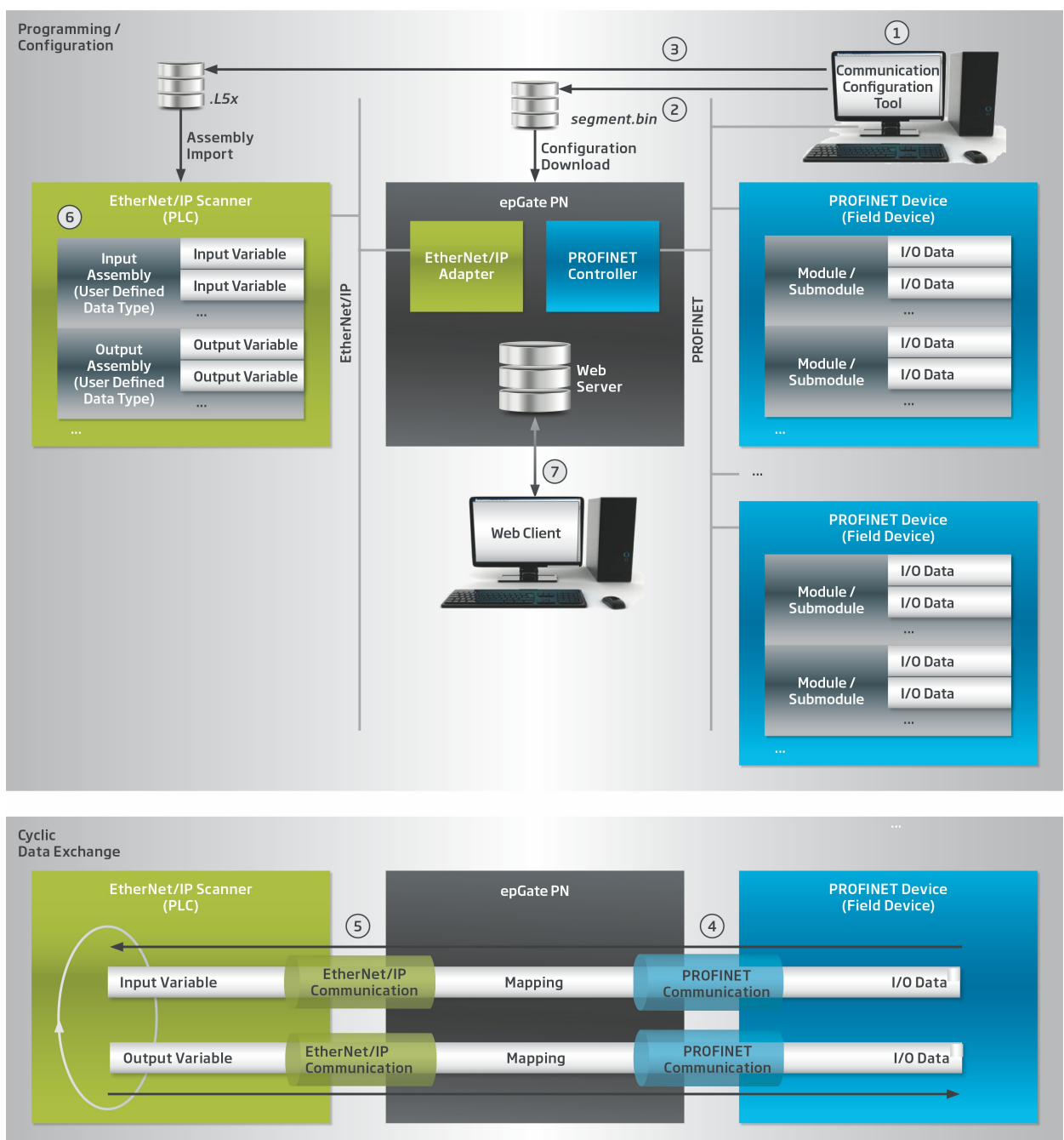
Electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime. Packaging material and worn components shall be disposed of according to the regulations applicable in the country of installation.

10 Appendix

10.1 The mindset behind epGate PN

The epGate PN implements functionality that allows the exchange of data between automation systems using PROFINET as communication means and automation systems using EtherNet/IP. The epGate PN implements a PROFINET Controller and an EtherNet/IP adapter. For detailed information about EtherNet/IP refer also to EtherNet/IP specification.

PROFINET is based on Ethernet. In a PROFINET system one or more controllers communicate cyclically and acyclically with one or more devices. The communication uses UDP/IP for non real time data exchange and pure Ethernet for real time data exchange. The functionality of a device is described by a specific GSDML file. For detailed information about PROFINET refer also to PROFINET specification. The following graphic shows an overview of communication and data exchange:



A configuration tool is used to define the way how controller and devices communicate with each other. Softing's Communication Configuration Tool (1) imports GSDML files to create a pool of device descriptions. The user of the tool selects a controller and devices from this pool to define the communication system. All PROFINET communication products have a unique MAC address. This address is assigned by the manufacturer of the device during production. Since UDP/IP is used as communication protocol, all devices must have an IP address. These addresses are defined by the user of the configuration tool and assigned to the devices by the controller at start up of the system. A third addressing that is called device name is used to reference devices independently from their MAC address. This device name is also assigned by the user of the configuration tool.

For details on how to interact with the Communication Configuration Tool refer also to the different descriptions in chapter Configuration [Configure PROFINET IO](#).

	Defined by	Assigned by	Example	Can be changed	Remarks
MAC address	Manufacturer	Manufacturer	00:3f:57:0a:bc:45	No	
Device name	User of configuration tool	Configuration tool	Temperature-sensor-01	Yes	In case of device replacement, a new device should have the same device name.
IP address	User of configuration tool	Controller	172.34.9.112	Yes	If the device has disappeared, controller tries to assign IP address. Controller searches for device with a defined device name.

In addition, the Communication Configuration Tool is used to define other aspects of communication such as cycle time for real time data exchange, structure of the device (selection of used modules) and parameter values. The system definition is downloaded to the controller (2). Both, the structure of this information and the way how it is downloaded, are proprietary for a specific pair of controller and configuration tool.

After receiving the configuration information, the controller application verifies its consistency. After this step, the controller first checks for the existence of the devices. It sends multicasts with the device name for each device in the configuration. Devices available will answer. In the next step the controller assigns the defined IP addresses. After having successfully finished, the controller establishes the connection. If the connection is established, data is exchanged cyclically. In addition to the epGate PN device, Softing's Communication Configuration Tool is also part of the complete product.

The configuration tool performs the above explained functions. The user defines the system and downloads the information to the gateway. Besides this configuration, the tool creates additional information and additional files (3).

PROFINET devices are structured in slots/modules. These are substructured into subslots/submodules which are again substructured into channels. IO data is assigned to channels. Today, devices support a number of modules, but in most of the cases only one submodule per module and one channel per submodule. Additionally, a status is assigned to each module during data exchange. There is a provider and a consumer status. All this information is contained in a frame which is exchanged cyclically (4).

EtherNet/IP uses assemblies to exchange IO data. EtherNet/IP has also defined a structure for assemblies. They only contain raw data (5).

It was the goal to provide as much information about the PROFINET devices and data as possible in the assemblies. Therefore, all IO data including the status is mapped into the assemblies. This means that the specific structure of an assembly depends on the structure of the PROFINET system and its devices. It would be possible to create such specific assemblies for each system. But this is not convenient. Therefore a different way has been selected.

There is one generic EDS that can always be used. It is installed by default in `..\Softing\epGatePN\EDS`. In addition to configuration and mapping information, the configuration tool creates an AOI for each assembly. This AOI contains UDTs that represent the mapping of the PROFINET system into the assembly. All variables of the AOI can be accessed from any Rockwell PLC program (6).

The mapping is described in a human readable file, that is also generated by the configuration tool. The same view is available at runtime from the gateway by using a web client. Additionally this web page contains the real data (7).

For details on how to use the web server interface refer also to Web Server Interface and front device label on housing:

**Note**

We strongly recommend connecting the two Ethernet interfaces to different networks (EtherNet/IP communication system and PROFINET communication system), see also [Connecting to network](#) and front device label on housing:

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