SIEMENS

Manual

SENTRON

SENTRON Powercenter 3000

Edition 11/2023

www.siemens.com/lowvoltage

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IoT data platforms
SENTRON Powercenter 3000

Equipment Manual

V1.8

11/2023
L1V30579222003-09

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens Aktiengesellschaft. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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℗ 11/2023 Subject to change

Table of contents

Introduction

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This manual contains all the information required to commission and use the SENTRON Powercenter 3000. It is aimed both at programmers and testers who commission the device themselves and connect them to other units, e.g. energy monitoring, automation systems or SCADA systems, and at service and maintenance technicians who install expansions or perform error analyses.

Required basic knowledge

In addition to knowledge about the design of a low-voltage power distribution system, basic knowledge of Ethernet technology and industrial communication is required.

Scope of validity of this document

This manual applies to all V1.x versions of the SENTRON Powercenter 3000.

Conventions

In this documentation, the term "device" is sometimes used instead of the product label SENTRON Powercenter 3000.

1.1 Reference documents

You can find further details in the following documents:

Title	Article number
Quick Installation Guide for SENTRON Powercenter 3000 (https://support.industry.siemens.com/cs/ww/en/view/109766001)	L1V30579222002

1.2 Further information

Find out about additional training courses on offer via the following links:

- Excel tool for creating annual reports based on the energy data archived by Powercenter 3000 (https://support.industry.siemens.com/cs/ww/en/view/109782120)
- Powercenter 3000 - Impressions of the system (https://www.youtube.com/watch?v=r9HSAysh9FY)

1.3 Technical Support

You can find further support on the Internet at:

TechnicalSupport (https://www.siemens.com/support-request)

Safety information

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2.1 General safety information

⚠ WARNING

The safety of a system in which the device is integrated is the responsibility of those who install the system.

There is danger of a malfunction resulting in death of serious injury.

- Ensure only qualified personnel perform work.

⚠ WARNING

Lethal voltage when the control cabinet is open.

If you install the device in a control cabinet, individual areas or components in the control cabinet might be carrying a lethal voltage. If you touch these areas or components, this can result in death due to electric shock.

- Disconnect the control cabinet completely so that it is dead before opening it.

System expansions

NOTICE

Damage due to system expansions

Device and system expansions can be faulty and affect the entire machine or plant. Installation of expansions can damage the device, machine or plant. Device or system expansions can violate safety rules and regulations relating to interference suppression.

The warranty is voided if you cause faults in the device due to installation or replacement of system expansions.

Battery

⚠ WARNING

Danger of explosion and danger of release of harmful substances

Improper handling of lithium batteries can result in explosion of the batteries.

Explosion of the batteries and the resulting release of harmful substances can result in serious injury. Worn batteries endanger the function of the device.

When handling lithium batteries, please note:

- Replace depleted batteries in a timely manner, see Replacing backup battery (Page 154).
- Replace the lithium battery only with identical types or types recommended by the manufacturer (Order No.: A5E34345932).
- Do not throw batteries into a fire, do not solder on the body of the cell, do not recharge, open, or short-circuit batteries, do not connect batteries with incorrect polarity, do not heat batteries above 100 °C (212 °F), and protect batteries from direct sunlight, humidity and condensation.

Radio-frequency radiation

NOTICE

Consider immunity to interference due to radio-frequency radiation

The device has enhanced immunity to interference caused by radio-frequency radiation in accordance with the electromagnetic compatibility specifications in the technical data.

Irradiation above the specified immunity levels can impair the function of the device, result in malfunctions and injury or damage to property.

Note the specifications for immunity to interference caused by radio-frequency radiation in the technical data.

2.2 Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit (https://www.siemens.com/global/en/products/automation/topic-areas/industrial-cybersecurity.html).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed at (https://www.siemens.com/cert):

2.3 Data protection

Siemens observes the principles of data protection, especially the rules on data minimization (privacy by design). For this product [SENTRON Powercenter 3000], that means: In respect of personal data, the product only processes / stores email addresses and their passwords which are required for the following functions:

- Sending data exports and reports
- Sending device alarms and service statuses
- Diagnostics data for support cases

The storage of data is expedient and limited to what is essential as those data are critical. The above-mentioned data are not stored in anonymized or pseudonymized form as otherwise the purpose cannot be achieved.

Our product does not provide for the automatic deletion of the above-mentioned data. If necessary, these can be deleted as required by resetting the product to its factory setting or deleting the configuration.

2.4 Information on use

NOTICE
Possible functional restrictions when the function of the plant has not been validated The device is tested and certified based on the technical standards. In rare cases, functional restrictions can occur during operation of your plant. To avoid functional restrictions, validate the correct function of the plant.

Note

Use in industry without additional protective measures

The device was designed for use in a normal industrial environment in accordance with IEC 60721-3-3.

NOTICE
Cleaning Clean the surface of the housing with a damp cloth and make sure that no water enters the interior of the device.

2.5 Open Source Software

This product, solution or service ("Product") contains third-party software components. These components are Open Source Software licensed under a license approved by the Open Source Initiative (https://www.opensource.org) or similar licenses as determined by SIEMENS ("OSS") and/or commercial or freeware software components. With respect to the OSS components, the applicable OSS license conditions prevail over any other terms and conditions covering the Product. The OSS portions of this Product are provided royalty-free and can be used at no charge.

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Siemens AG
Smart Infrastructure
Electrical Products
Technical Support
Postfach 10 09 53
93009 Regensburg
Germany

You will find Technical Support under (https://www.siemens.com/support-request).

Keyword: Open Source Request (please specify Product name and version, if applicable)

SIEMENS may charge a handling fee of up to 5 EUR to fulfil the request.

Warranty regarding further use of the Open Source Software

SIEMENS' warranty obligations are set forth in your agreement with SIEMENS. SIEMENS does not provide any warranty or technical support for this Product or any OSS components contained in it if they are modified or used in any manner not specified by SIEMENS. The license conditions may contain disclaimers that apply between you and the respective licensor. For the avoidance of doubt, SIEMENS does not make any warranty commitment on behalf of or binding upon any third-party licensor. The Open Source Software used in the product and the license agreements concerning this software can be found in the Readme_OSS.

You can find the readme OSS on the internal web server in the menu Information → Open Source Software (OSS) Components → "Open readme OSS" button.

Description

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3.1 Product description

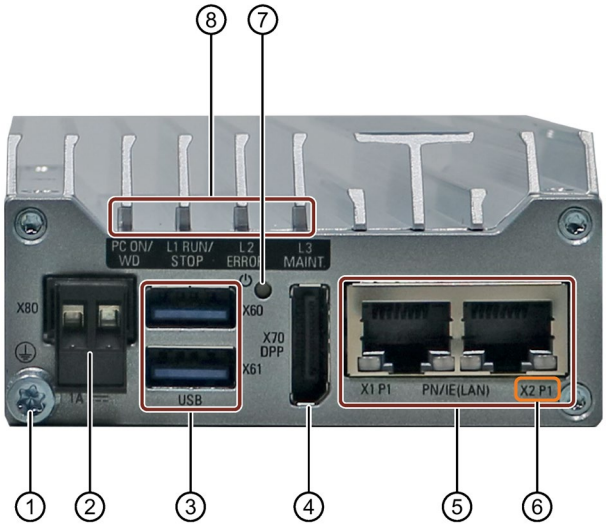
Overview

The SENTRON Powercenter 3000 has high industrial functionality.

- Compact dimensions
- Highly robust

3.2 Design of the devices

Interfaces and connections



① Ground connection
② Connection for the 24 V DC power supply
③ 2 x USB 3.0 port, high current
④ Not used
⑤ 2 x RJ45 Ethernet port X1P1 and X2P1 for 10/100/1000 Mbps
⑥ X2P1 Ethernet connection for first commissioning
⑦ On-off switch; for function, see Switching the device on/off (Page 39)
⑧ LED displays

Note

The device starts as soon as it is energized,

Because of this, there is no need to press the ON/OFF switch to switch on the device.

3.2.1 Operating displays of the devices

LED name	Status	Description
PC ON/WD	Off	No voltage
	Green	BIOS active
	Flashing green / yellow (4 Hz)	Power ON self-test
	Yellow	Idle state / shutdown
	Flashing red (4 Hz)	Hardware watchdog active
L1 RUN/STOP	Off	Not used
	Flashing green (2 Hz)	SENTRON Powercenter 3000 starting
	Green	SENTRON Powercenter 3000 active
	Yellow	Not used
L2 ERROR	Off	Not used
	Red	Serious error
	Yellow	Alarm
L3 MAINT	Off	Not used
	Flashing yellow (2 Hz)	Firmware updating (do not switch off), shutdown has been initiated
	Yellow	Not used
	Red	Not used
	Flashing red (4 Hz)	Factory reset has been started • Once the factory reset has been triggered, at first only the PC ON/WD LED lights up green. • It can take up to 4 minutes before the L1 RUN/STOP LED also lights up green. Only then is SENTRON Powercenter 3000 accessible again via the X2P1 interface at the IP address 192.168.1.2.
L1 RUN/STOP and L2 ERROR and L3 MAINT	Flashing yellow (2 Hz)	The device "identifies" itself. • An "Activate flashing mode" has been started via SENTRON powerconfig in the scan function: Ethernet. • The "Identify device" *) command has been executed via the web user interface.

*) See: Settings → Actions → Device

3.3 Accessories

This section contains the range of accessories available at the time of production of the manual.

Wall mounting	6AG4021-0AA20-0AA2
Upright mounting	6AG4021-0AA20-0AA3
Upright mounting on DIN rails	6AG4021-0AA20-0AA5
Lithium battery	A5E44491494

You will find further information on the Internet at:

- Service & Support (https://support.industry.siemens.com/cs/ww/en/)

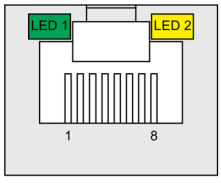
3.4 Hardware description

3.4.1 Data interfaces

Interface overview

Interface		Use	Description	
X1P1	Ethernet	Intranet	RJ45	10/100/1000 Mbps
X2P1	Ethernet	Smart assembly network	RJ45	10/100/1000 Mbps
X60	USB	Not used	USB channel	USB 3.0
X61	USB	Not used	USB channel	USB 3.0
X70	Not used			
X80	24 V DC	Power supply		

Ethernet interface



LED	Short code	Meaning
1	LED 1	Off: 10 Mbps Lights up green: 100 Mbps Lights up yellow: 1000 Mbps
2	LED 2	Lights up yellow: Connection established Flashing: Activity

Installing, connecting, commissioning

4

4.1 Preparing installation

4.1.1 Checking delivery

Procedure

1. When you receive the delivery, check the packaging for visible damage in transit.
2. If you discover damage in transit, lodge a complaint with the carrier responsible. Have the carrier confirm the damage in transit immediately.
3. Unpack the device at its destination.
4. Keep the original packaging for reshipping the device. See information on damage.

NOTICE
Damage to the device during transportation and storage If a device is transported or stored without packaging, shocks, vibrations, pressure and humidity act on the unprotected device. Damaged packaging is an indication that the environmental conditions have already had a large impact on the device. The device may be damaged. Do not dispose of the original packaging. Pack the device for transportation and storage.

5. Check that the package contents are complete and undamaged.

6. If the package contents are incomplete or damaged, or not exactly what was ordered, inform the responsible delivery service immediately.

NOTICE
Damaged device • Ensure that the damaged device is not installed and commissioned. • Label the damaged device and keep it locked away. • Send the device for repair immediately.

NOTICE
Damage due to condensation If the device has been exposed to low temperatures or extreme temperature fluctuations during transportation, e.g. in cold weather, moisture may have formed as condensation on or inside the device. Moisture causes short-circuits in electrical circuits and damages the device. To avoid damage, proceed as follows: • Store the device in a dry place. • Equalize the temperature of the device with room temperature before starting it up. • Do not expose the device to the direct radiated heat of a heater. • In the event of condensation, only switch on the device when it has completely dried or after a delay of approx. 12 hours.

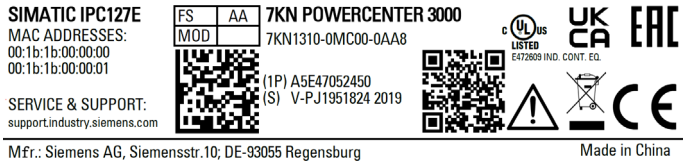
7. Also keep the supplied documentation in a safe place. It forms part of the device. When you commission the device for the first time, you will require the documentation.
8. Note the identification data of the device.

4.1.2 Identification data of the device

The identification data can be used to uniquely identify the device in case of repair or theft.

Enter the identification data of your rating plate in the following table.

Order number	7KN1310-0MC00-0AA8
Production version (FS)	
Serial number (S)	
Production version	
Ethernet address 1 (MAC)	
Ethernet address 2 (MAC)	



See also

Technical data (Page 169)

4.1.3 Permissible mounting positions

The following mounting positions are permitted:

- Upright mounting
- Upright mounting on DIN rails
- Wall mounting
- Mounting on DIN rails

Pay attention to the permissible temperature range for operation depending on the mounting position as stated in Technical data (Page 169).

Make sure that the following clearances are maintained from other components or an enclosure wall:

- Below the device: ≥ 50 mm (2 in.)
- Above the device: ≥ 50 mm (2 in.)

Order numbers for available mounting accessories:

Wall mounting: 6AG4021-0AA20-0AA2

Upright / wall mounting: 6AG4021-0AA20-0AA3

Upright mounting / DIN rail: 6AG4021-0AA20-0AA5

4.1.3.1 Upright mounting

The upright mounting is suitable for vertical mounting of the device. The mounting bracket provided for this permits space-saving installation with DIN rail and wall mounting.

Requirements

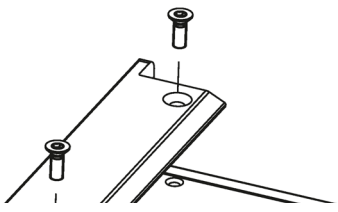
- Mounting bracket

Note

Use only the screws supplied to mount the mounting bracket. Longer screws can damage the interior of the device

- A T10 screwdriver
- Two wall plugs and two screws

Procedure – upright mounting



1. Place the mounting bracket on the mounting surface.
2. Mark out the mounting holes.
3. Drill the mounting holes.
4. Place the wall plugs in the drilled holes.
5. Fasten the mounting bracket with 2 screws.

6. Screw the device to the mounting bracket with the two screws supplied.

4.1.3.2 Upright mounting on DIN rails

Upright mounting on DIN rails is suitable for vertical mounting of the device. The mounting bracket for this permits space-saving installation with wall mounting.

Requirements

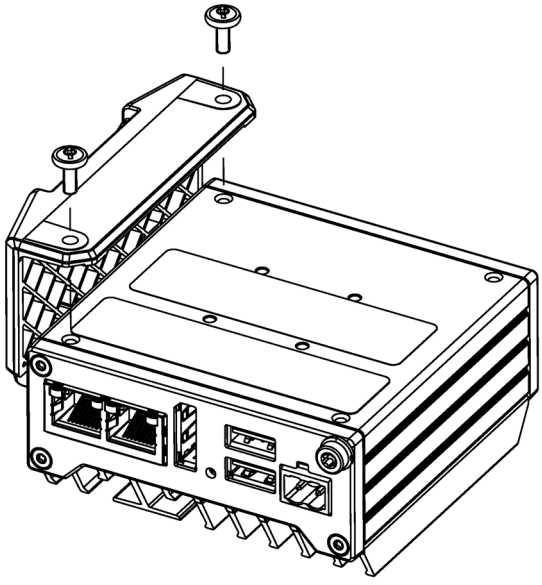
- Mounting bracket

Note

Use only the screws supplied to mount the mounting bracket. Longer screws can damage the interior of the device

- A T10 screwdriver
- Two wall plugs and two screws

Procedure – upright mounting on DIN rails



1. Place the mounting bracket on the rear of the device.
2. Fasten the mounting bracket with two screws supplied.
3. Place the device on the mounting bracket onto the DIN rail.

4.1.3.3 Wall mounting

The wall mounting is suitable for horizontal mounting of the device.

Requirements

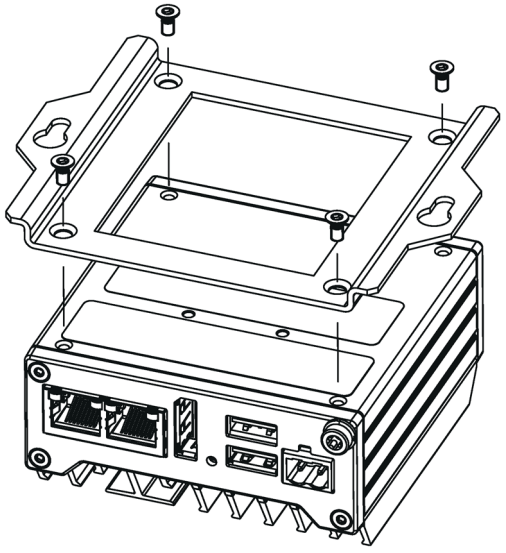
- Mounting bracket

Note

Use only the screws supplied to mount the mounting bracket. Longer screws can damage the interior of the device

- A T10 screwdriver
- Two wall plugs and two screws

Procedure – mounting



1. Mark out the mounting holes on the mounting surface.
2. Drill the mounting holes.
3. Place the wall plugs in the drilled holes.
4. Place the mounting bracket on the rear of the device. Pay attention to the orientation of the keyholes in the mounting bracket.
5. Fasten the mounting bracket with the 4 screws supplied.
6. Place the device with the mounting bracket onto the mounting surface.
7. Screw the device on.

4.1.3.4 Mounting on DIN rails

The standard rail mounting is suitable for horizontal and vertical mounting of the device.

Requirements

- A SIEMENS 35-mm DIN rail TH35-15 in accordance with EN 60715:2001
  The DIN rail is mounted.
- A DIN rail clip

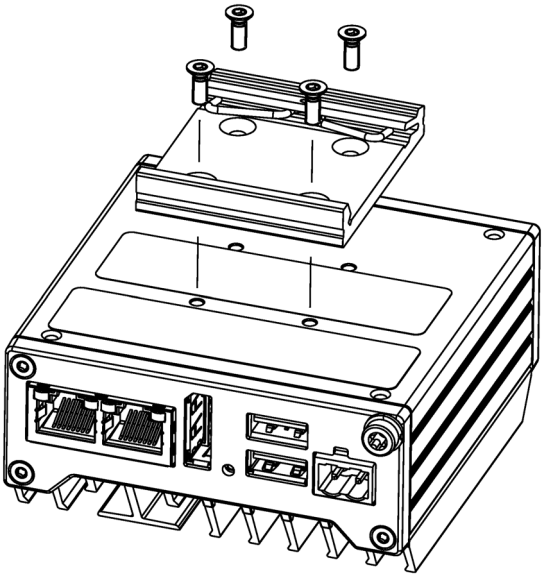
Note

Use only the screws supplied to mount the DIN rail clip. Longer screws can damage the interior of the device

Tools

- A T10 screwdriver

Procedure – mounting



1. Place the DIN rail on the rear of the device.
   Pay attention to the position of the springs of the DIN rail clip.
2. Fasten the DIN rail clip with the 4 screws supplied.
3. Place the device on the DIN rail clip onto the DIN rail from above.
   If you position the device so that it is skewed, the DIN rail clip will not engage.
4. Press the device downward onto the DIN rail until the DIN rail clip engages below.
5. Check that the device fits closely on the DIN rail.
6. For vertical standard rail mounting: Mount a DIN rail grounding clip below the device.

Procedure - removal

1. Press the device downward until the lower DIN rail guide releases the device.
2. Swing the device away from the DIN rail.
3. Remove the device.

See also

Dimensional drawing of basic device (Page 177)

4.2 Mounting the device

4.2.1 Mounting instructions

Note the following:

- The device is only approved for operation in closed rooms.

Mounting tips for power distribution boards:

- Maintain the largest possible clearance from the main circuit, e.g. mounting in the cross-wiring compartment.
- For increased temperature requirements, mount as low as possible in the power distribution board.
- Keep the control cables and power supply as short as possible and group them in a separate cable duct.
- Place the power supply as close as possible to the SENTRON Powercenter 3000.
- If possible, use one 24 VDC power supply to power several devices. The power supply should be protected with an appropriate miniature circuit breaker (MCB) or with SITOP selectivity modules SEL1200 / SEL1400. That increases the availability in case of faults of individual devices.

Alignment of the interfaces

In standard rail mounting, the interface side of the device can point either upward or downward, right or left.

4.3 Connecting the device

4.3.1 Instructions for connection

⚠ WARNING

Danger of fire and danger due to electric shock

The ON/OFF switch does not disconnect the device from the power supply. Danger of electric shock on incorrect opening of the device and on a device nonconformance. If the device or the connecting cables are damaged, there is also a danger of fire. This can result in death or serious injury.

Therefore protect yourself and the device as follows:

- When the device is not in use or is nonconforming, always pull out the power supply plug. The power supply plug must be easily accessible.
- Connect the device correctly with a ground conductor (see "Connecting the ground conductor (Page 33)").
- Use a main disconnect switch when installing the cabinets.
- When setting up the device, ensure that the disconnector is easily accessible.

⚠ WARNING

Danger due to lightning strike

Lightning can penetrate power cables and data transmission cables and flash over to a person.

Death, serious injury and burns can result from a lightning strike.

Take the following precautions:

- Disconnect the device from the power supply if a thunderstorm is approaching.
- Do not touch any power cables and data transmission cables during a thunderstorm.
- Keep a sufficient distance from electrical cables, distribution boards, installations, etc.

NOTICE
Fault due to peripheral devices/USB V3.0 devices Connection of peripheral devices can result in faults on the device. This can result in personal injury and damage to the machine or plant. Note the following when connecting peripheral devices/USB V3.0 devices: • Read the documentation of the peripheral devices/USB V3.0 devices. Follow the instructions in the documentation. • Connect only peripheral devices that are suitable for industrial use in accordance with EN 61000-6-2 and IEC 61000-6-2. • Peripheral devices that are not hotplug-capable must only be connected when the power supply of the device is switched off.

NOTICE
Damage due to power feedback Power feedback of voltage to ground through a connected or installed component can damage the device. Connected or installed peripheral devices, e.g. a USB drive, must not introduce voltage into the device. Power feedback is not permissible at all.

4.3.2 Connecting the ground conductor

A connected ground conductor conducts potentially hazardous electrical charges to the metal enclosure. The current flowing through the ground conductor in such a case trips the line-side fusing device that disconnects the device from the power supply.

Moreover, the ground conductor improves the conduction of interference that is transmitted via external power supply cables, signal cables, or cables to peripheral devices. The connection for the ground conductor is marked with the following symbol:

CAUTION

Minor injury and danger of fire

In the interior of a nonconforming device, a dangerous voltage may be present that causes a fire or an electric shock if touched.

- Connect the ground conductor first, before starting up the device.
- The ground conductor for the device must be connected to the ground conductor for the cabinet or the equipment in which the device is installed.
- Never operate the device without a ground conductor.
- Remove the nonconforming device from use immediately and label it as nonconforming.

Requirements

- T20 screwdriver
- Cable lug for M4
- Ground conductor with minimum conductor cross-section 2.5 mm^2 (12 AWG)

Procedure

1. Connect the cable lug to the ground conductor.
2. Connect the cable lug with the M4 thread firmly to the ground connection on the device (see marked position).
3. Connect the ground conductor to the ground connection for the cabinet or the equipment in which the device is installed.

4.3.3 Connecting the power supply

⚠ WARNING

Safety regulations - connecting cable

Use only DC connection cables that comply with the local safety regulations.

Otherwise, there is a danger of fire and danger due to electric shock. This can result in death, serious injury or damage to property.

- Make sure that the DC connection cables comply with the safety regulations of the country in which the device is installed and have the prescribed markings.
- Connect the ground conductor as described in the operating instructions.

Note

IEC/EN/UL 61010

Note the following if you are operating the device in accordance with IEC/EN/UL 61010-2-201:

- The device must only be connected to a 24 V DC power supply that meets the requirements of a safety extra low voltage (SELV/PELV) in accordance with IEC/EN/UL 61010-2-201.
- When operated outside an enclosure in accordance with UL/CSA 61010-2-201, the device must be supplied with NEC Class 2 or an energy-limited circuit in accordance with UL/CSA 61010-1.

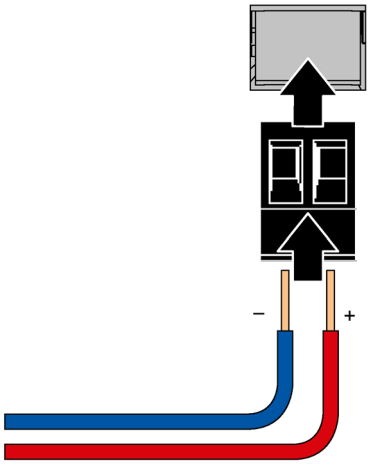
Note

The 24 VDC power supply must meet the voltage requirements specified in Technical data (Page 169).

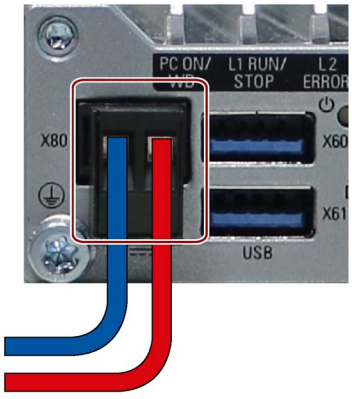
Requirements

- The ground conductor has been connected.
- You are using the terminal provided.
- A two-wire cable with a conductor cross-section for the 24 V DC connection of 0.75 mm^2 to 2.5 mm^2 (18 - 12 AWG).
- A flat-tip screwdriver with an approx. 3 mm (1/8 in.) blade.

Procedure



1. Switch off the 24 V DC power supply.
2. Connect the power supply cables to the marked position.



3. Connect the terminal to the marked position.

4.4 Connecting the device to networks

For integration into existing or planned system environments and networks, the following options are available.

Ethernet

You can use the integrated Ethernet interfaces (10/100/1000 Mbps) for communication with the devices and applications stated in Application examples (Page 131). You network the SENTRON Powercenter 3000 and other devices via Industrial Ethernet.

4.5 Commissioning a device

4.5.1 Instructions for commissioning

⚠ CAUTION

Danger of burns

The surface of some devices can reach a temperature of over 70 °C (160 °F). These devices are marked with labels indicating this.

- Touching without protection can result in burns.
- Avoid touching directly during operation.
- Only touch the device with suitable protective gloves.

Requirements

- The ground conductor has been connected.
- The device is connected to the power supply.
- The connecting cables are plugged in correctly.

4.5.2 Switching the device on/off

Procedure - switching the device on

The device starts as soon as 24 VDC is applied.

Note

The LED "PC ON/WD" lights up green.

You will find more information on the LEDs in Operating displays of the devices (Page 19).

Procedure - switching the device off

SENTRON Powercenter 3000 can be switched off with the ON/OFF switch (see Design of the devices (Page 18)) using a narrow object, e.g. a screwdriver.

1. Press briefly (less than one second) to shut down the device. Shutdown can take up to one minute.
   → The LED "PC ON/WD" lights up yellow.

   → The LED "MAINT" flashes yellow when shutdown has been initiated.
2. Press for longer than 5 seconds to switch off the device (power OFF).
   → The LED "PC ON/WD" lights up yellow. The power supply can now be disconnected. Alternatively, brief repeated pressing causes a restart of the SENTRON Powercenter 3000.
3. Press briefly 5 times until the LED "MAINT" flashes red to reset the device to the delivery condition. SENTRON Powercenter 3000 has to be commissioned again.

Further information

If the SENTRON Powercenter 3000 is disconnected from the power supply, the current processing status is backed up, if possible.

The time continues to be kept during the power failure for as long as the battery remains active.

4.6 Interfaces of the SENTRON Powercenter 3000

SENTRON Powercenter 3000 provides separate interfaces for external and internal communication, which have different communication options. These are explained below.

4.6.1 Internal Ethernet interface for the smart assembly network

Benefits: Through this interface, the SENTRON devices of a smart switchgear assembly (= smart assembly) are connected via Ethernet to a SENTRON Powercenter 3000.
For example:

- PAC1020, PAC1600 via Modbus TCP/RTU gateway
- PAC2200 / PAC2200CLP
- PAC3120 / PAC3100 via Modbus TCP/RTU gateway
- PAC3220 / PAC3200 / PAC3200T
- PAC4200, e.g.
  - As gateway
  - With I(N), I (Diff) expansion modules
  - With 4DI/2DO expansion modules

  Similarly for the archiving and monitoring of residual currents
- 3WL via COM16 via RS 485
- 3WL via COM35
- 3WA via Modbus TCP
- 3VA via COM100 / COM800
  - incl. condition monitoring with circuit breaker health indicator and remaining service life with V4.4 and higher
- Other Modbus devices and Modbus gateways
- SENTRON powerconfig (optional)
- Web user interface, e.g. HMI Panel. The default IP address on X2P1 is: 192.168.1.2
- Powercenter 1000 with the following CP-COM devices:
  - 5SL6 COM miniature circuit breaker with EM or RCM version
  - 5SV6 COM arc fault detection device
  - 5ST3 COM combined auxiliary switch and fault signal contact
  - 3NA COM fuse link
  - 5ST3 COM remote operating mechanism
  - 5TY COM electronic circuit protection device

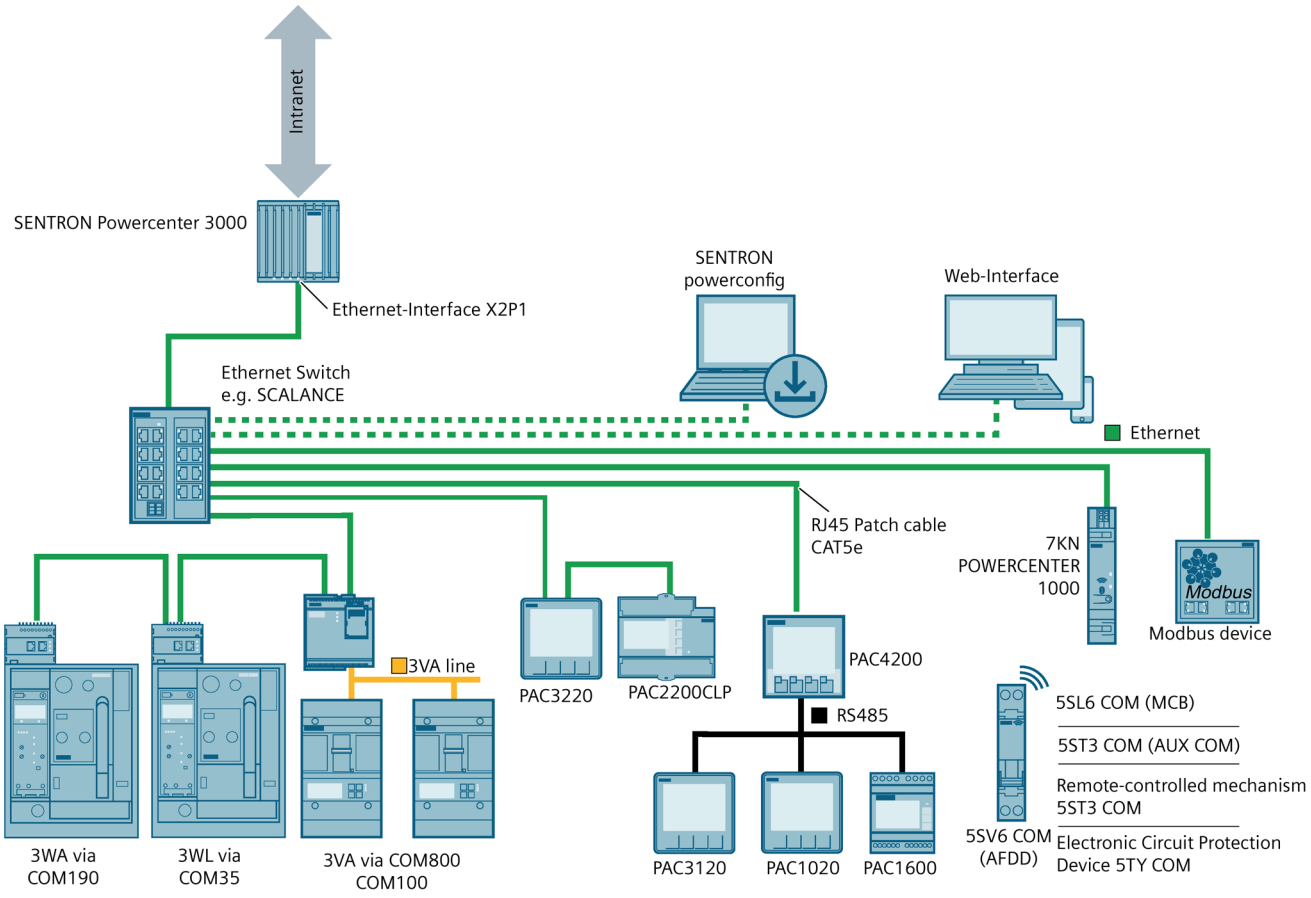
See also

ReadMe (https://support.industry.siemens.com/cs/ww/en/view/109762951)

4.6.1.1 Performance features of the smart assembly interface

- The devices are addressed via SENTRON Powercenter 3000 with one IP address only. This saves costs if the network infrastructure is charged based on IP addresses.
- The devices can be accessed with uniform security settings via the external interface. This saves administrative work and reduces errors due to missing security settings.
- The security measures (see Security features (Page 44)) of the internal interface are deactivated in the delivery condition.
- Date and time synchronization of the connected devices as the basis for digitalization.
- The internal Ethernet interface (X2 P1) must be used for first commissioning. This can be done via SENTRON powerconfig or alternatively via the web user interface.
- Transmission rates 10/1000 Mbps
- RJ45 socket (8P8C) on the underside of the device for RJ45 connector with EIA/TIA T568B assignment
- Auto negotiation
- MDI-X auto crossover
- Communication over Modbus TCP
- Interface with web browsers. Various browser types are supported.

Typical devices of a smart assembly network



The interface must be multiplied for the individual devices using an industrial-type Ethernet switch, e.g. SCALANCE. Some SENTRON devices, e.g. the Switched Ethernet PROFINET extension module, have 2 Ethernet ports. These devices can be directly connected using patch cables. This enables short cables to be used and reduces cabling work. If media redundancy is dispensed with within the smart switchgear assembly, the Ethernet interface X2P1 can be connected directly to the Ethernet interfaces of a Switched Ethernet PROFINET expansion module.

4.6.2 External Ethernet interface with the intranet

Benefits: The external Ethernet interface is the basis for integration of a smart switchgear assembly into IP communication and therefore into the digitalization.

Through this interface, detailed status and power monitoring and integration into the application (see Application examples (Page 131)) are possible.

Each of the services that are to be used has to be activated at the external interface. Default IP address to X1P1: 192.168.0.2

4.6.2.1 Performance features of the external Ethernet interface

- Powerful Ethernet interface with 10/100/1000 Mbps.
- Automatic network configurations, e.g. IP address, via DHCP
- Strong security functions (see Security features (Page 44)).
  The communications services of the external interface are deactivated as standard. This means that the required services must be explicitly activated for use.
- Interface with web browsers. Various browser types are supported.
- Interface with MindSphere, the Siemens operating system for the Internet of Things (IoT).
- MQTT interface to different cloud systems for SENTRON and other Modbus devices
- Support of application on other cloud systems.
- Modbus TCP communication with all connected devices.
- Periodic and explicit export from energy counters by email or file storage.
- Email service for event notification
- NTP for time synchronization
  - Time setting for the SENTRON Powercenter 3000
  - Time setting for the connected devices via SNTP
- Explicit setting of the time via Modbus (time synchronization service)

The external Ethernet interface has the same data transmission features as the internal interface. You will find more information under Application examples (Page 131).

See also

Internal Ethernet interface for the smart assembly network (Page 40)

4.7 Security features

The security features of a central communication device, such as SENTRON Powercenter 3000, provide protection against unauthorized access and require specific attention during use. In the same way that a lock on a door provides protection and is also an obstacle that can be overcome with the matching key.

Provided that the necessary security measures are applied, the security features protect the SENTRON Powercenter 3000 from unauthorized access.

For each application of the SENTRON Powercenter 3000, depending on the hazard potential and the operating environment, a decision must be made as to which security features will be used.

It is important to consistently disconnect the external network environment from the smart assembly network.

The smart assembly network must be physically protected, e.g. doors, sheet metal enclosures, locks, which must be protected from tampering. This network must never be connected to another network with unknown or insecure network nodes.

Each security measure can be selected via the web user interface → Settings → General for each Ethernet interface and each feature.

- On the X1P1 interface, security measures (hardening) are activated on delivery and can be deactivated.
- On the X2P1 interface, security features are deactivated on delivery and can be activated. For that reason, the X2P1 interface has to be used when the device is commissioned for the first time.

It should be noted that Siemens employees can access service functions via the web user interface in addition to the functions described in section Web user interface (Page 77).

4.7.1 Security performance features of the SENTRON Powercenter 3000

- **Signed firmware**: SENTRON Powercenter 3000 can be operated only with firmware signed by SIEMENS. This makes operation with corrupted or manipulated firmware impossible. Downgrading to firmware that may be faulty is not possible either.
- **Encrypted splx project file:** Projects can be exported in encrypted form in order to protect sensitive data, such as passwords. The exported splx file can also be protected with a password.

  Note

  If the project is to be used downstream in SENTRON powerconfig, version (see Compatibility matrix (Page 160)) or higher is required.

- **IP firewall**: In SENTRON Powercenter 3000, up to 5 different privileged IP addresses or IP subnets, the so-called firewall allowlist, can be selected. If this option is used, all further IP addresses/IP address ranges or subnets are excluded from communication if they are not entered in the firewall allowlist.

  Note

  An individual IP address is entered in CIDR notation (Classless Inter-Domain Routing): xxx.xxx.xxx.xxx/32, e.g. for 192.168.10.15/32.

  The IP subnet is entered as follows: xxx.xxx.xxx.xxx/24 and therefore e.g. for IP address range 192.168.10.1 to 192.168.10.254

  If more than 5 explicit IP addresses are required, the applications (=IP addresses) can be grouped together into one IP subnet (IP address range), which is then specified.

- **Secure MindSphere communication**: With the secure login process defined for MindSphere and the exchange of electronic keys defined for this, communication with MindSphere is encrypted. Communication with MindSphere can be initiated only from the SENTRON Powercenter 3000, not the reverse.
- **Selectable TCP ports**: Spying and analysis of the communication is typically performed by identification of the ports. If attacks of this kind are possible, another port can be chosen. The port must be adapted on both communication partners.
- **Encrypted communication** with MindSphere and other clouds.
- **Services that are not required**: Every service is a point of attack, so services that are currently not used should be deactivated.
  - Identification service can be deactivated. It is then not possible to locate or identify SENTRON Powercenter 3000 via the interface with SENTRON powerconfig.
  - Modbus TCP gateway can be deactivated or not started automatically. SENTRON Powercenter 3000 can then no longer be used as a Modbus TCP gateway by other applications such as powermanager or SENTRON powerconfig.
  - Web user interface can be deactivated. SENTRON Powercenter 3000 cannot then be accessed via the interface with web browsers and it is therefore no longer possible to manipulate it via "Settings".

- **Write protection for the web user interface on the external interface X1P1:** For the web user interface on the external Ethernet interface X1P1, web server write protection can be deactivated / activated under Settings → General, in the area "External Communication (X1P1)". Write protection is activated on delivery.
- **Login for the web user interface:** For the web user interface on the internal and external Ethernet interface, a login for admin and guest can be activated / deactivated under Settings → General, in the area "Communication".
  The login is deactivated on delivery. After activation, the web user interface switches to encrypted communication via https.
- **Security tests**: SENTRON Powercenter 3000 is regularly subjected to security tests and is certified to Achilles Level 2.

  Further information on the scope of the Achilles certification tests can be found under the following link (https://support.industry.siemens.com/cs/us/en/view/109816857).

  The latest certificate can be downloaded here (https://support.industry.siemens.com/cs/us/en/view/109822202).
- **Continuous vulnerability management**: For the SENTRON Powercenter 3000, as for many other Siemens devices, continuous vulnerability management is set up. This means that if security vulnerabilities are found in individual program sections, they are published via Siemens ProductCERT and rectified as soon as possible in a firmware update.

The following services must be considered in the external network environment:

Service	Layer 3 / 4	Layer 7	SENTRON Powercenter 3000		Remote Partner	
			Port	Interface	Host	Port
Data transfer to MindSphere	TCP	https	-	X1P1	MindSphere	433
Web user interface	TCP	http	Def. 80 *)	X1P1 & X2P1	-	-
	TCP	https	Def. 443	X1P1 & X2P1	-	-
Modbus TCP gateway	TCP	Modbus TCP	Def. 502 *)	X1P1 & X2P1	-	-
Time synchronization (client)	UDP	NTP	-	X1P1 & X2P1	-	123
Time synchronization (server)	UDP	NTP	-	X1P1 & X2P1	-	123
Identification service	UDP		17008	X1P1 & X2P1	-	17009
Name resolution in the local subnet	UDP	LLMNR	5355	X1P1 & X2P1	-	-
MQTT Cloud Service	TCP	MQTT via TLS	-	X1P1	Cloud	8883 *)
	TCP	MQTT	-	X1P1	Cloud	1883 *)
Checking internet connectivity	ICMP	Ping	-	-	8.8.8.8	-
Checking DNS configuration (siemens.com)	UDP	DNS	-	-	<DNS>	53

*) adjustable

4.7.2 Further recommended security measures

The security disclaimer always applies, see Security instructions.

Nevertheless, SENTRON Powercenter 3000 provides the most important security features for operation in an intranet.

Moreover, the following measures are recommended against attacks from the Internet, using special devices such as Ethernet switches or IP routers:

- **Firewall**: A firewall restricts data traffic in a network to that which is strictly necessary. Data traffic that is not required is filtered out. This substantially reduces vulnerability to attack. A firewall must be configured for this. E.g. only the necessary ports are enabled (see table in Security features on the external Ethernet interface (Page 45)). Depending on the quality and care in setup of the firewall, unknown / non-permitted subnet and IP addresses can filtered out.
  The firewall functions are typically located in a central router or Ethernet switch, e.g. SCALANCE **xxx**.
  SENTRON Powercenter 3000 already offers firewall subfunctions (firewall allowlist). You will find more information in the IP filter section in Security features on the external Ethernet interface (Page 45).
- **VPN**: VPN is the abbreviation for "Virtual Private Network" and refers to a logically self-contained network. A VPN connects a few known network nodes via encrypted communication via a larger, potentially insecure network, e.g. Internet. If the web user interface of the SENTRON Powercenter 3000 can be accessed via the Internet, we strongly recommend establishing a VPN connection between the web client (device on which the web browser is running) and the router.
- **Physical access protection**: Unauthorized access or manipulation of networks and electronic devices is possible without leaving visible traces. For that reason, physical access protection for the installed SENTRON Powercenter 3000 is necessary. The SENTRON Powercenter 3000 should also be protected from unauthorized access when it is not installed, because the device could be manipulated without leaving visible traces. For example, services could be activated at the external interface in order to be misused later.
- **Device-specific passwords, accounts and certificates:** In order to reduce the risks of a cyber attack on distribution cabinets and systems, for secure operation all passwords, email accounts and certificates must be allocated device-specifically, i.e. each device must be given its own certificate, password and email account. On decommissioning, these accounts must be deactivated in the systems concerned.

Functions

5

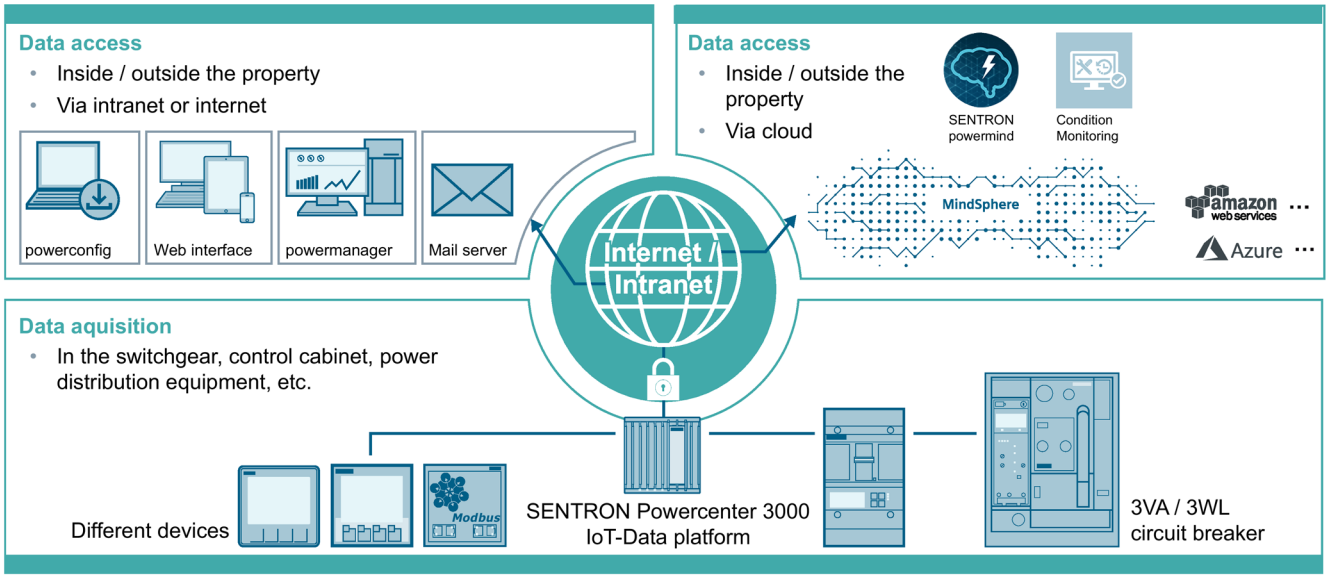
As energy, operating and investment costs steadily increase, it is important for operators to keep track of actual power consumption and the status of the power distribution board.

The SENTRON Powercenter 3000 provides numerous important functions for this.

For greater clarity, these functions can be assigned to one or several types of application:

Function overview of the SENTRON Powercenter 3000	
Digital documentation	• Automatic reference to the product-specific information.
User specific maintenance	• Display of warnings and statuses of all connected protection and measuring devices • Export and display of the 10-second average values of the previous 24 hours using the archive charts • Prompt information about exceptional situations via email and web user interface
Power management	• View of the demand and energy values • Display of the demand curves • Support of ISO 50001 through the periodic or explicit export of the 15-minute energy values of all connected devices of the previous year • Very easy integration of the connected devices into the MindSphere application powermind
Exception notification	• The user is notified about definable exceptional situations using an information service, e.g. email.
Optimization and retrofit	• The function and security measures of devices already installed can be enhanced with the SENTRON Powercenter 3000. • Access to all devices of the smart switchgear assembly via an IP address ≙ Routing • Several Modbus TCP connections (≙ Modbus Master) can access the devices via a RS485 / Modbus RTU interface.
Easy to use	• Shared web user interface as a local display for all connected devices • MindSphere connection for all devices in the smart switchgear assembly
Open interfaces	• A wide variety of devices can be integrated into the applications of the SENTRON Powercenter 3000 via Modbus TCP. • Various cloud applications can be expanded with the SENTRON Powercenter 3000 and connected devices.
Security	• Login for the web user interface using https (http via TLS [Transport Layer Security]) • Firewall functions and encrypted communication, e.g. MQTT via TLS. See section Security features (Page 44)

The SENTRON Powercenter 3000 provides a secure and universal communication interface for all specified functions.



The external and internal communication interfaces have been deliberately separated to ensure the security and functional independence.

The device types mentioned in "Internal Ethernet interface for the smart assembly network (Page 40)" are supported in SENTRON Powercenter 3000. In future versions, additional device types will be supported.

5.1 Commissioning

5.1.1 Establishing a connection to the device prior to commissioning

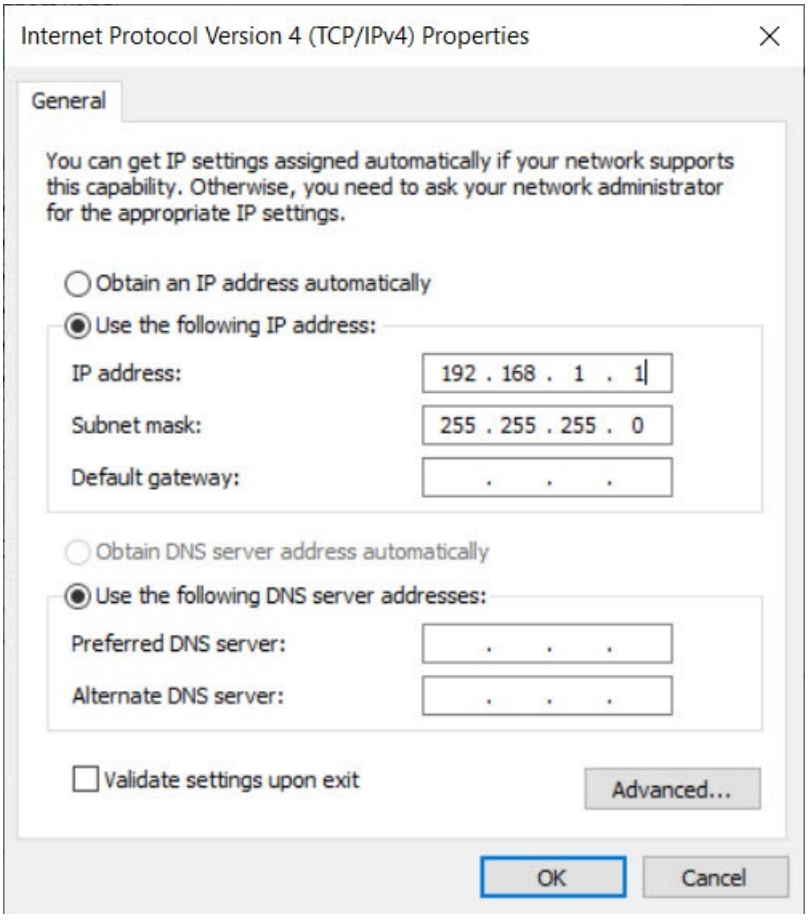
When delivered, the SENTRON Powercenter 3000 is configured such that parameterization is possible only via the X2P1 network interface with the default IP address 192.168.1.2.

The following options are available for changing the IP address.

Connect to the engineering PC and web user interface

Connect the X2P1 interface of the SENTRON Powercenter 3000 to the local network interface of your engineering PC.

Now open the settings of your network adapter and change the IP address to **192.168.1.x** and the subnet mask to 255.255.255.0 to enable communication.

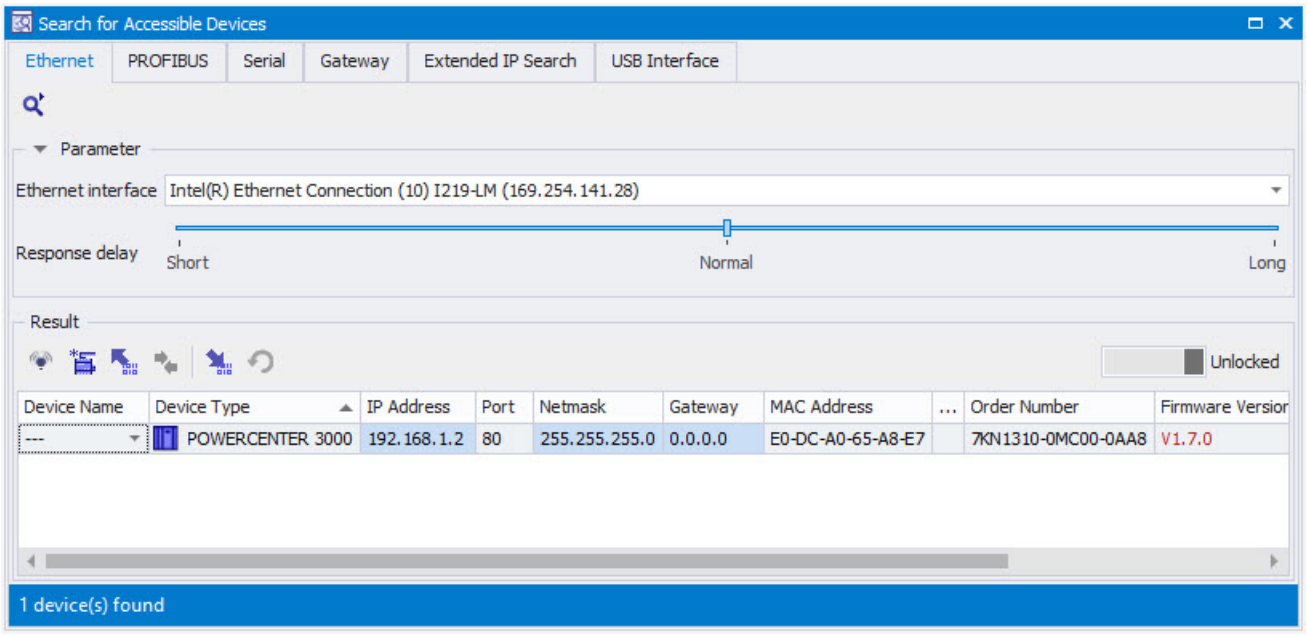


Now open the web browser and type **http://192.168.1.2** into the address bar. In the web user interface, set the parameters of both network interfaces in the Communication tab under the Settings menu.

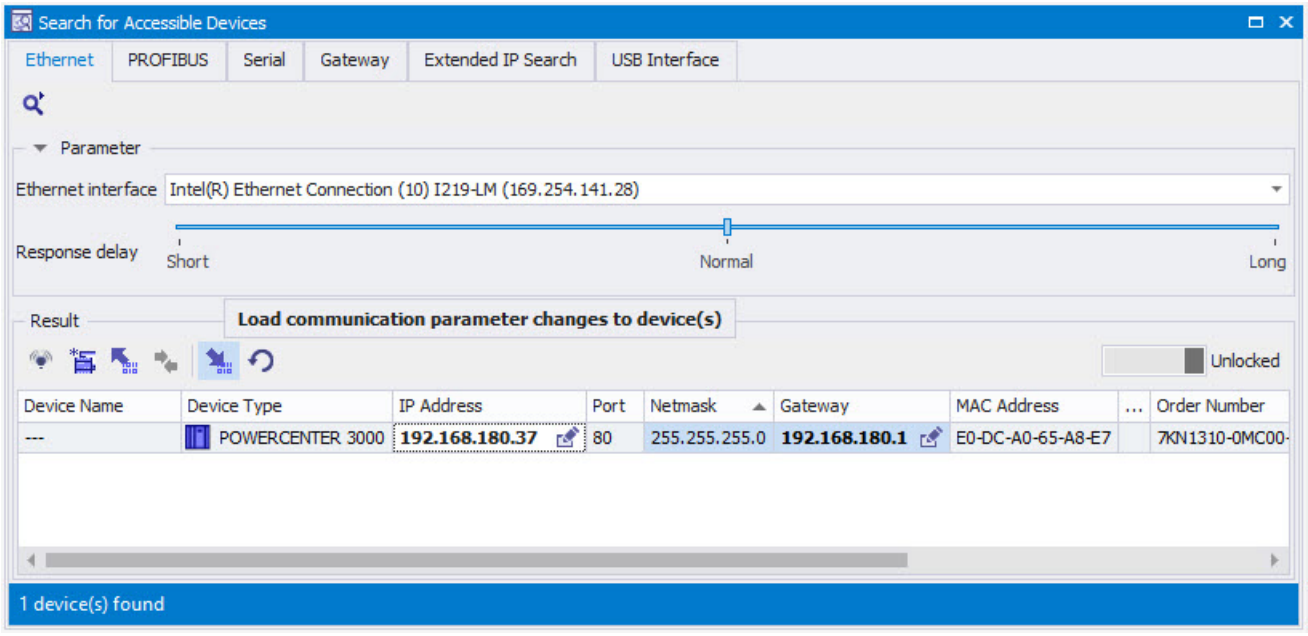
Assign a new IP address via the powerconfig network scan

Connect the X2P1 internal Ethernet interface of the SENTRON Powercenter 3000 to the plant network and ensure that a network connection with your engineering PC is possible.

Start SENTRON powerconfig and perform an Ethernet network scan. Thanks to the scanning method of the connectionless IP protocol, the SENTRON Powercenter 3000 is identified even if the IP configuration does not yet match the subnet.



The IP address, subnet mask and gateway can be changed as long as you set the switch to "Unlocked". Then load the changed communication parameters onto the device.



5.1.2 Commissioning

The following procedures are available for commissioning SENTRON Powercenter 3000:

- Commissioning in the web user interface via network scan or manual addition of devices
- Commissioning with SENTRON powerconfig

You will find more information in FAQs (Page 159).

In low-voltage power distribution systems, not only SENTRON devices but other Modbus devices are frequently used, either because they are already installed or because they provide more additional functions, such as inputs/outputs or motor control functions.

The SENTRON Powercenter 3000 provides integrated services for the devices of a low-voltage power distribution system.

See section

- Web user interface (Page 77)
- Exporting recorded data (Page 92)
- Communication with MindSphere (Page 107)
- Cloud service with MQTT (Page 115)
- The SENTRON Powercenter 3000 as a Modbus gateway (Page 125)
- Time synchronization (Page 128) if supported by the Modbus device.

To ensure that these services can be offered for other Modbus devices too, they must be provided with comparable information to the SENTRON devices in SENTRON powerconfig ≥ V3.15.

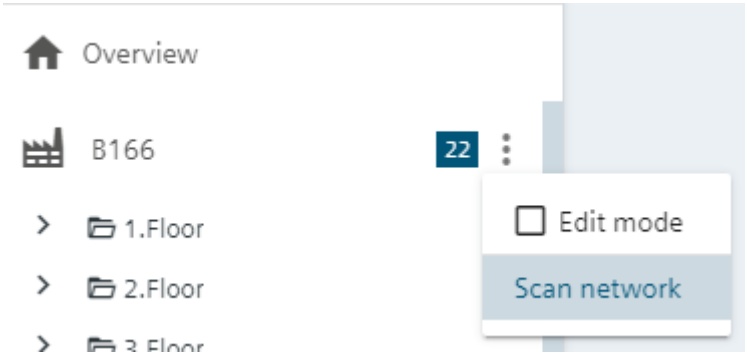
5.1.3 Commissioning via SENTRON Powercenter 3000 web user interface

5.1.3.1 Commissioning by means of network scan

To commission the SENTRON Powercenter 3000 by means of a network scan, proceed as follows:

- Click the three dots in the top line.

  A context menu appears:



- Click "Scan network".
- Select the network interface (X1 or X2) from where you want to run the scan. The scan takes place in two separate steps:

  First all the devices are scanned by means of a broadcast for the selected interface.

  In the second step, all the subordinate devices are scanned for.

  – Devices below the PAC4200: Brute-force scan via Modbus addresses 1-247 to find all the connected serial devices.

  – Devices below the COM800/COM100: 3VA

  – Devices below the SENTRON Powercenter 1000 (the devices listed below do not count towards the 32-device limit):

    - 5SL6 miniature circuit breaker

    - 5SV6 arc fault detection device

    - 5ST3 combined auxiliary switch and fault signal contact

    - 3NA fuse link

    - 5ST3 COM remote operating mechanism

    - 5TY COM electronic circuit protection device

During the scan, all devices currently supported by SENTRON Powercenter 3000 are detected (see Interfaces of the SENTRON Powercenter 3000 (Page 40)).

Note

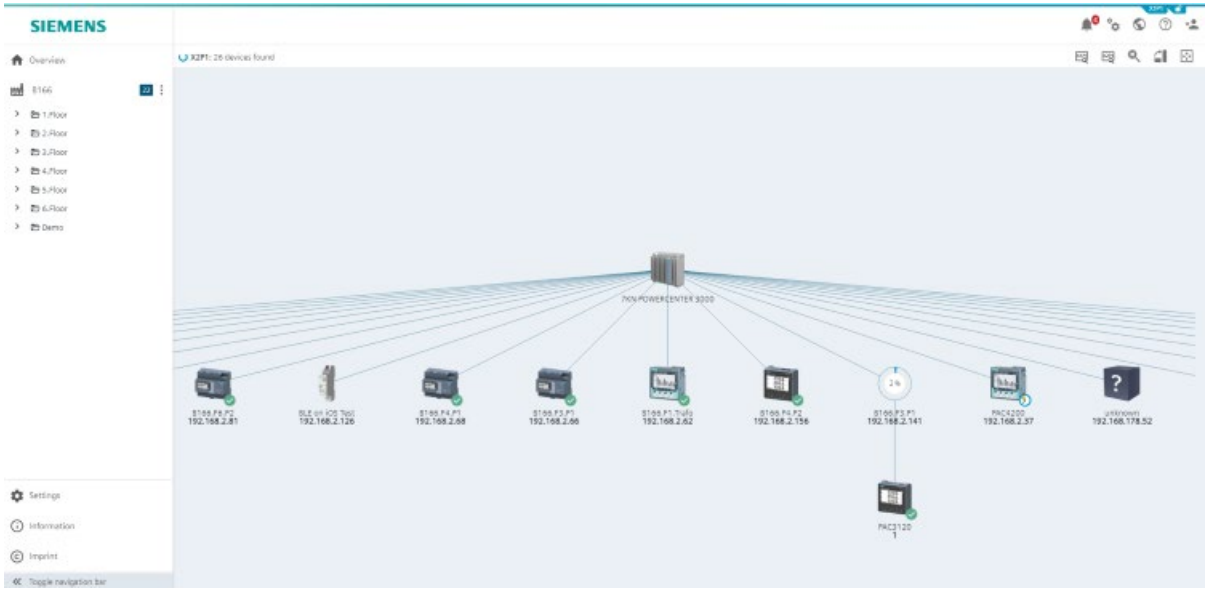
In the basic configuration, Powercenter 3000 supports a total of 32 devices.

Licenses can be used to expand the device limit by 10, 20, 50 or 100. See section Installation of upgrade licenses for SENTRON Powercenter 3000 (Page 163).

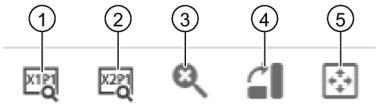
The maximum number of devices supported is 212.

Display of the network diagram

The scan results are displayed in the form of a network diagram:



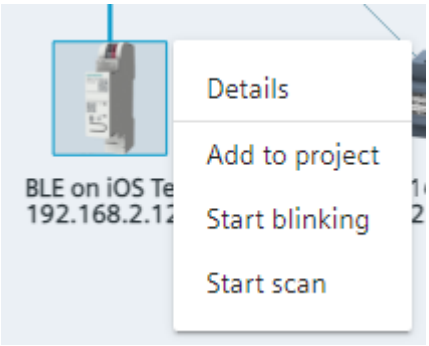
The following functions are available in the toolbar:



- Click buttons ① and ② to start a new scan for X1 or X2.
- Click button ③ to interrupt a running scan.
- Click button ④ to rotate the network by 90°.
- Use button ⑤ to center the display.

When a scan is running in a subnode, a progress indicator appears at this node.

Features at network nodes



Details

Display of detailed information about the specific network node:

Add to project

You can add a device to the project if it is not included in the project tree and has no green check mark.

To do this, click "Add to project" in the context menu of the network node.
The new devices are not included in services that are already running immediately, the service will have to be restarted. For example, a new device created cannot be accessed directly via the Modbus gateway.

Projects that are already included in the project are marked with a green check mark and cannot be added to the project again.

Start flashing

The selected device changes to blinking (flashing) mode.

Start scan

The scan can be restarted manually with gateway devices.

Cancel scan

When a gateway scan is running, the scan can be interrupted.

Select device

Use the function "Select device" to call up the device view of the selected device.

Exception: Generic Modbus devices

Generic Modbus devices are not detected as nodes.

There are two different variants for commissioning generic Modbus devices.

Variant 1: You must add the device to the project manually in SENTRON powerconfig. To do this, proceed as follows:

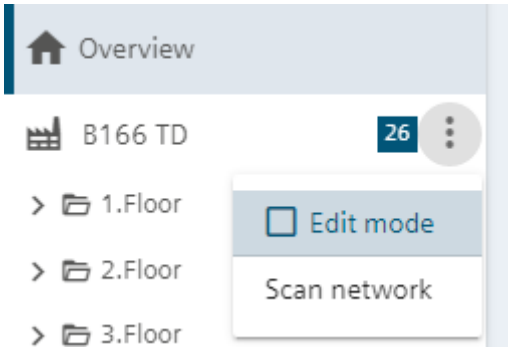
1. Export the project.
2. Add the generic Modbus device to the project in SENTRON powerconfig.
3. Import the project.

Variant 2: Import a Modbus device type and then create the device as an instance. You can find the exact procedure in section Integrating Modbus devices via type import (Page 60).

5.1.3.2 Commissioning by adding devices manually

To add a device manually, proceed as follows:

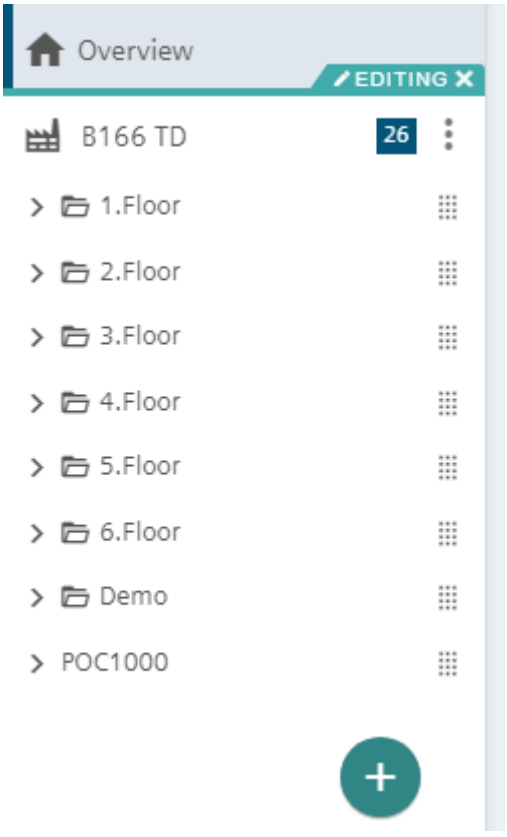
1. Click the three dots in the top line.
   A shortcut menu appears:



2. Set a check mark next to "Edit mode".

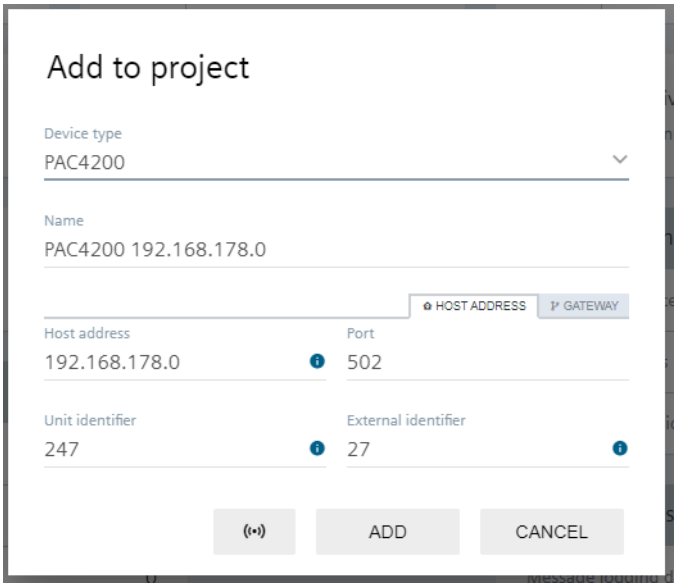
   Edit mode is activated.

3. Click the "+" button.

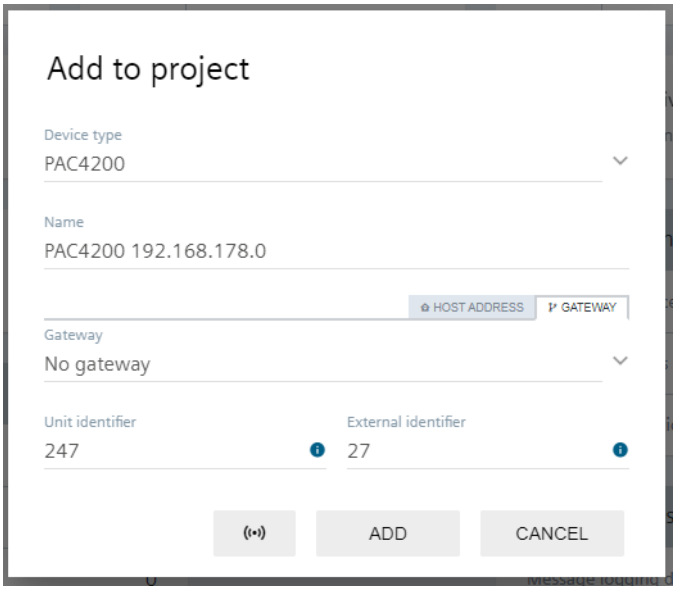


The window "Add to project" appears.

4. Select the Device type and assign a Name.
Under the "Host address" tab, enter the communication parameters for Host address, Port, Unit identifier and External identifier.



5. Click the "Gateway" tab and select the gateway.



6. Click the "Ping" button.
   The device is scanned and the network settings checked. The check can take several seconds depending on the network.
   If the check was successful, the brief message "Action completed successfully" appears. Otherwise, the message "Connection failed" is displayed. In that case, check the communication parameters used and whether the device is in operation.
7. Click the "Add" button.
   The device is added to the project and appears in the navigation area under the project name.
8. To exit edit mode, click the x in the display.

5.1.3.3 Integrating Modbus devices via type import

If several Modbus devices of a third-party manufacturer are to be integrated, it is recommended that the additional tool **Power Device Engineer** be used to define a device type in which all data points are defined centrally. This eliminates the need for time-consuming editing in powerconfig.

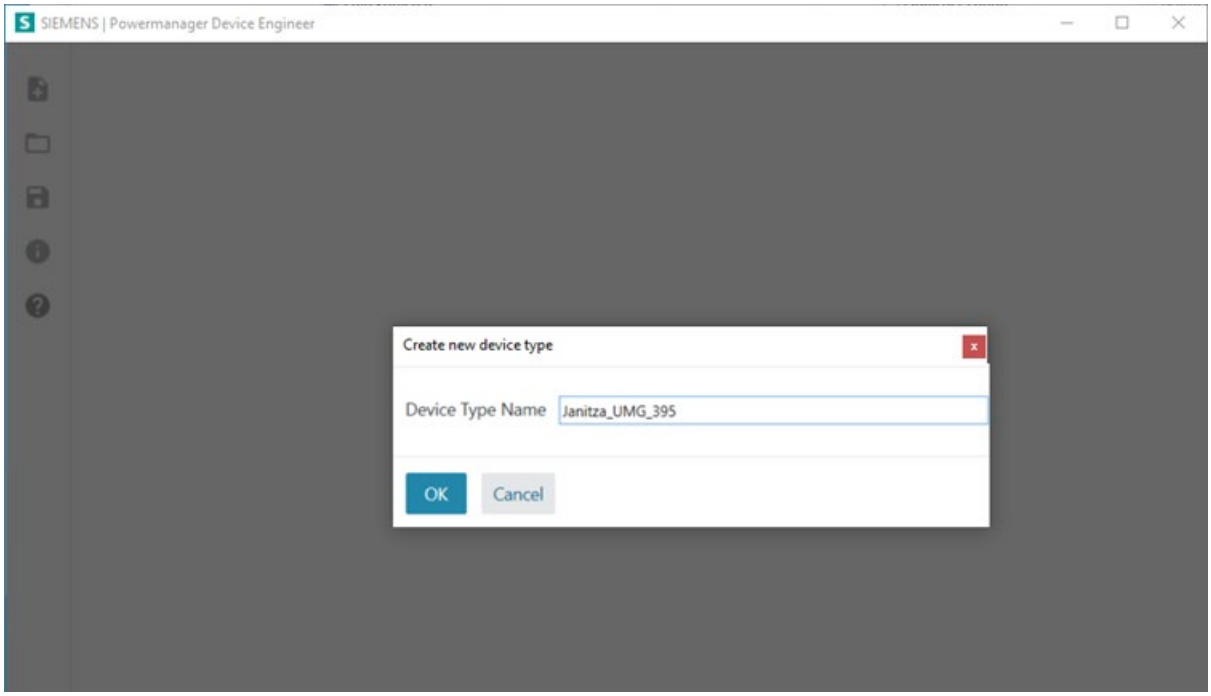
Advantages:

- Visibility of the device subtype in POC3000 (instead of just generic Modbus type)
- Modifications can be made to data points by re-importing the type
- All devices of this type have the same data points

You can find the Power Device Engineer tool on the download page (https://support.industry.siemens.com/cs/document/109814517/update-version-sentron-power-device-engineer-v7-0?dti=0&lc=en-WW) with the current firmware version of SENTRON Powercenter 3000.

Create Modbus device type

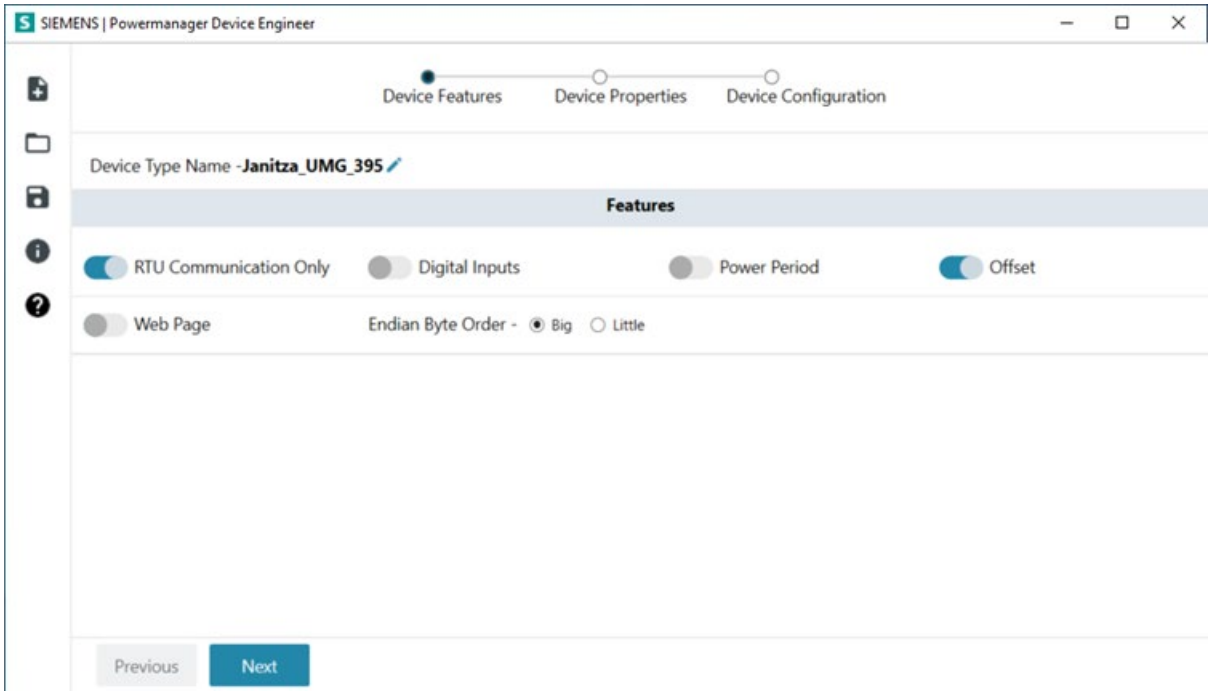
Start the **Power Device Engineer** application and click on the **Create new device type** button. Enter an appropriate name for the new device type.



The **Device Features** step is opened.

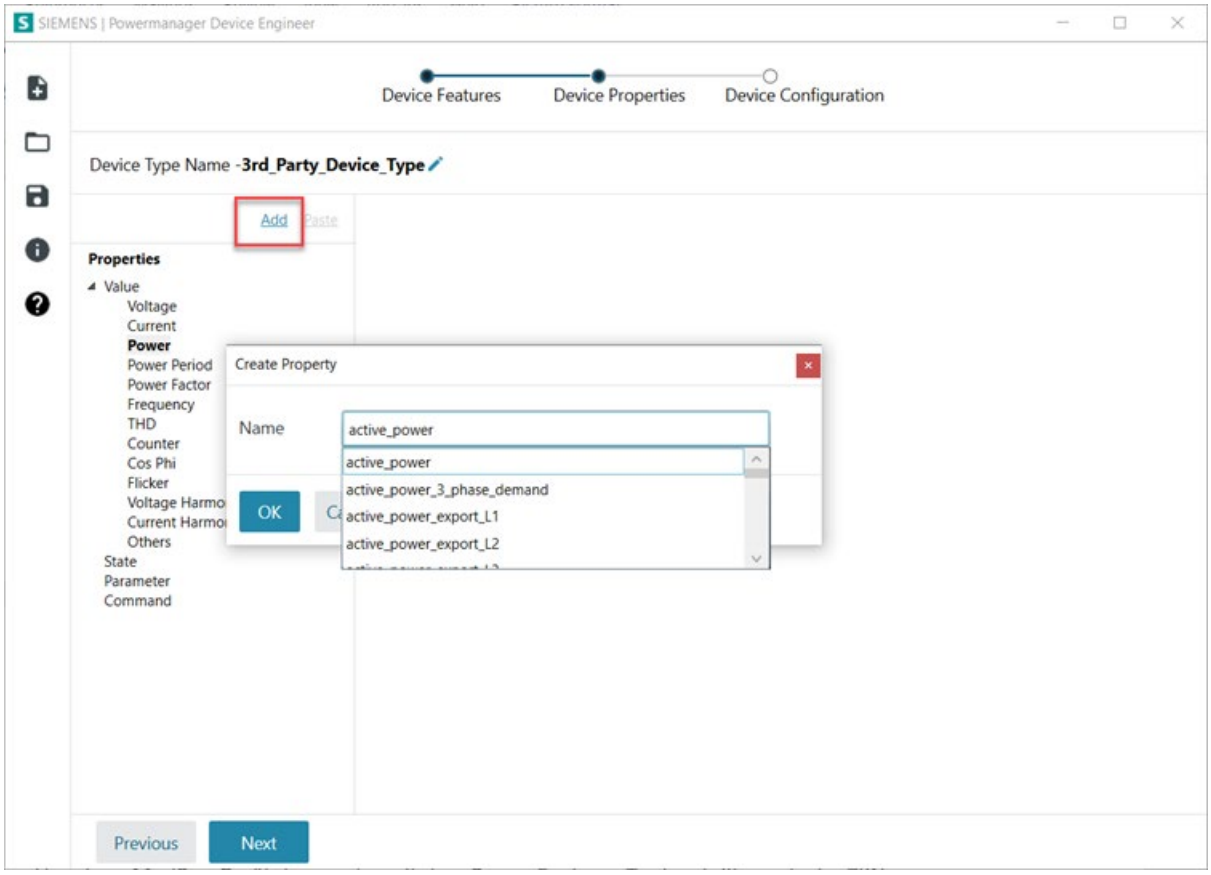
The following settings are relevant for import in the SENTRON Powercenter 3000:

- "RTU Communication Only" specifies that the device supplies the data via a serial communication, e.g. Modbus RTU.
- "Offset" causes the value "1" to always be subtracted in the register addressing of the data points.
- "Endian Byte Order" - only "Big" is supported.



The next step is to edit the data points of the Modbus device.

This takes place in the **Properties** section. Data points are created only below the predefined groups, such as "Voltage", "Current", "Power", etc.



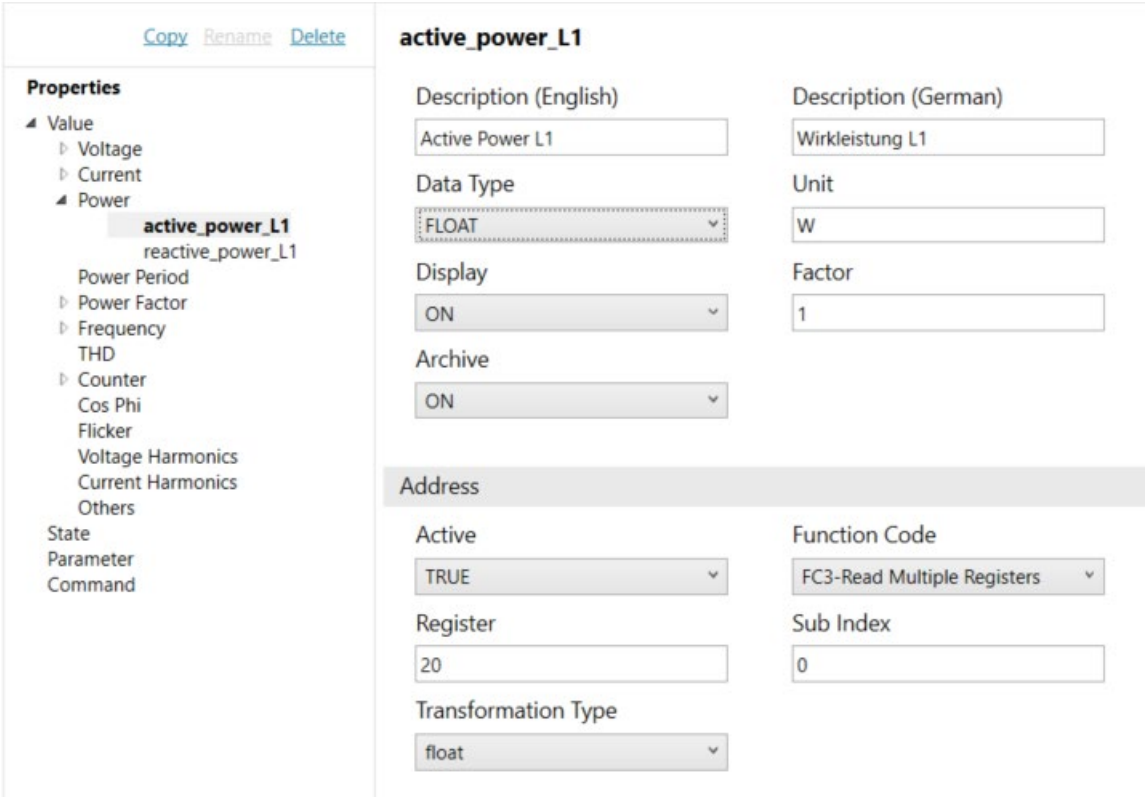
Click on "Add" to add a data point. During input of a new data point name, a drop-down list appears with suggestions for known data point names.

The suggested data point names conform to the naming system for the sister product Powermanager. For Powercenter 3000, the names specified below from the "Uniform name" column should be used:

Uniform name	Category	Period	Data type	Unit	German data point name	Powercenter use	
						Energy data export	Powermind
ACTIVE_ENERGY_EXPORT_TARIFF1	Energy	15min	float	Wh	Active energy exported at tariff 1	x	x
ACTIVE_ENERGY_EXPORT_TARIFF2	Energy	15min	float	Wh	Active energy exported at tariff 2	x	-
ACTIVE_ENERGY_IMPORT_TARIFF1	Energy	15min	float	Wh	Active energy imported at tariff 1	x	-
ACTIVE_ENERGY_IMPORT_TARIFF2	Energy	15min	float	Wh	Active energy imported at tariff 2	x	-
REACTIVE_ENERGY_EXPORT_TARIFF1	Energy	15min	float	varh	Reactive energy exported at tariff 1	x	-
REACTIVE_ENERGY_EXPORT_TARIFF2	Energy	15min	float	varh	Reactive energy exported at tariff 2	x	-
REACTIVE_ENERGY_IMPORT_TARIFF1	Energy	15min	float	varh	Reactive energy imported at tariff 1	x	-
REACTIVE_ENERGY_IMPORT_TARIFF2	Energy	15min	float	varh	Reactive energy imported at tariff 2	x	-
ACTIVE_POWER_CUMULATED_IMPORT_ACT_PERIOD	Energy	15min	float	W	Cumulated active power import in the current measuring period	-	x
ACTIVE_POWER_ACT_PERIOD_MIN	Energy	15min	float	W	Minimum active power in the current measuring period	-	x
ACTIVE_POWER_ACT_PERIOD_MAX	Energy	15min	float	W	Maximum active power in the current measuring period	-	x
ACTIVE_POWER	Energy	instanta-neous	float	W	Total active power	-	x
APPARENT_POWER	Energy	instanta-neous	float	VA	Total apparent power	-	x
POWER_FACTOR	Energy	instanta-neous	float	-	Total power factor	-	x

Uniform name	Category	Period	Data	Unit	German data point	Powercenter use	
ACTIVE_POWER_MAX	Energy	instanta-neous	float	W	Maximum total active power	-	x
APPARENT_POWER_MAX	Energy	instanta-neous	float	VA	Maximum total apparent power	-	x
POWER_FACTOR_MAXTS	Energy	instanta-neous	float	-	Maximum total power factor	-	x
ACTIVE_POWER_MIN	Energy	instanta-neous	float	W	Minimum total active power	-	x
APPARENT_POWER_MIN	Energy	instanta-neous	float	VA	Minimum total apparent power	-	x
POWER_FACTOR_MINTS	Energy	instanta-neous	float	-	Minimum total power factor	-	x

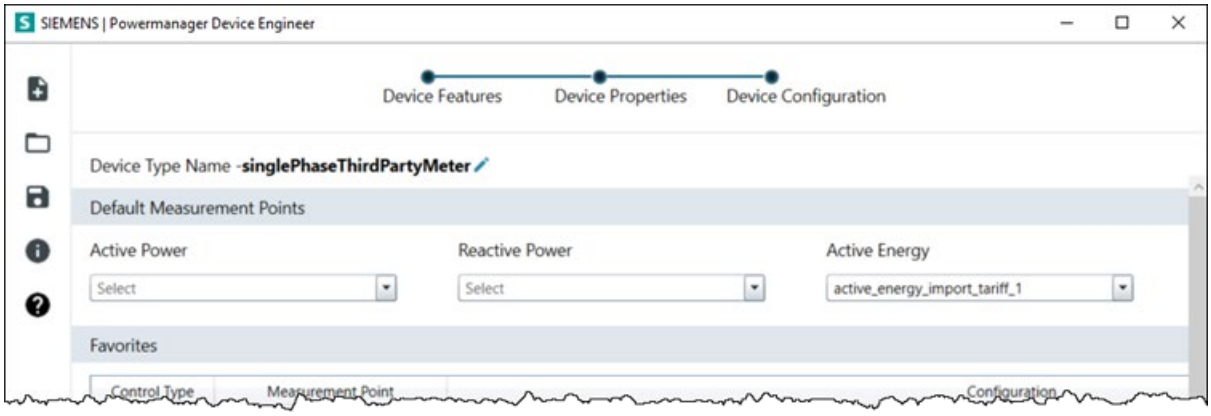
The data point properties are input in this view:



Take the following data from the address Modbus register of the device.

Attribute	Explanation
Description (English/German)	Display name
Data Type	The basic data type in the Modbus register (without specification of the register width) • FLOAT • INT • UINT • STRING • BOOL
Unit	Displayed unit
Factor	Multiplication factor for conversion of the raw data in relation to the above unit
Display	Not applicable
Archive	If ON, the SENTRON Powercenter 3000 automatically starts archiving this data point. If OFF, archiving must first be activated manually in the web user interface for this data point.
Active	Not applicable
Function Code	Function code to be used for reading the measured variable Only the following function codes are supported: • FC3 Read Holding Registers • FC4 Read Input Register
Register	The register address (also note the offset setting, see above)
Sub Index	Relevant for reading the measured variable from a certain bit offset
Transformation Type	Determines the type of display **and** the number of registers to be read: • Float – 2 registers • Double - 4 registers • Int64 - 4 registers • UInt64 - 4 registers • Int32 - 2 registers • UInt32 - 2 registers • Int16 – 1 register • Uint16 – 1 register • float with timestamp – 4 registers • Binary – 1 bit

The input step **Device Configuration** is not applicable for import in SENTRON Powercenter 3000, and the configuration can be completed by saving.

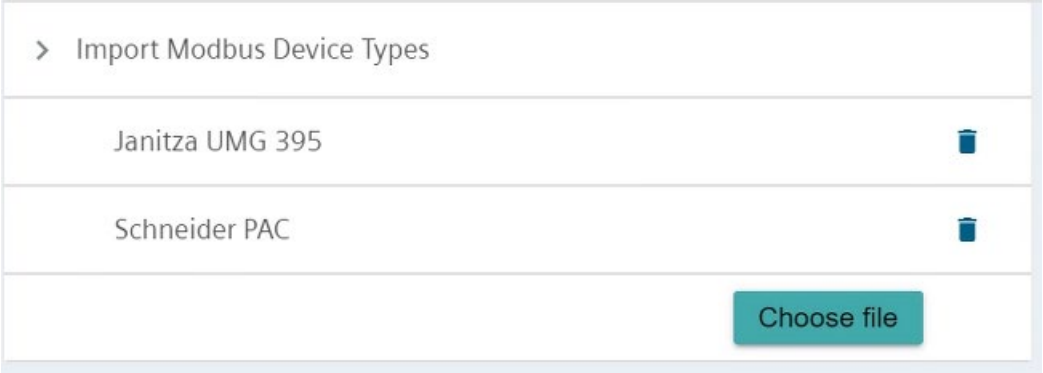


Now click on the **Save** button to save the configuration as a *.json file.

Import Modbus device type

Once you have created a Modbus device type using the Power Engineer tool, you can import it in the SENTRON Powercenter 3000 as follows in the web user interface:

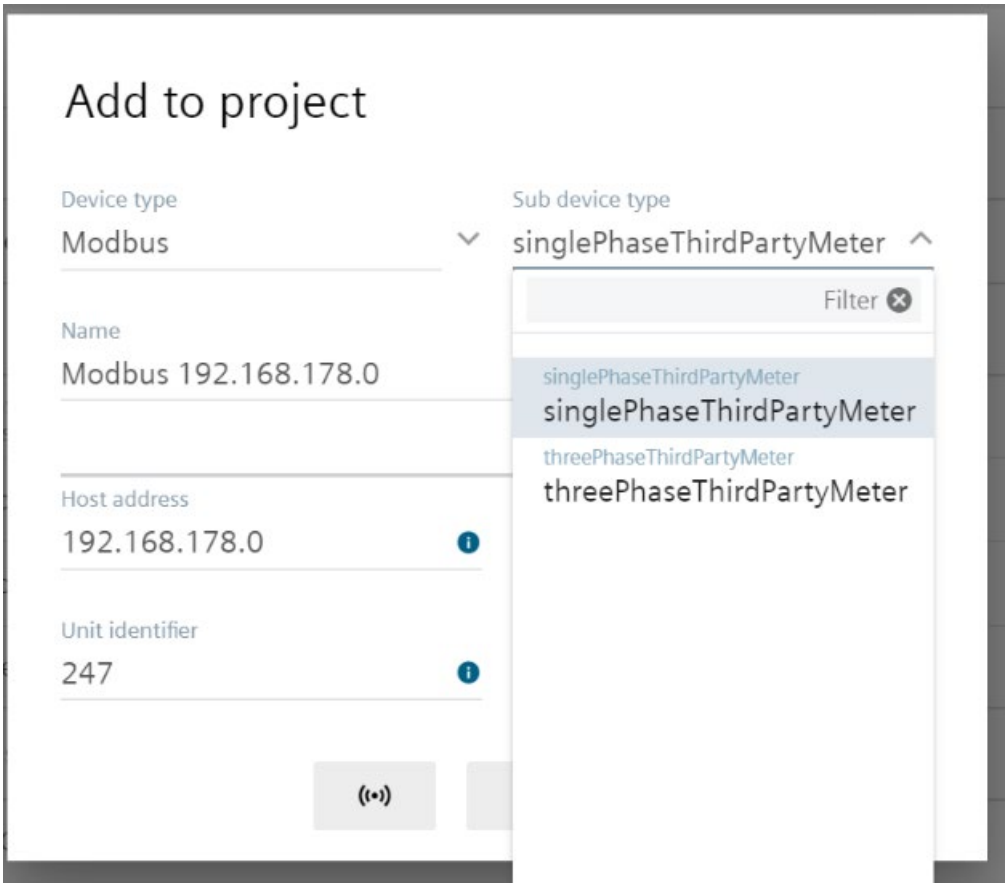
1. "Settings → Actions → Project → Import Modbus Device Types
2. Select the *.json file.
3. The new device type is now displayed.



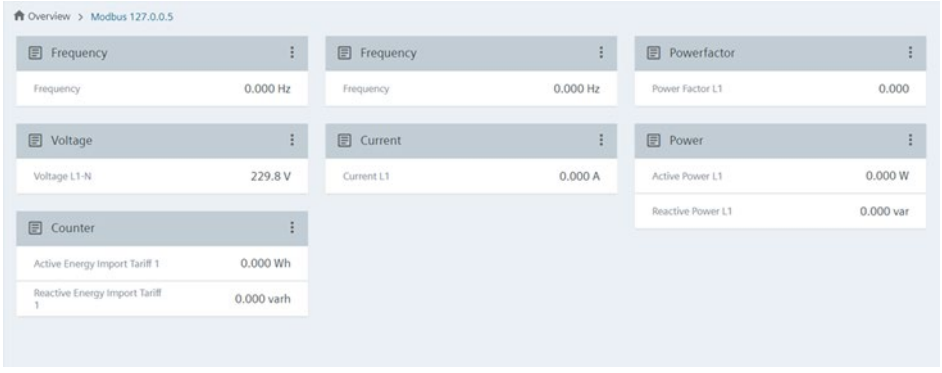
Create Modbus device instances on the basis of an imported device type

Proceed as described in section Commissioning by adding devices manually (Page 57).

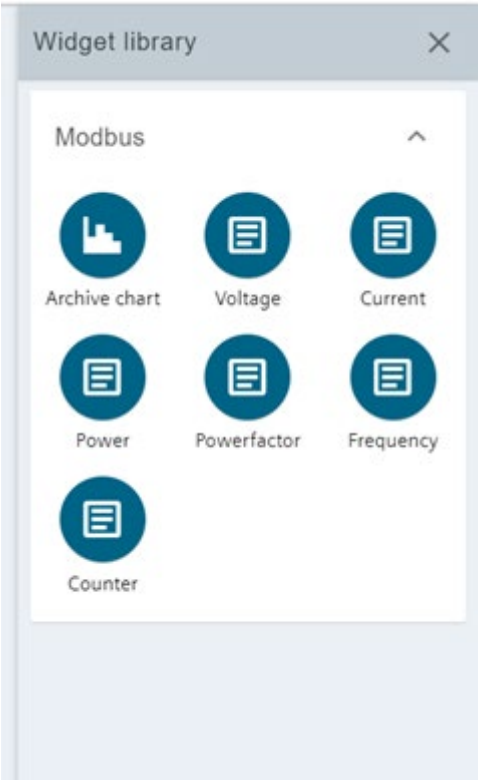
Once a device instance has been created, a table widget is created in the device dashboard in SENTRON Powercenter 3000 for each group of properties from the Power Device Engineer:



Once a device instance has been created, a table widget is created in the device dashboard in SENTRON Powercenter 3000 for each group of properties from the Power Device Engineer:



In addition, you can add one or more archive graphs from the widget library in order to implement the progression of the measuring point over time.



5.1.4 Commissioning with SENTRON powerconfig

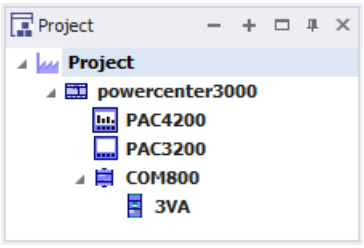
5.1.4.1 Integration into a powerconfig project

During commissioning, the SENTRON powerconfig configuration software is connected to the internal network (X2 P1, default IP address: 192.168.1.2) of the smart assembly.

You will find further information in the graphic in "Performance features of the internal Ethernet interface (Page 41)".
All networks of the smart assembly network, whether it is Ethernet, or in future RS485 with Modbus RTU, are set up as separate networks, e.g. with address space and subnet ID.

There, the individual devices, including SENTRON Powercenter 3000, will be supplied with network addresses and other parameters and operated in the normal way.

The connected devices are located in the project tree and in the gateway hierarchy below the SENTRON Powercenter 3000.



SENTRON Powercenter 3000 and the other SENTRON devices can also be scanned for via SENTRON powerconfig and can be created in the project tree and in the gateway hierarchy in the way described above.

SENTRON Powercenter 3000 is parameterized like any other SENTRON device in SENTRON powerconfig.

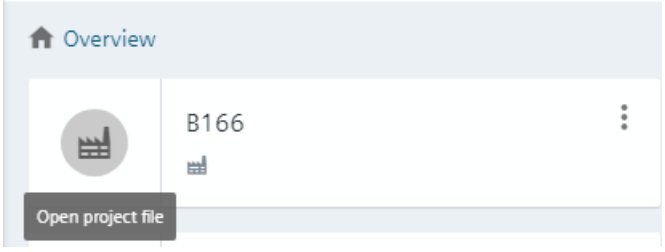
The configuration of the SENTRON Powercenter 3000 and all subordinate devices can be stored or opened as an .splx file using the SENTRON powerconfig configuration software.

The project configuration can be imported directly from SENTRON powerconfig to the SENTRON Powercenter 3000 and exported in the opposite direction (Devices/shortcut menu).

Import of project files

This .splx file can be imported via the web user interface via "Settings → Actions → Import project". If an encrypted project file is imported, the password must be entered before pressing "Select file". An error message will be displayed otherwise.

Alternatively you can import a project file in the "Project" widget using "Open encrypted project file → Open project file".



After you have selected the project file, you are prompted to enter the password.

Export of project files

Conversely, SENTRON Powercenter 3000 can export an splx file via "Settings → Actions → Export project".

If you enter a password for encryption, the file is encrypted for export in order to protect sensitive data.

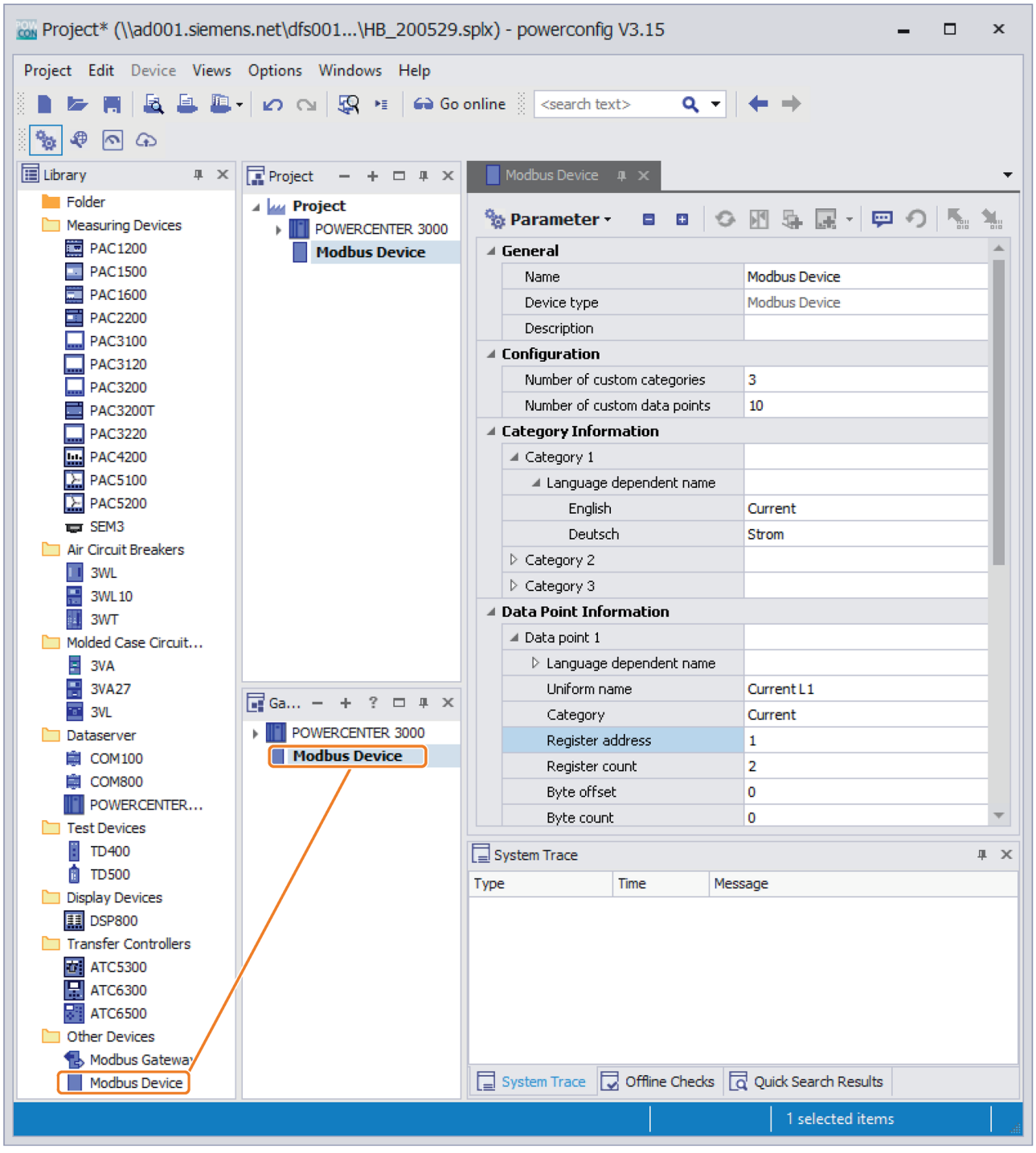
Note

The exported project can be imported only by SENTRON Powercenter 3000 with the same or a later firmware version, or by a compatible powerconfig version. See section Version management between SENTRON powerconfig and SENTRON Powercenter 3000 (Page 160).

If you activate the function "Include sensitive data", passwords and Powercenter 1000 installation codes are written into the project file in addition.

Because the identification and communication data can be changed through the web user interface of the SENTRON Powercenter 3000, the setup data can be kept consistent and further processed in SENTRON powerconfig. You will find further details in FAQs (Page 159).

Create a Modbus device from the device library below SENTRON Powercenter 3000.



The properties of a Modbus device are defined via categories and data points. Data points are the readable registers of a Modbus device, typically measured variables. For a good overview, the number of categories and data points should be restricted to those that are actually necessary.

The data points can be grouped in categories. Some typical categories in the power distribution system are current, voltage L-N, etc.

The categories can be given names in each of the languages of the web user interface.

The data points are the measured variables of the Modbus device.

The attributes relevant for integrated services can be set with SENTRON powerconfig.

Description of a data point

Attributes of a data point	Description	Notes
Language-specific name	In SENTRON Powercenter 3000, data points are handled in various languages, e.g. in the web user interface. These names can be defined for the individual languages here.	
Uniform name	This attribute is optional. It is used by SENTRON Powercenter 3000 for uniform handling of such data points across all device types. These are currently the SENTRON powermind and the project Export (json, csv). A data point can be assigned to one of these selectable uniform names.	= Uniform Name
Category	Assignment of the data point to one of the defined categories	
Register address	Register address [0001, 65535] of the data point must be entered in the Modbus device. The register address 0 is used as the default value. I.e. this address is not actively used.	
Register count	Number [1.125] of register addresses occupied by the data point.	
Byte offset	Byte position within the addressed register from which the data are interpreted.	See Example for addressing a data point (Page 75)
Byte count	Number of bytes that are interpreted.	
Bit offset	Bit position within the addressed register from which the data are interpreted.	
Bit count	Number of bits that are interpreted.	
Data format	The format for the data point must be chosen here. For details, see the table Supported data formats below.	See the table Supported data formats below (Page 76)
Scaling factor	This factor must be applied to the value. E. g. at frequency 0.01: Value 5015 x 0.01 = 50.15 Hz	
Display format	In this way, display of the value on a user interface, e.g. the web user interface of the SENTRON Powercenter 3000, can be controlled. • Scaling: Values with the most significant 4 decimal places. • Counter value: The value is displayed with all its digits. • K count value: The value is displayed with all its digits and k (= Kilo). • Boolean: 0 → "No", 1 → "Yes" • Text: Value is displayed as text.	Depending on the time zone chosen, a suitable decimal separator e.g. "." in the USA or "," in Europe is used.
Unit	Basic unit of the value, such as A, V, W	
Runtime settings	The setting(s) control the processing of the value by SENTRON Powercenter 3000	
Archiving	On → Values are archived every 10 seconds and 15 minutes. Off → No archiving	For numeric data points only

In particular in existing Modbus devices, several data points, e.g. individual statuses, are shown partly in a Modbus register. With these attributes, several data points can be read out of the same register.

Individual data points on a Modbus address are addressed according to the following system.

Byte ordering with big-endian data transmission

Register		U8	U16	U32	FP32
Register address	High byte	0x00	High data byte	1st data byte	1st data byte (sign bit)
	Low byte	Data byte	Low data byte	2nd data byte	2nd data byte
Register address + 1	High byte	-	-	3rd data byte	3rd data byte
	Low byte	-	-	4th data byte	4th data byte
Number of registers		1	1	2	2

Storage of the time stamp according to the Unix format Time_T, seconds since January 1, 1970

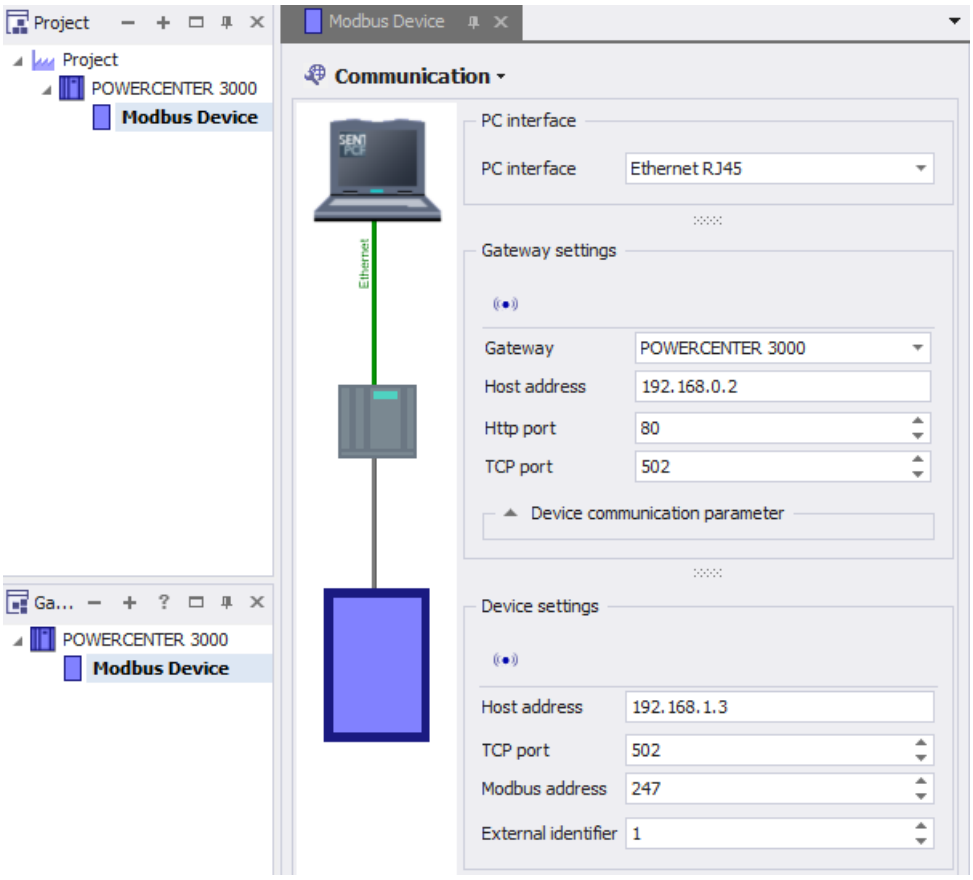
Note

If the attributes of a data point are not set completely and correctly, errors may occur in individual services of the SENTRON Powercenter 3000.

For that reason, we recommend creating a Modbus device in full and in detail, testing it and copying this Modbus device multiple times within the project with copy and paste or exchanging it between projects with "Export device(s)" and "Import device(s)".

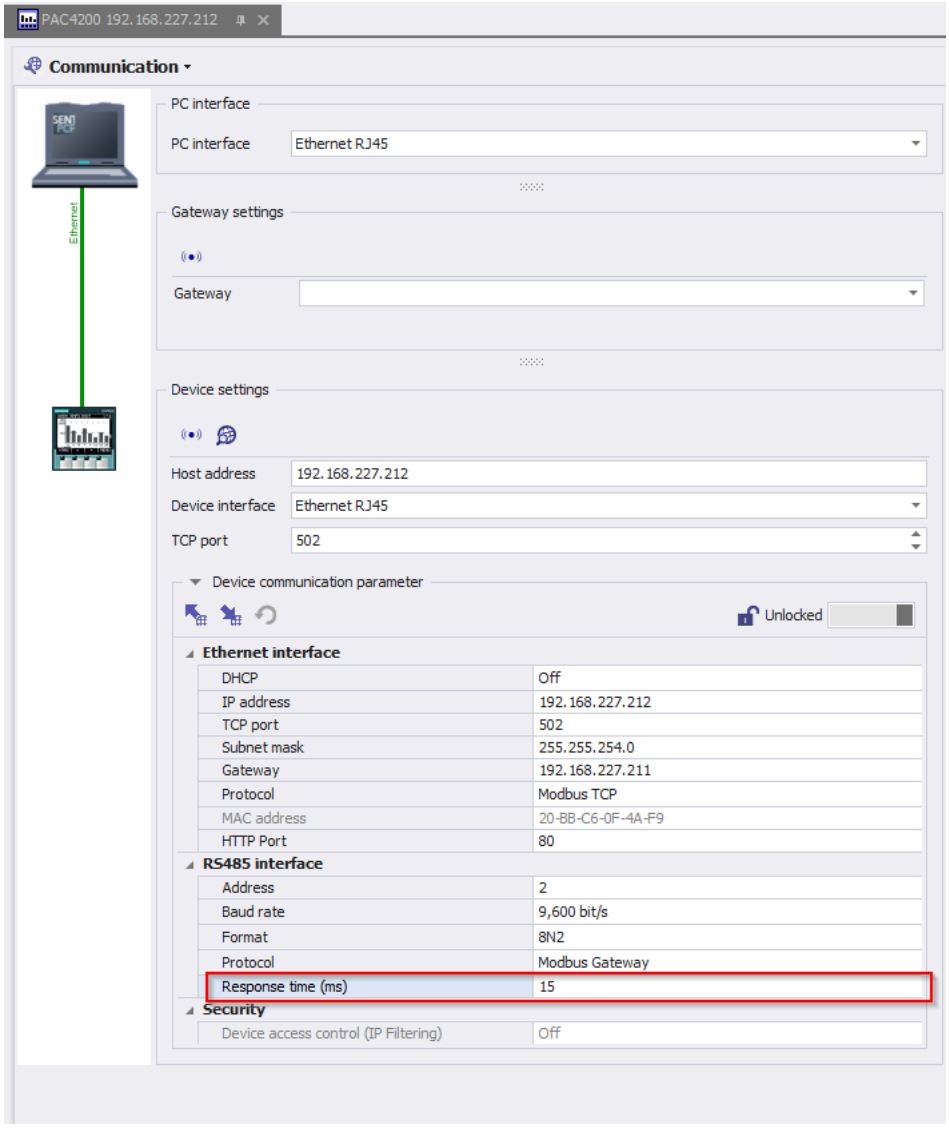
5.1.4.2 Integrating the Modbus device into the communication

In the "Communication" view, the IP address, the TCP port and the external identifiers are set.



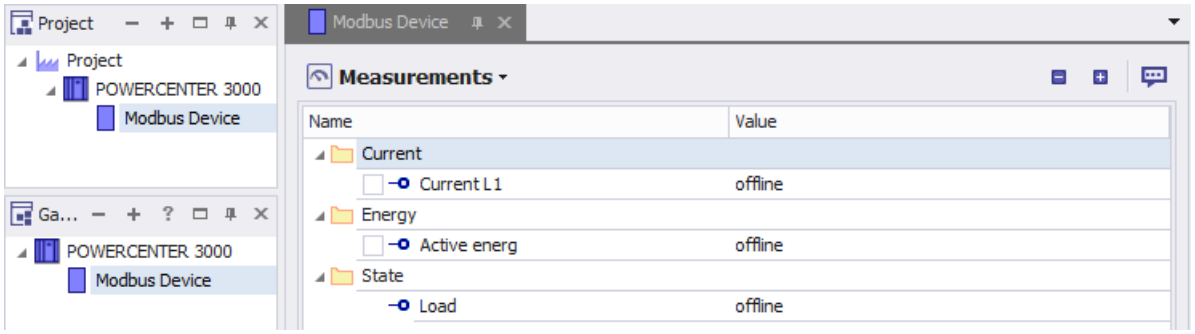
If a future version of the Modbus device is to be operated on a RS485 network, a Modbus address is required. The addressing via the Modbus gateway (see section SENTRON Powercenter 3000 as Modbus gateway (Page 125)) is implemented via the external identifier.

To ensure communication with the slightly slower RS485 devices, it is recommended that the response time of 0 ms be set to 15 ms or higher in the communication parameters.



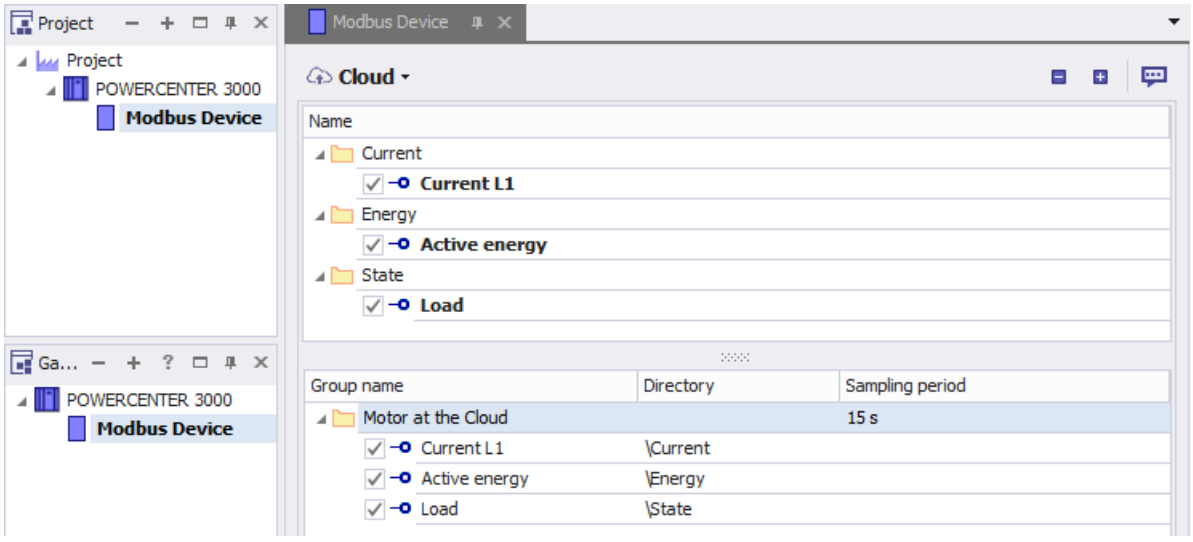
5.1.4.3 Displaying a Modbus device with SENTRON powerconfig

The individual measured variables of the Modbus devices are displayed as a 2-level tree in SENTRON powerconfig in the "Measurements" view.



5.1.4.4 Preparing a Modbus device for the cloud

Individual measured variables can also be selected for Modbus devices for provision in clouds.



This option should be used as the first test of the ability to function of the communication.

1. Select the Modbus device in SENTRON powerconfig.
2. Choose the menu item "Go online".
   The measured variables are displayed in categories in the "Measurements" view.
3. Check the measured variables and their values and correct the parameter settings, if necessary.

5.1.4.5 Example for addressing a data point

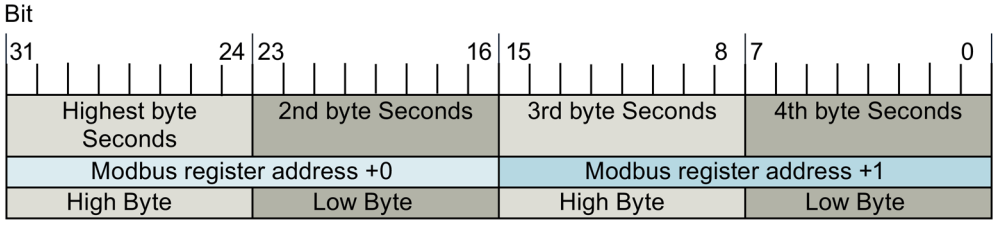
As from register address 6001, 2 registers, i.e. 4 bytes, are to be read.

In byte 2 (offset = 2, because counted 0, 1, 2, 3), bits 4 and 5 are to be read.

Element	Example	Bit or byte field									
Register address	6001	Register									
Register count	2	Register +1									
Byte offset	2	0	1	Byte 2							3
Byte count	1			<---------- 1 byte ---------->							
Bit offset	4			7	6	5	**Bit 4**	3	2	1	0	
Bit count	2			7	6	**Bit 5**	**Bit 4**	3	2	1	0	

5.1.4.6 Supported data formats

Value format	Description
Unsigned	Depending on the number of bytes or bits If both values = 0, the entire number of registers (one register is equal to two bytes) is interpreted as unsigned
Signed	Depending on the number of bytes or bits If both values = 0, the entire number of registers is interpreted as signed
Floating point	If the data point is defined as 2 registers, floating point 32 bits is used. If the data point is defined as 4 registers, floating point 64 bits is used.
ASCII text	ASCII text
Time stamp	Time stamp



5.2 Web user interface

Note

The web user interface must only be used in compliance with Security features (Page 44).

SENTRON Powercenter 3000 provides web user interfaces for the following display options:

- on a PC
- on a tablet
- on a smartphone, either:
  - Android based
  - Apple iOS based

The web user interface is based on HTML5 and can therefore be used with many modern browsers.

These include:

- Google Chrome (latest versions for PC, Android and Apple devices)
- Safari (latest version for Apple devices)
- Mozilla Firefox (latest version for PCs)

The web interface is only active at the internal Ethernet interface X2P1 by default, but can also be activated at the external Ethernet interface (Page 42) X1P1.

In the simplest case, the browser is opened via the SENTRON powerconfig view "Open web browser". Another option is to enter the valid IP address at the Ethernet interface or the current host name, directly in the address line of the browser.

Note

Cookies

Cookies should be activated in the web browser to ensure that all functions, e.g. login, can be used.

Benefits of the web user interface

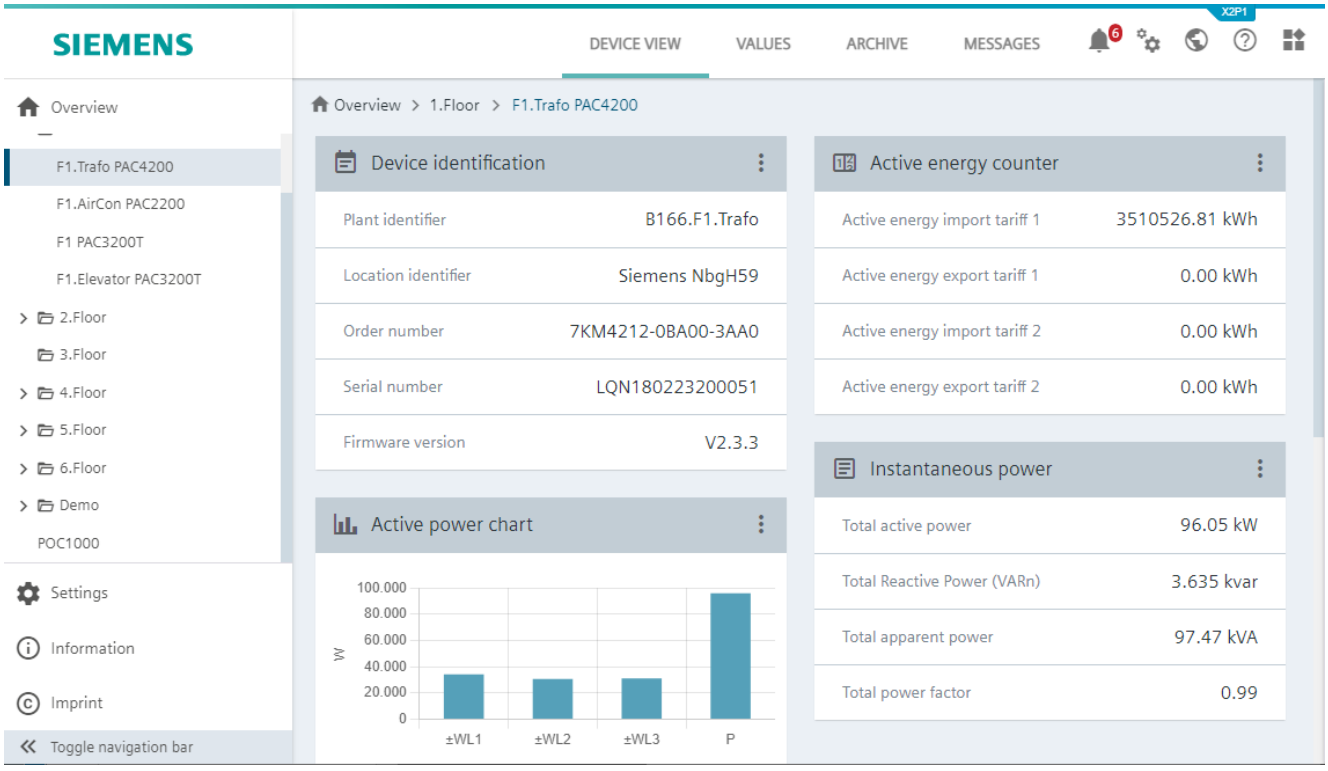
All the information about the connected devices can be displayed via the web user interface without the need for any setup or configuration.

The web user interface offers the same information and structure as SENTRON powerconfig. For example, a device view showing the most important information about a device is available for each device.

In the case of the 3VA molded-case circuit breaker, this includes the circuit breaker health indicator and the remaining service life, among other things.

5.2.1 Contents of the Web user interface

The essential elements of the web user interface are explained below.



The devices in the navigation area on the left are taken over from SENTRON powerconfig (see Commissioning (Page 53)). With SENTRON Powercenter 3000, folders can also be used for structuring.

The standard view can be further adapted to the particular requirements.

5.2.1.1 Print

The contents of the web user interface, including graphics displayed, can be printed using the browser print function (key combination <Ctrl> + <P>).

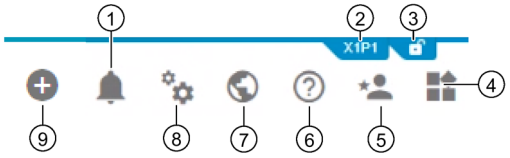
Note

The project tree and menu commands are not printed.

It is also possible to export to PDF or graphics files.

5.2.1.2 Toolbar

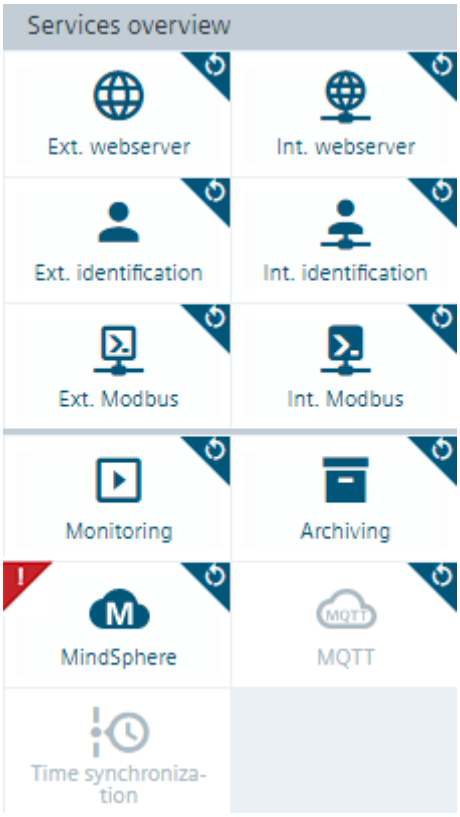
Depending on the area or device selected in the navigation area, a toolbar is displayed.



Area-specific or device-specific views are selected via the corresponding menu items.

- The bell icon ① displays the event messages since the last selection.
  By clicking on the icon, the messages are displayed in the project. See Messages (Page 84).
- The interface used for the current web user interface is indicated by the respective icon ②.
- The padlock icon ③ indicates whether or not the current interface ② is write-protected.
- The possible widgets can be selected via the toolbox icon ④. See Widgets (Page 83).
- If the login icon ⑤ is displayed, the login function is activated for the current interface ②.
  See section Login on the SENTRON Powercenter 3000 (Page 88)
- Further information and support can be found via the ? icon ⑥.
  See Diagnostic data (Page 152).
- Ten different languages can be selected for the web user interface via the globe icon ⑤.
  - German
  - English
  - Spanish
  - French
  - Italian
  - Polish
  - Portuguese
  - Russian
  - Turkish
  - Chinese

- By clicking on the gear icon ⑧, the currently activated services (functions) are displayed.



Status of the services

Color strong and pulsating - service is active

Top right corner is marked - autostart is active

Top left corner is marked - clarification is required

- Click on the plus symbol ⑨ to create new tabs for different work areas (e.g. Room 1, Room 2) in the Overview area. See section Dashboards (Page 85).

5.2.1.3 Editing devices

You can make the following changes in edit mode:

- Change the device name
- Remove the device from the project
- Change the communication parameters:
  - Address / port
  - Unit identifier (= Modbus address)
  - External identifier (unique assignment within the Powercenter 3000)

Activating edit mode

Proceed as follows to activate edit mode:

1. Click the icon below in the project navigation:

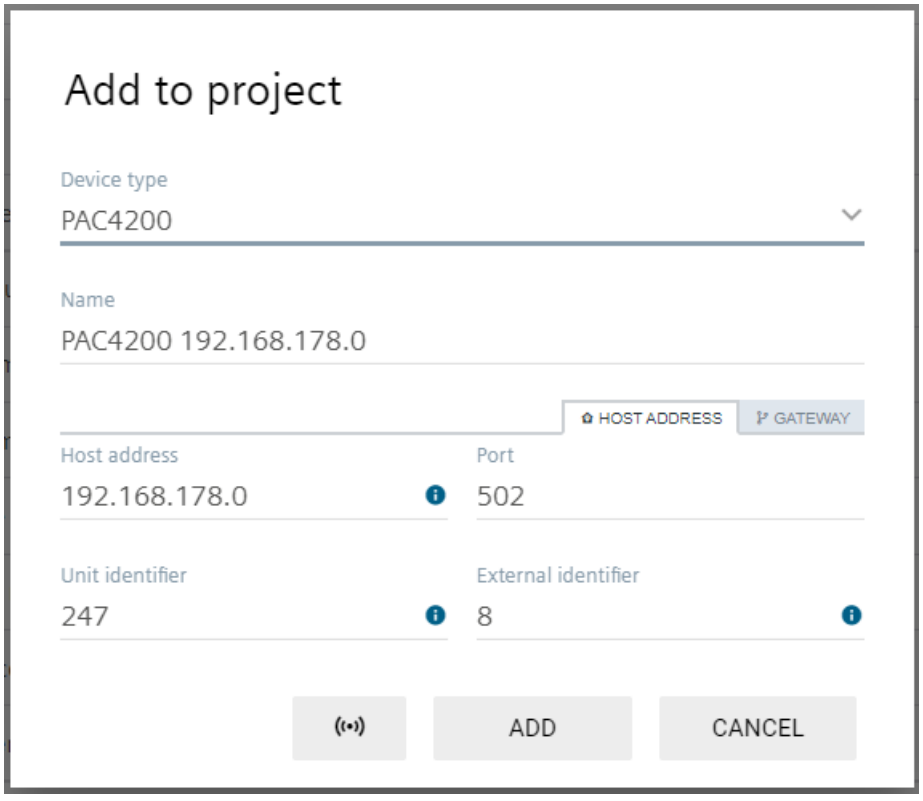
   A menu appears.

2. Set a check mark next to "Edit mode".

   Edit mode is activated. The icon below indicates that edit mode is active:

3. When you click a device, you can edit the specific properties, as shown in the example screenshot below:

4. To exit edit mode, click the x in the display:

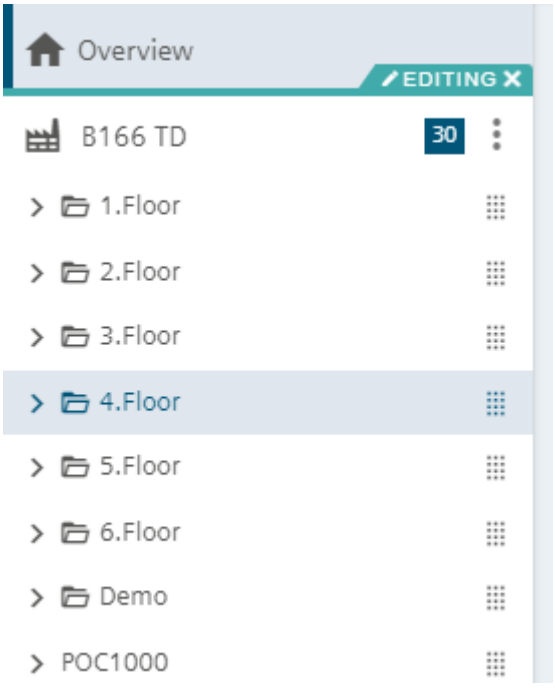
   

5.2.1.4 Arrangement of devices/folders in the project

The devices and folders in the project can be arranged using Drag & Drop if Edit mode is activated.

To do this, proceed as follows:

1. Activate Edit mode if it is not yet active.
   Information on activation can be found in chapter Editing devices (Page 80).
2. Click the ⣿ button to the right of the device name/folder and keep the mouse button pressed down.



3. Drag and drop the device/folder onto another device/folder to add it below the respective device/folder.
4. Deactivate Edit mode.
   Information on deactivation can be found in chapter Editing devices (Page 80).

5.2.1.5 Widgets

Widgets are display elements that can be added, modified and deleted.

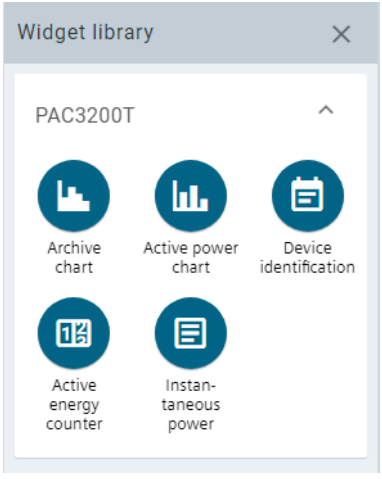
Click the icon below to change their size or layout:

The layout can be modified by repositioning the widgets. The changes are retained after the page has been exited.

Widgets can only be changed when the web user interface is not write-protected. See chapter Write protection in the web user interface (Page 88).

Widget library

The widget library shows all available display elements for the selected object, e.g. a device.

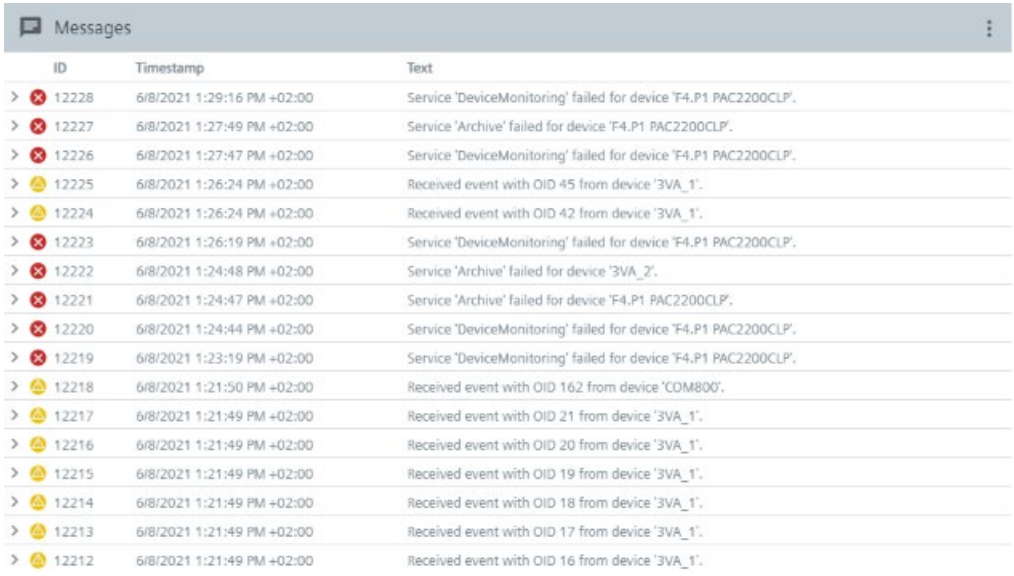


5.2.1.6 Messages

In the message widget, messages of events are displayed

- in chronological order
- with a time stamp
- with their severity

Messages are available both for devices and in an overview.



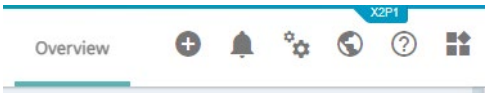
By clicking a message, details are made visible, if available.

5.2.1.7 Dashboards

In the "Overview" menu, new dashboards can be compiled with the help of the widgets and/or existing dashboards can be modified.

Importing widgets into the "Overview" menu

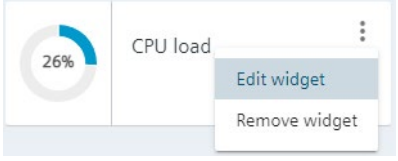
1. Switch to the "Overview" menu by clicking on "Overview" in the menu tree.



2. Click the button.
3. Click the widget that you want to import into the menu.
   The widget is displayed in the "Overview" menu.
4. Position the widget where you want it to appear in the menu by clicking it with the left mouse button, holding the button down and dragging the widget to the desired position.

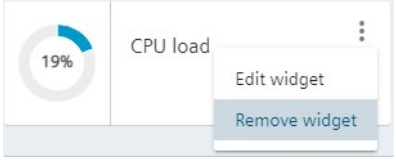
Changing the width of widgets in dashboards

1. Click the three dots in the widget.
   A context menu appears.
2. Select "Edit widget" and adjust the width of the widget.



Removing widgets from the "Overview" menu

1. Click the three dots in the widget.
   A context menu appears.
2. Select "Remove widget".



The widget is removed from the menu.
You can reimport it from the widget library at any time.

The "Overview" dashboard can be renamed or deleted at any time.

Creating further dashboards

Up to 10 dashboards can be created.

1. Click the ⊕ button in the top menu bar.
   Next to the "Overview" menu, another menu entitled "New View" appears.
2. Click the name "New View" and rename the new menu, e.g. "My Dashboard".
3. Import the widgets into the new menu as described above.

Deleting dashboards

1. Choose the menu that you wish to delete, "My Dashboard" in the screenshot example.
2. Click the ⊗ button next to the name of the menu.
3. Confirm deletion in the confirmation prompt.

   The menu is erased.

5.2.2 Settings via the web user interface

SENTRON Powercenter 3000 is the first SENTRON device to provide a way of making important parameter settings via the web user interface, alongside the option provided via SENTRON powerconfig.

In particular, these settings are for

- commissioning an individual SENTRON Powercenter 3000,
- modifying a previously installed SENTRON Powercenter 3000,
- testing functions of the SENTRON Powercenter 3000,
- for targeted data access to the acquired data.

The settings have the following structure:

General	Communication	Cloud	Actions
Device information • Plant identifier, etc. • Manufacturer information	External communication X1P1	MindSphere	Project • import • export
Communication • Host name • Proxy settings • Access protection	Internal communication X1P2	MQTT	Device • identify • restart • reset
External communication X1P1 • Settings • Services • Firewall • Security settings (login)			Firmware update
Internal communication X1P2 • Settings • Services • Firewall • Security settings (login)			
Notifications for • Web user interface • Email address			
Email address			
Periodic energy data exports			
Events			
Miscellaneous • Diagnostics • Clock/time-of-day/time synchronization • Language			

- Settings relating to the current application are grouped together under "General". Services can be activated or deliberately deactivated, for example, for security reasons.
- Related settings of the communication interfaces are to be found in "Communication". These are active immediately after they have been saved.
- Under "Cloud", the settings for MindSphere can be made, in particular for connection to powermind and a further cloud system.
- Under "Actions", SENTRON Powercenter 3000 administrator actions are possible.

Note

Security aspects must be considered when making these settings.

All settings are saved in a project file (*.splx), which can be exported with "Settings → Actions → Project" and used in SENTRON powerconfig or another SENTRON Powercenter 3000.

5.2.3 Write protection in the web user interface.

In SENTRON Powercenter 3000, write protection for the web user interface can be activated and deactivated for the external communication interface.

In this way, views can be protected from being modified, for example.

Note

When write protection is activated, those elements in the web user interface that result in changes are grayed out or hidden completely. This means that if the elements described here are not visible in your web user interface, it may be because write protection is active. The status of the write protection is shown by a padlock icon in the top-right corner during a connection via the external interface.

5.2.4 Login on the SENTRON Powercenter 3000

The login function offers differentiated read/write protection for the web user interface of the SENTRON Powercenter 3000.

Benefit of the login:

Different users can access the web user interface via the same interface but with different function scopes.

For example, a Supervisor configures the individual views and functions of the SENTRON Powercenter 3000 and one or more Observers use the views.

The Supervisor role makes it possible to adapt the SENTRON Powercenter 3000 to the current requirements both initially during first commissioning with SENTRON powerconfig (Page 51) and later during use (see section Web user interface (Page 77)).

The login function is based on the role concept described in IEC 61850, i.e. the roles apply for SENTRON devices. The individual roles permit defined actions, such as switching, reading and parameterizing. Each role is executed by a real person with a name.

SENTRON Powercenter 3000 offers two roles with fixed user names.

The passwords must be

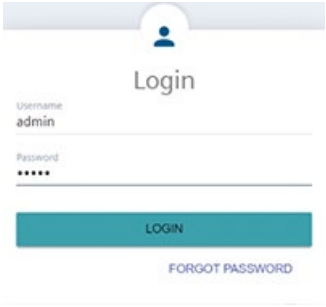
- individually assigned and
- at least 8 characters long.

Role	Description	User name	Default password
Superuser	may perform all actions	admin	admin
Observer	can read and export device data. It is not possible to change widgets. The settings cannot be viewed.	guest	guest

Further roles which can be assumed by different users will be added in the future.

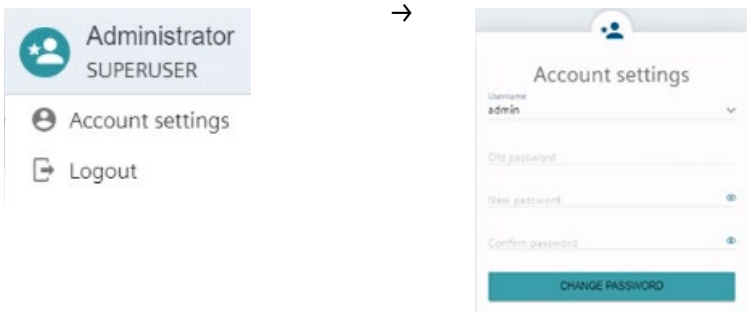
The login function must be activated via Settings → General → External/internal communication for the individual interfaces. Write protection must be deactivated for the corresponding interface for this purpose.

After the login is activated, the corresponding interface can only be used via the login with user name and password.



During the initial login as "admin", the password must be changed. The password for the "guest" role can also be changed at this time.

The password for the guest user can only be changed in the Supervisor role, i.e. by the admin user.



The current user is indicated by one of the two icons shown below.

Admin

Guest

Note

1. When the login is activated, access to the corresponding interface is only possible via https. http communication is automatically redirected to port 443 (see section Security performance features of the SENTRON Powercenter 3000 (Page 45)).
2. When the login is activated, access with SENTRON powerconfig is no longer possible via the corresponding interface. For this reason, it is recommended to activate the login on one interface only, typically the one for external communication (X1P1).
3. If the administrator password is lost, the following can be performed via the other interface, typically the one for internal communication (X2P1):
   – The configuration can be exported in the splx file, see "Settings → Actions → Project".
   – Data can be backed up, e.g. Project → Actions → Export energy data of all devices.
   – SENTRON Powercenter 3000 can be reset to the factory settings, e.g. Settings → Actions → Device.
   – SENTRON Powercenter 3000 can be recommissioned, see section Commissioning with SENTRON powerconfig (Page 51).
   – The configuration backed up in the splx file can be reimported, see "Settings → Actions → Project".

   Access to this "other interface" must therefore be protected by suitable means. (See section Security features (Page 44))
4. If the login function is activated on both interfaces and the administrator password is lost, SENTRON Powercenter 3000 can be reset. See section Switching the device on/off (Page 39). For this reason, it is recommended to export the project before activating the login on both interfaces, e.g. Settings → Actions → Export project (see section Settings via the web user interface (Page 86)), and to back up the splx file.

Note

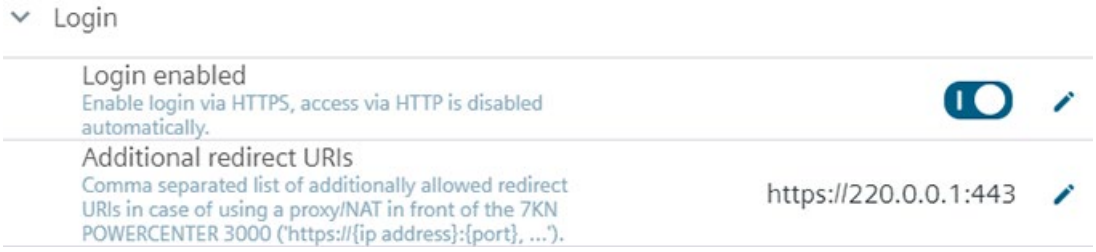
The administrator's password should not be disclosed to the members of the energy management team without due precautions, as anyone who has this password can read all other passwords.

5.2.4.1 Redirect for the login

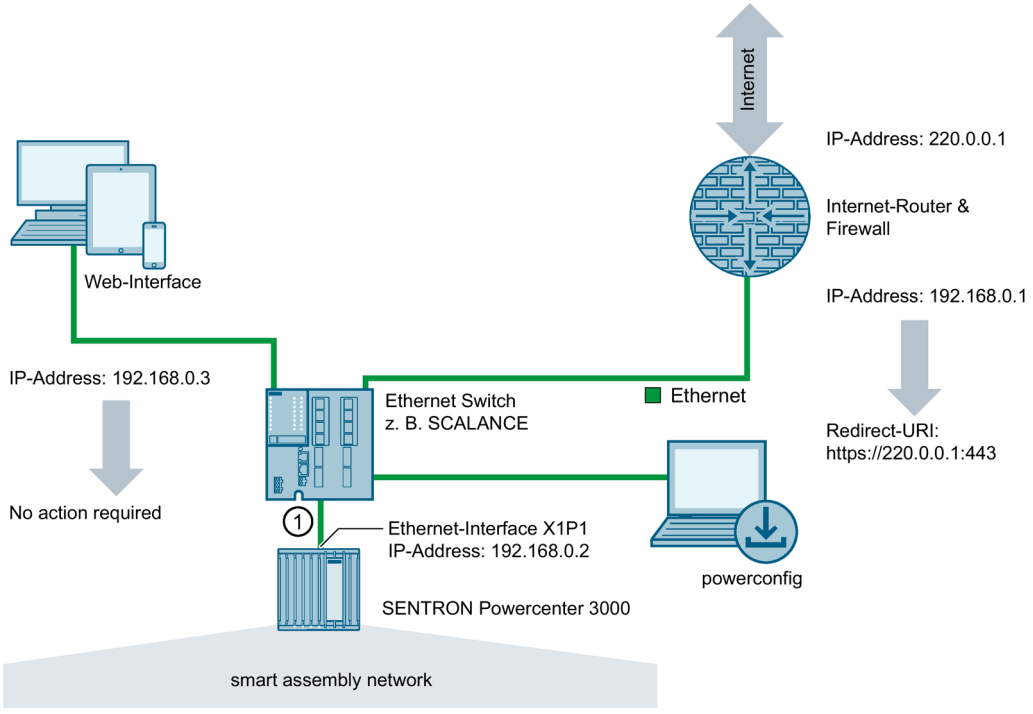
As described in section Login on the SENTRON Powercenter 3000 (Page 88), when the login is activated on an interface, the corresponding interface switches to the https protocol.

When the login is active, authorization takes place on the basis of the OAuth 2.0 protocol (see https://tools.ietf.org/html/rfc6749 (https://tools.ietf.org/html/rfc6749)).

For this purpose, the redirect URI used must be known to the SENTRON Powercenter 3000 for security reasons. If access does not take place directly, but rather, for example, via a router with port forwarding (NAT), the public address must be entered as an additional redirect URI.



Example:



Redirect URI: https://220.0.0.1.443

If the web browser is in the same network as SENTRON Powercenter 3000, the login works without the need for any further measures.

The ports for HTTP (80) and HTTPS (443) are open as a default setting. When the login is active, there is an automatic redirect from the HTTP port to the HTTPS port.

5.3 Exporting recorded data

With SENTRON Powercenter 3000,

- Energy counters and universal counters up to 14 months,
- 15-minute average values (average values 2) up to 14 months and
- 10-second average values (average values 1) up to a period of 24 hours

can be recorded and archived. The recorded values can be exported in different ways depending on the application.

For this purpose, archiving must be started in SENTRON Powercenter. See Settings → General → Communication: Autostart archive service**.**

See also

Toolbar (Page 79)

5.3.1 Data records

SENTRON Powercenter 3000 can record the energy counters and the average values 2 of connected SENTRON devices every 15 minutes. In this way, the energy balance for each device is acquired as import and export and can be used as a basis for the energy management according to ISO 50001.

Note

The 15-minute values recorded are stored in the so-called Archive 2.

Benefits:

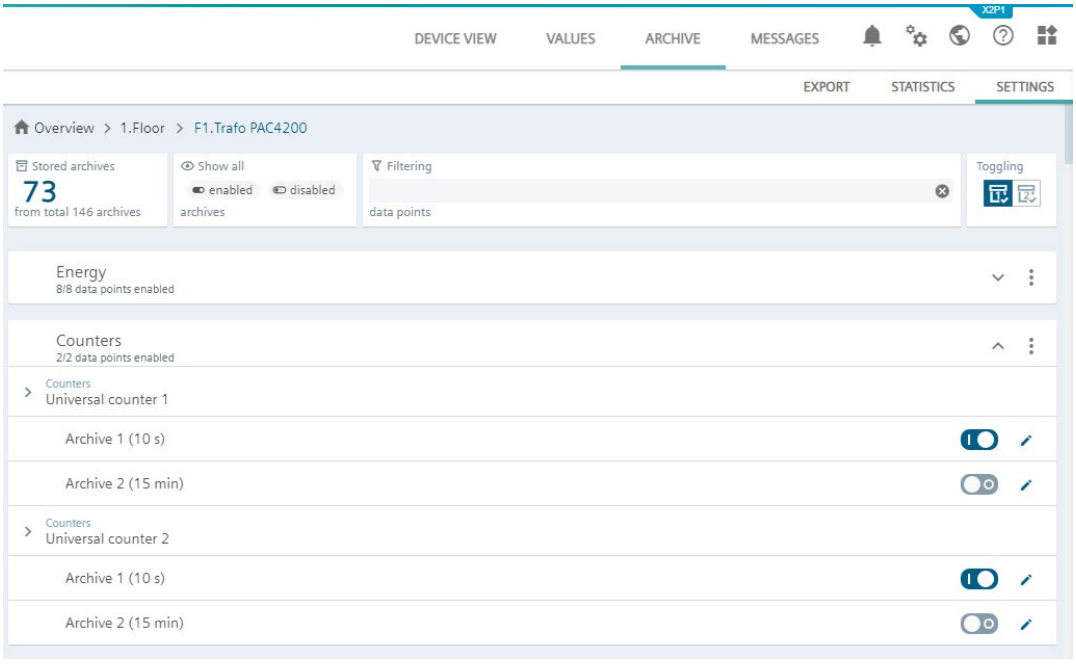
Based on each quarter hour over 14 months (= 14 x 30 days), stored energy values (import and export) can easily be kept as proof of the energy management according to ISO 50001, which is in some cases required by law.

From the devices that provide aggregated measured variables, these are archived additionally every 15 minutes and can be displayed and exported.

- The variables measured every 15 minutes (average values 2) and energy counters are stored for 14 months.
- These values can be exported for all devices for selectable time intervals. See section Explicit export of energy data for ISO 50001 (Page 94).
- These values can be exported periodically. See section Periodic export of energy data for ISO 50001 (Page 95).
- In the archive chart widget, values can be displayed and exported. See section Designation and content of the exported energy data (Page 98). To do this, go to the project level and, in the project tree, to → Archive → Export.

- As well as energy data points, other data points can also be exported if an archive chart is available for this purpose. ... menu, "Export data (csv format)" command.
- These values can be exported for each device on the "Actions" tab for selectable time intervals.
- The archiving function for the variables measured every 15 minutes can be checked via the web user interface, see "Service overview" in section Toolbar (Page 79).
- In the "Archive" menu, any data point for archiving can be activated or deactivated under the "Settings" tab.

Designation	Description
Stored archives	Shows the number of stored archives as well as the total number of archives
Show all	For showing/hiding activated or deactivated archives
Filtering	For filtering by name or parts of names of data points
Toggling	For toggling between archive 1 and archive 2



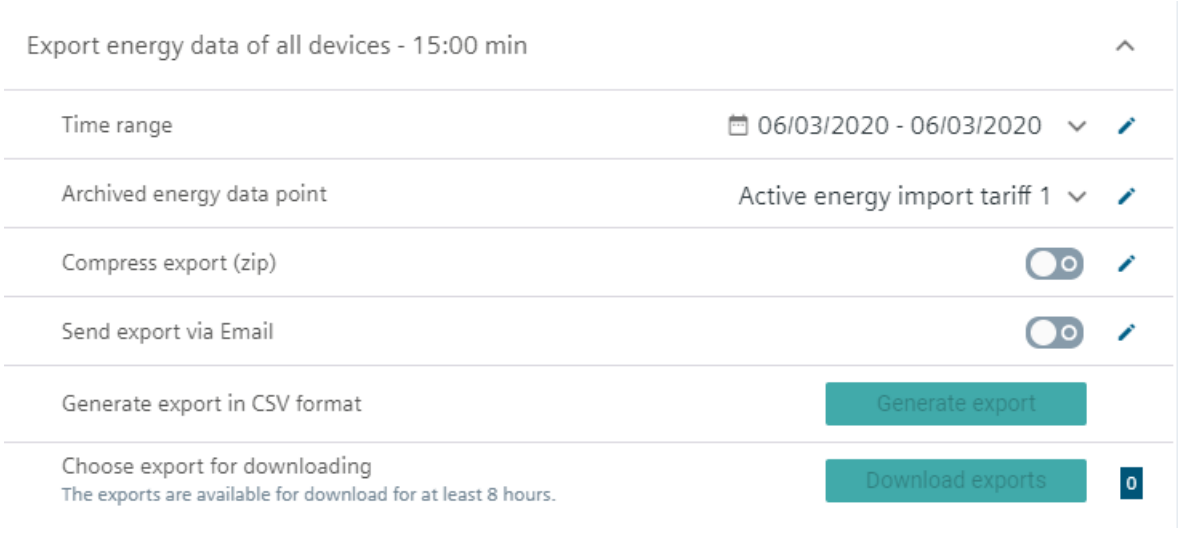
- The period for display and export with the archive chart can be configured user-defined or in time units, e.g. Today, Current week, ...

5.3.2 Explicit export of energy data for ISO 50001

Benefits:

For various reasons, it may be necessary to export energy counters or tariffs **of all devices** explicitly for a specific period.

To do this, go to the project level and, in the project tree, to "Archive → Export".



1. Select the relevant time period
2. Select the desired export format, zip or directly csv.
3. Select the desired export by email or direct data storage.
   If sent by email, the zip or csv file is sent as an attachment to the email address defined under "Settings → General → Email" as soon as it has been generated.
   The required file is created by export generation. With download export, the selectable file is stored in a selectable path.

Note

- Generation of the export file can take a few minutes.
- The generated export files are retained for up to approx. 8 hours in SENTRON Powercenter 3000. This means that the download export can be performed for up to 8 hours after generation. After that time, the generated data are automatically deleted.
- If you find cells containing "NaN" in the export file, this could be for a number of reasons, e.g. archiving of the data point is not activated, device is not making the data point available or archive service in the Powercenter 3000 is not activated.

5.3.3 Periodic export of energy data for ISO 50001

SENTRON Powercenter 3000 provides the possibility of exporting energy data (recorded every 15 minutes) periodically from all connected devices.

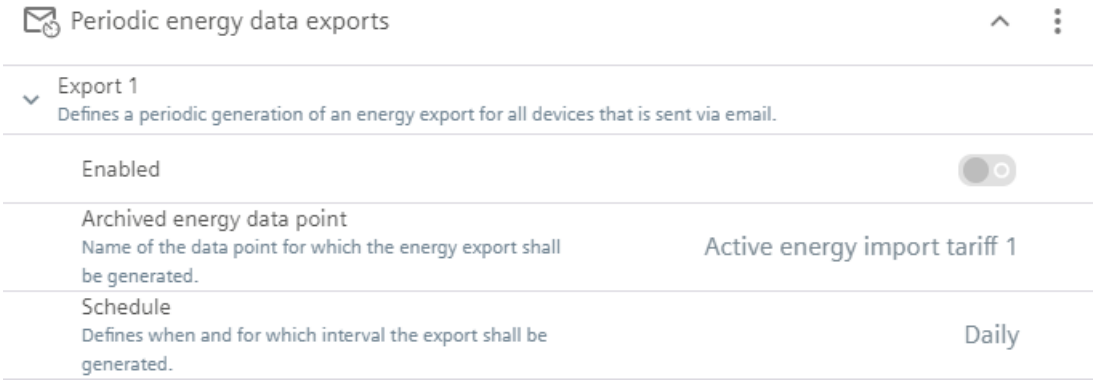
Benefits:

- Energy management according to ISO 50001 requires regular analysis of the energy consumption.
- The more frequent the analysis, the more precise the measures that can be taken.
- With SENTRON Powercenter 3000, the energy counters of all connected devices can be exported in definable cycles.

Under "Settings → General → Periodic energy data exports", up to 8 jobs can be created that export energy data periodically. The energy data are generated as csv files, packed as zip files and attached to an email as an attachment.

The energy data are sent to the email address defined under "Settings → General → Email".

The time zone and language can be set under "Settings → Miscellaneous".



Each job must be activated and an energy counter and a cycle (daily, weekly, monthly, yearly) must be selected.

Note

The export job is executed at the end of the defined cycle.

- The first execution is performed at the end of the first cycle, for example, for "Daily", the energy values are exported from the time of setup until 24:00, at around 0:00.
- Tip: The method should be tested with a manageable cycle, e.g. daily or weekly.

Note

The period "Yearly" is not recommended with multiple devices because the .zip file can be over 10 Mbytes in size. Various email servers could reject it.

Note

The energy counters of devices that only offer one tariff are exported as high tariff or tariff 1.

5.3.4 Display and export with the archive chart

With the archive chart, archived measured variables can be visualized and exported in the web user interface of the SENTRON Powercenter 3000.

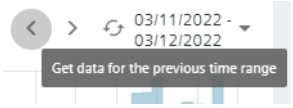
The precondition for this is that archiving (see Settings → General → Communication: Autostart archive service) was activated.

Benefits:

- The archive chart can be positioned at any time in the web user interface of the SENTRON Powercenter 3000 for the individual devices. See section Widgets (Page 83).
- Both the relevant time period and the measured variable of interest can be selected via the archive chart. This makes it easy to export various measured variables.
- The archive chart can be positioned multiple times so that the progression of several measured variables can be displayed in parallel.
- Data series are drawn differently depending on the data point:
  - bar chart for all energy values calculated during any 15-minute period
  - envelope curve with minimums and maximums for all other data points

The curve view can be adjusted as required:

- Change curve view:
  Click the curve and move the curve section while holding the mouse button down. The data are reloaded automatically and displayed according to the respective curve section.
- Axis zooming:
  Position the cursor on the label of the x-axis or y-axis and change the zoom factor using the scroll wheel of the mouse while holding down the <Shift> key. The zoom factor of the time range (X axis) is decisive for the resolution.
  If, for example, the cursor is positioned on the resolution "15 minutes" on the X axis, and this is changed by operating the scroll wheel of the mouse so that a larger time range is to be displayed, the resolution will automatically be reset to "1 hour" if a certain number of values is exceeded.
- Scroll to the previous/next time range:
  Click the arrows to the left of the calendar icon to scroll to the previous or next time range. The time range changes by the same period of time each time when scrolling forwards or backwards.
  Example of scrolling to the previous time range:



- Zooming to a certain curve range:
  Press the <Shift> key and drag a box over the desired range while holding down the left-hand mouse button.
  The range is displayed so that it fills the screen in the archive chart.

See also

Toolbar (Page 79)

5.3.5 Designation and content of the exported energy data

The exported energy data are intended for further processing with a spreadsheet program, such as Excel.

The file name starts with

- the time of generation
- the designation of the measured variable

The spreadsheet contains

1. Row 1 Headings of the columns
   - Culture data of the time zone and region acc. to language setting. See "Settings → General → Miscellaneous".
   - Measured variable
   - Unit
   - File version
2. Row 2 Headings of the columns
   - Time stamp, at the end of the recording interval, in line with the relevant time zone. See "Settings → General → Miscellaneous".
   - Date
   - Time of day
   - and all other columns: Device designation as in navigation area
3. Row 3 and all following rows, the values acc. to the column heading

*) The energy values are abbreviated as follows:

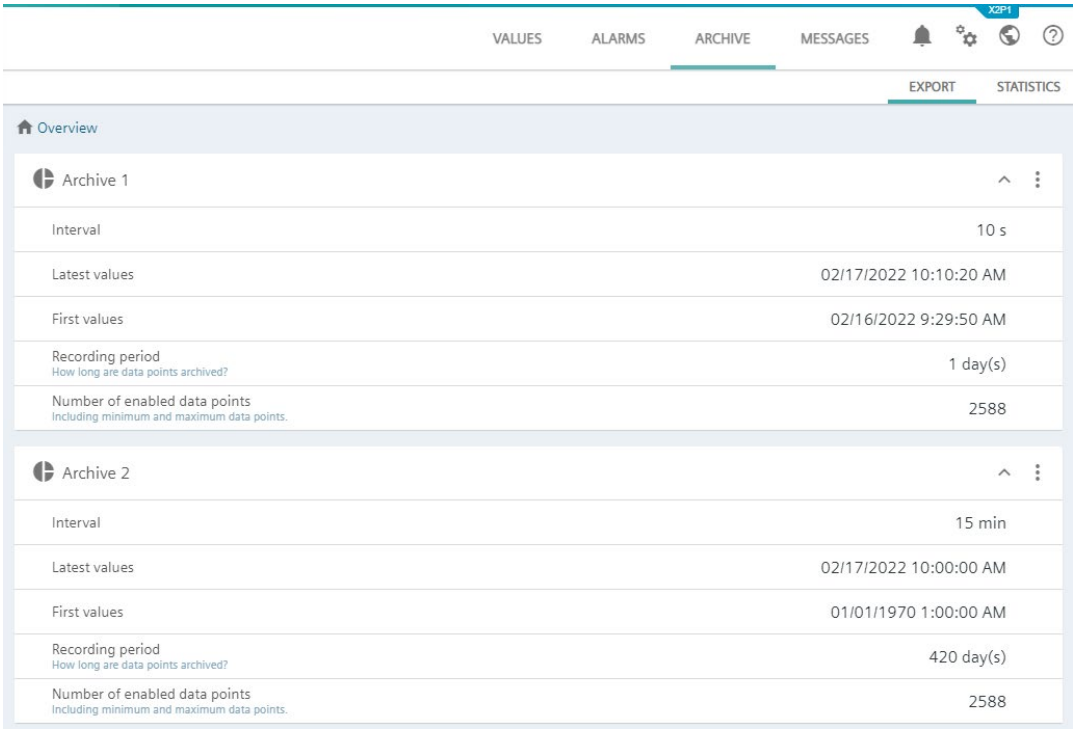
- for active energy import: Ea_imp in German or Wh_imp in English
- for active energy export: Ea_exp in German or Wh_exp in English
- for reactive energy import: Wq_imp in German or VARh_imp in English
- for reactive energy export: Wq_exp in German or VARh_exp in English

5.4 Displaying of archive statistics

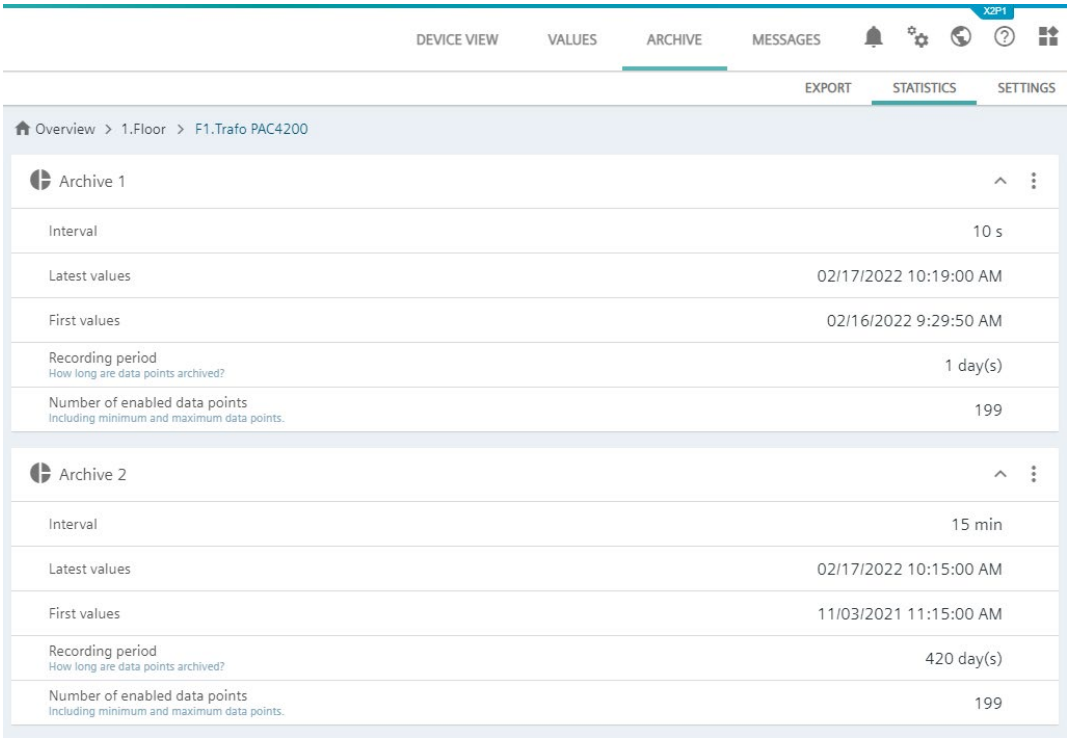
Statistics can be retrieved from the archives in the web user interface of the SENTRON Powercenter 3000.

Statistics can be retrieved both globally for the whole SENTRON Powercenter 3000 and for each individual device.

- Click the project name in the navigation area to retrieve the statistics for the whole SENTRON Powercenter 3000.



- Click the device name in the navigation area to retrieve the statistics for that device.



The statistics display the following information:

Designation	**Description**
Interval	Possible values: • 10 s • 15 min
Latest values	Time stamp of the latest value
First values	Time stamp of the first value
Recording period	• 1 day for archive 1 • 420 days for archive 2
Number of enabled data points	Min. and max. values are also included in the number displayed.

5.5 Display and export of daily trends

Recording and exporting of daily trends

The recording of certain values of the connected devices can be activated in the SENTRON Powercenter 3000.

Average values 1 of the devices can be used to track the trend of the respective measured variable over a period of one day at a cycle duration of 10 seconds.

Benefits:

The trend can be used as a basis for analyzing the development and thus the possible causes of a fault.
It can be determined, for example, whether an overload trip has resulted from a slow rise or a transient overload. Appropriate countermeasures can then be chosen.

- The variables measured (average values 1) every 10 seconds are stored for one day.
- The archiving function for all variables measured every 10 seconds can be started via the web user interface "Settings → General → Communication: Autostart archive service" and tested via the "Service overview" toolbar.
- In the archive chart widget, it is possible to choose which value will be displayed and exported.
- The 10-second values (= average values 1) are selected via the right point below the time axis.

More than 8000 entries are provided for average values 1 in each case. With a 10-second interval, this yields a period of one day.

Note

Average values for SENTRON Powercenter 3000

- Average values 1, formed in a standard cycle of 10 seconds, and
- Average values 2, formed in a standard cycle of 900 seconds (= 15 minutes).
  On many SENTRON devices, the cycle can be varied between 3 seconds and 31536000 seconds (= one year).
  For archiving, SENTRON Powercenter 3000 uses the cycle of the device that is actually set, provided that this set value can be read from the device.
  On devices on which the cycle cannot be read, SENTRON Powercenter 3000 uses the default setting for the cycle stated above.
- On devices that do not support average values, only the energy counters and, where they are available, the universal counters are processed.
- On devices with average values, the average values and energy values are provided with the time stamp of the device. → Ensure that the devices are provided with the correct time of day. See section Time synchronization (Page 128).
- For devices that do not have time keeping, the energy values are time-stamped with the preceding 1/4-hour change on arrival in the SENTRON Powercenter 3000.

5.6 Alarms for limit violations and status changes

You can set up alarms for data points in the SENTRON Powercenter 3000 for the purpose of monitoring limit violations. The data point is then monitored and a message is entered in the message memory when a limit violation occurs.

Depending on how it is configured, you either receive a notification in the web user interface or via email when a message is output.

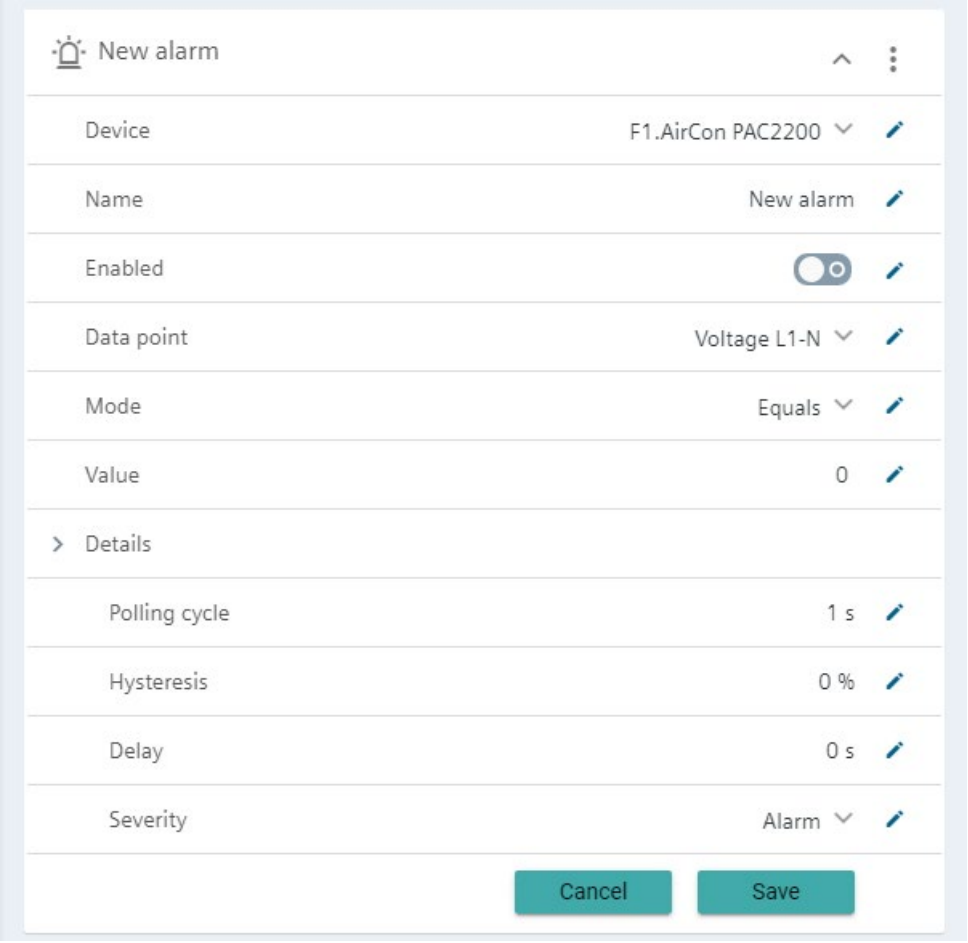
Proceed as follows to set up an alarm:

1. Select the project in the project navigation.
2. Open the "Alarms" tab.
3. Click the icon.

   The "New alarm" editor appears.
4. Configure the alarm in line with your requirements.
5. Save the alarm.

   The alarm appears in the list and is displayed as defined in the configuration:

   - Disabled alarm
   - Enabled alarm


New alarm
Device
F1.AirCon PAC2200
Name
New alarm
Enabled
Data point
Voltage L1-N
Mode
Equals
Value
0
Details
Polling cycle
1 s
Hysteresis
0 %
Delay
0 s
Severity
Alarm
Cancel
Save

Designation	Description
Device	Drop-down list containing all the devices in the project.
Name	Name of the alarm; this free text will also be displayed in messages as the alarm ID.
Enabled	Indicates the enable status of the alarm.
Data point	Selected device-specific data point.
Mode	Specifies the method of comparison with the value. Select between: • Equals • Not equal to • Greater than • Less than
Value	Defines the threshold: • Non-discrete value: Free input of numeric value. • Discrete value: Drop-down list of possible values.
Polling cycle	Specifies the time interval for checking the specified value.
Hysteresis	Threshold buffer. This prolongs the limit violation. The hysteresis refers to the disappearance of the limit violation or the return to a level below the defined threshold. It is expressed as a percentage. The percentage value refers to the threshold in the "VALUE" field. See the graphic below for the effects of delay and hysteresis.
Delay	Delay in seconds before reporting the limit violation. The delay refers to the occurrence of the limit violation or the upward violation of the threshold defined in the "Value" field. See the graphic below for the effects of delay and hysteresis.
Severity	Specifies a severity class for the limit value violation or the generated message: • Information • Warning • Alarm

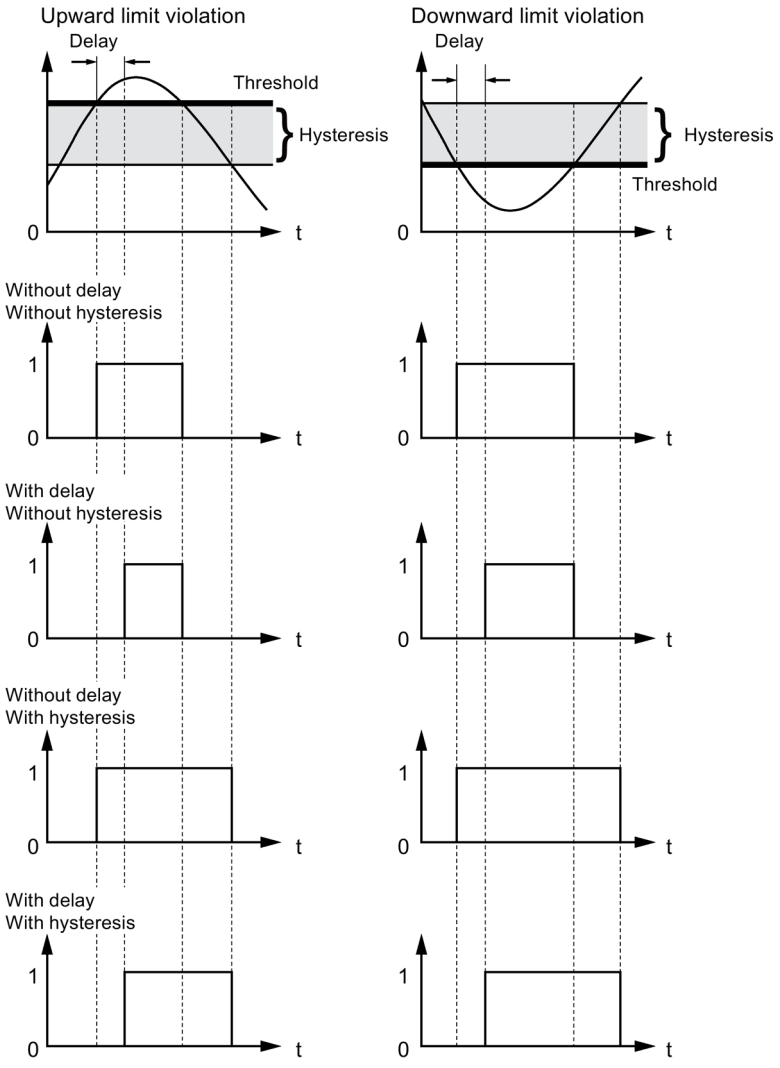


Figure 5-1 Effect of delay and hysteresis

Changing alarm configurations

Alarms are displayed as non-editable as standard.

If you want to make changes to the configuration of an alarm, you can set the alarm to edit mode.

To do this, click the  icon and activate edit mode.

Notifications for alarms

By defining the severity/alarm class, you specify whether and how you are informed when an alarm is activated.

Under Settings → Notifications, you specify the severity an alarm must have for you to be informed in the web user interface or by email.

Filter options for alarms

The following filter options can be found in the "Alarms" menu:

- Filter by alarm name
- Search for all active alarms
- Search for all inactive alarms

Designation	Description
Active alarms	Shows the number of active alarms as well as the total number of alarms
Triggered alarms	For filtering alarms by corresponding weighting
Filtering	For filtering by name or parts of names of alarms
	Add a new alarm

5.7 Communication with MindSphere

Benefits: MindSphere (https://new.siemens.com/global/en/products/software/mindsphere.html) is a cloud-based, open IoT (Internet of Things) operating system from Siemens, with which you connect your low-voltage power distribution system to the digital world.

With SENTRON Powercenter 3000, data of the smart switchgear assembly, e.g. energy values or states, are transferred into MindSphere in settable cycles. In MindSphere, these data are stored, evaluated, and further processed across all devices.

To handle the large volume of data in MindSphere, SENTRON Powercenter 3000 provides setup information in MindSphere. SENTRON Powercenter 3000 even offers cost-efficient handling of factors relevant to costs, such as data volume and transfer rate, in MindSphere. For a general understanding of communication with MindSphere, we recommend the manual Getting connected to MindSphere V3 (https://documentation.mindsphere.io/resources/pdf/getting-connected-en.pdf).

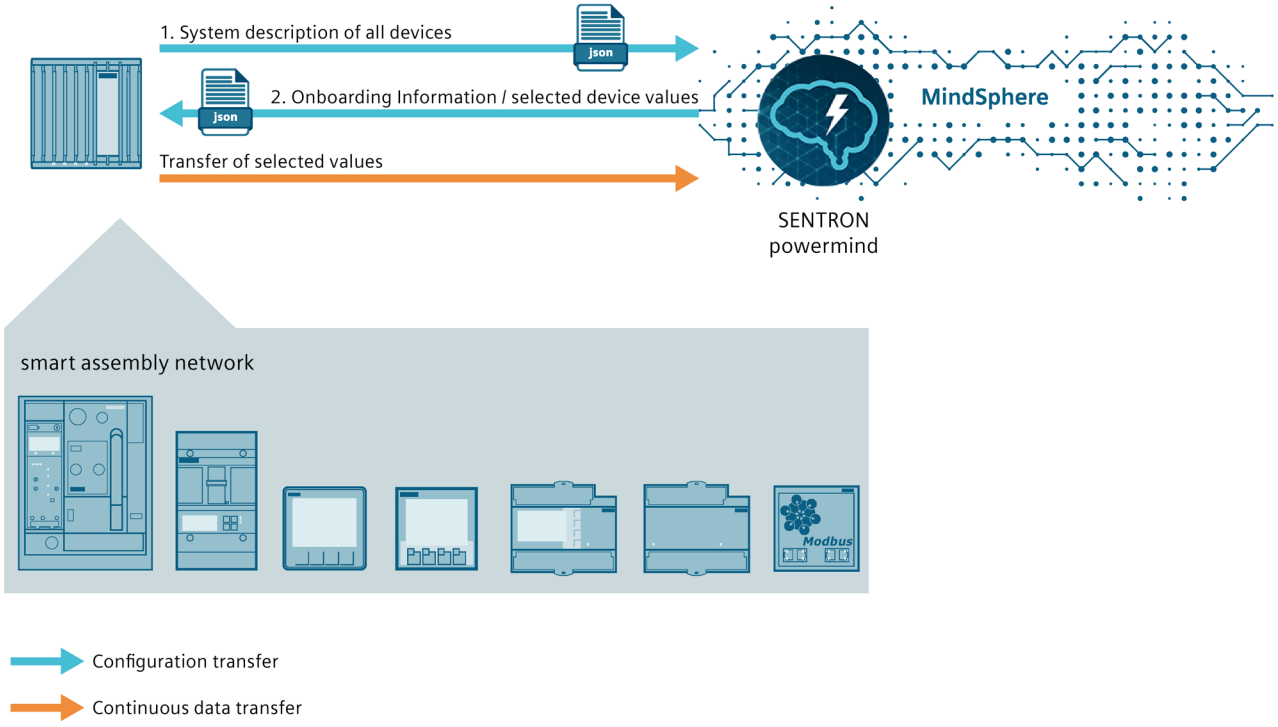
Performance features of SENTRON Powercenter 3000:

- Mapping of the connected SENTRON devices on one device, referred to as asset.
- Optimized data volume to MindSphere.
- Simple, fast and web-based onboarding (= logon)
- Supports MindSphere application "SENTRON powermind" for many SENTRON devices in a special way. See Communication with SENTRON powermind (Page 108).
- Supports any MindSphere application, e.g. Fleet-Manager, through the specific provision of data from the smart switchgear assembly. See MindSphere application support (Page 110).
- If communication with MindSphere is interrupted, up to 250,000 data points are buffered in SENTRON Powercenter 3000 and are subsequently transmitted when communication becomes available.
- Transmission in time slices, i.e. with a polling cycle of 15 minutes, for example, the data points are read and transmitted by the device every 0, 15, 30, 45 minutes of each hour. This primarily serves to improve the evaluation of energy counter values. The same applies to MQTT.

5.7.1 Communication with SENTRON powermind

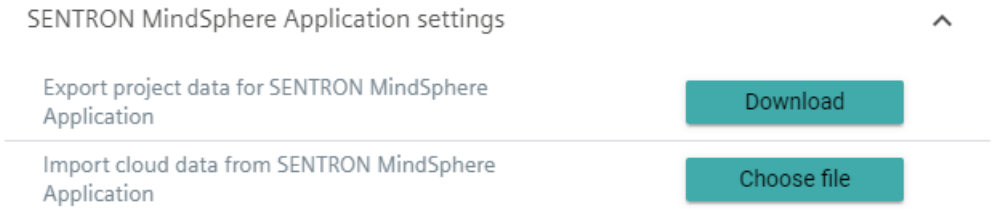
SENTRON powermind creates transparency for low-voltage power distribution by providing a cloud-based solution that eliminates the need for an on-site energy management system. The perfect interaction of SENTRON Powercenter 3000 and SENTRON powermind is reflected in the simple and quick onboarding process and in the predefined views (so-called dashboards).

The values from the power distribution are processed, stored and analyzed in SENTRON powermind, and displayed in dashboards, curves and comparisons. Further details on SENTRON powermind and ordering are available in the MindSphere Store (DEX - Digital EXchange (https://www.dex.siemens.com/ccrz__ProductList?operation=quickSearch&searchText=powermind)): There you will also find further details on the open cloud-based Eco system of Siemens.



5.7.1.1 Setting the SENTRON MindSphere application with SENTRON POWERCENTER 3000

The current setup of SENTRON Powercenter 3000 (system structure and device parameterization) is saved in a file (*.json) via the web user interface "Settings → Cloud → MindSphere → Export project data for SENTRON MindSphere application".



This file (*.json) is used by SENTRON powermind to automatically generate the IoT data model and select the device dashboards. The device selection made by the user and the MindSphere onboarding key are stored in a response file (*.json).

This response file (*.json) is provided to SENTRON Powercenter 3000 via "Settings → Cloud → MindSphere → Import cloud data".

Note

Automatic onboarding

After the file has been imported, this data is interpreted, an encrypted communication with MindSphere is established and authentication is performed. The MindSphere service must be started explicitly for data transmission (see Onboarding with SENTRON Powercenter 3000 (Page 112)).

This process must be actively completed by the user via "Start data transfer", see Starting MindSphere data transfer (Page 114).

This procedure must be repeated if setup changes are required.

Setup changes may be required due to changes in the SENTRON Powercenter setup or due to an increased demand for information from SENTRON powermind.

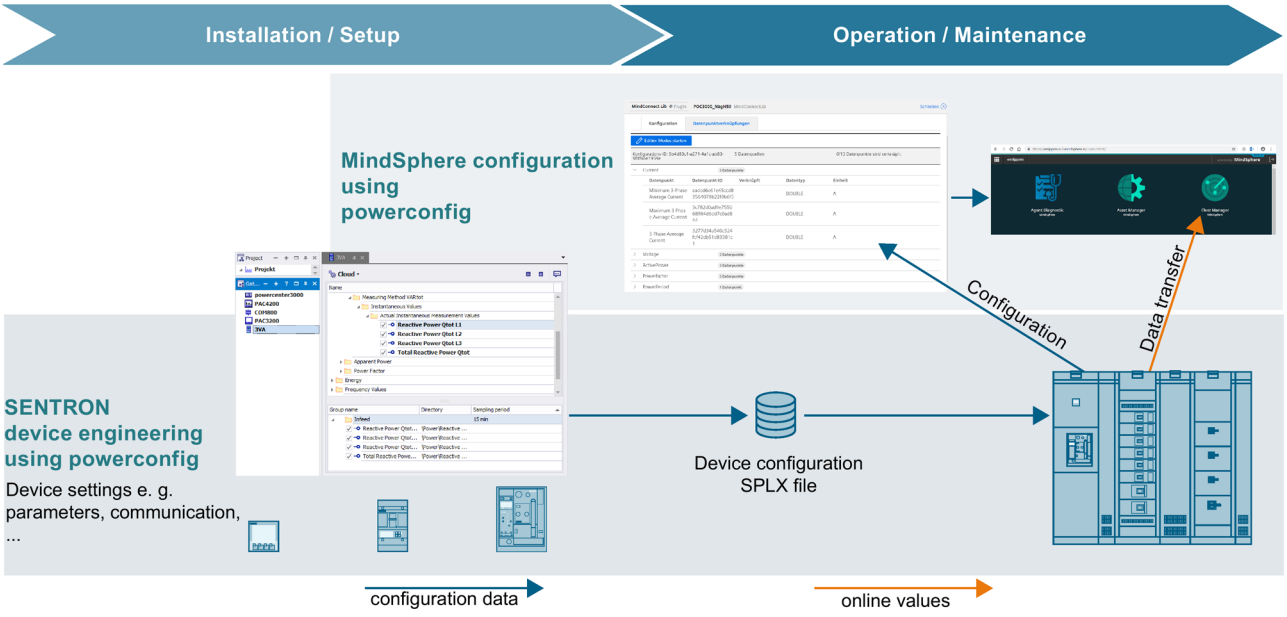
5.7.2 MindSphere application support

SENTRON Powercenter 3000 provides the smart switchgear assembly with selected data to support any MindSphere application, e.g. Fleet-Manager.

These can be performed in definable cycles (1 s, 5 s, 15 s, 30 s, 1 min, 5 min, 15 min, 30 min, 1 h, 4 h, 12 h, 24 h).

MindSphere requirements:

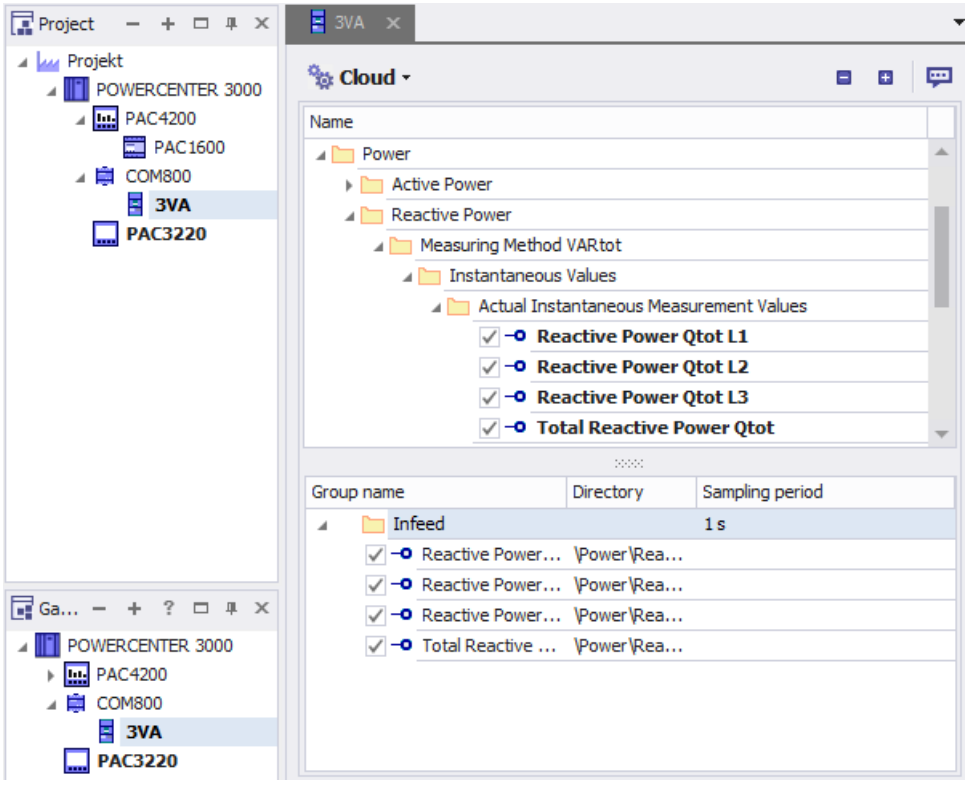
To do this, the requirements defined in section "Onboarding of MindConnect Elements" of manual Getting connected to MindSphere (https://documentation.mindsphere.io/resources/pdf/getting-connected-en.pdf), must be met.



5.7.2.1 Grouping the information

To prepare them, the data of the individual devices must be grouped in SENTRON powerconfig in the "Cloud" view and be given a name and transmission cycle.

These groupings are handed over to the SENTRON Powercenter 3000 via the splx file to be imported (see First commissioning (Page 68)).



5.7.2.2 Onboarding with SENTRON Powercenter 3000

Onboarding connects SENTRON Powercenter 3000 to the corresponding MindSphere account. Onboarding is required for all types of MindSphere communication.

The SENTRON Powercenter 3000 is logged onto a MindSphere "Tenant" or "Subtenant" with the onboarding key of an asset of type "MindConnect Lib".

Note

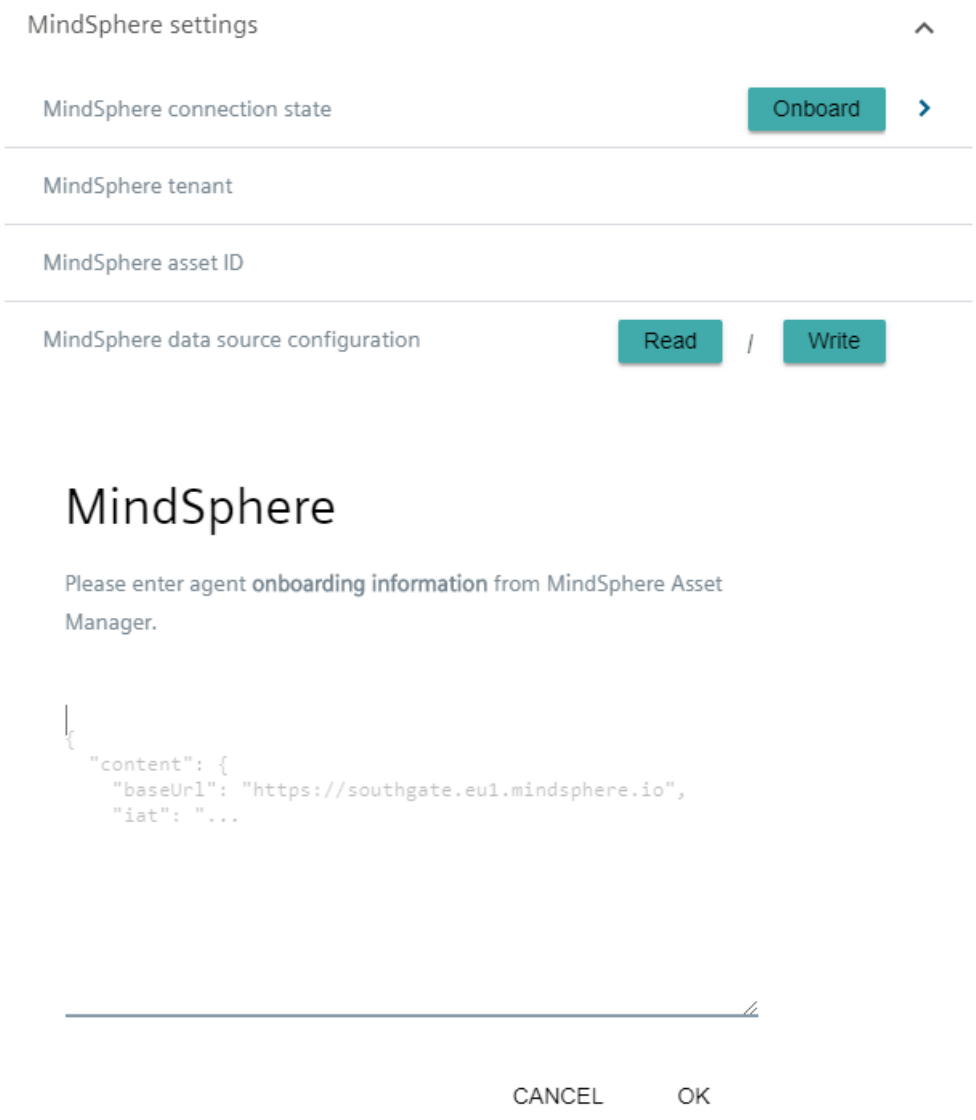
Make sure that the key generation SHARED_SECRET is set.

Note

Generating the onboarding key

Proceed as described in "Onboarding of MindConnect Elements" in "Getting connected to MindSphere (https://documentation.mindsphere.io/resources/pdf/getting-connected-en.pdf)" to generate the onboarding key.

1. In the web user interface, select "Settings → Cloud → MindSphere" and open the onboard dialog box under "MindSphere connection state".



2. Copy the generated onboarding key from MindSphere to the cursor position.
3. Close the dialog box with OK. The tenant and the asset ID are displayed.

5.7.2.3 Transferring the manual settings in MindSphere

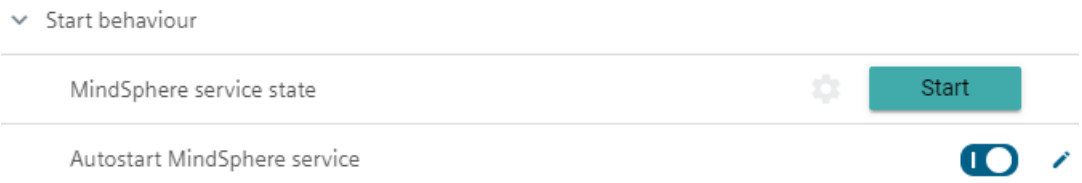
When the MindSphere data source setup is written, the data points are set up in the asset and are made available in the MindSphere applications.

After transferring the manual settings, the data points must be assigned individually to Aspects & Types in the MindSphere asset manager.

See section Configuring data in the Asset Manager (https://documentation.mindsphere.io/resources/pdf/getting-connected-en.pdfhttps://support.industry.siemens.com/cs/ww/en/view/109755908).

5.7.3 Starting MindSphere data transfer

Data transfer to MindSphere can be started via "Web user interface → Settings → Cloud → MindSphere → Data transfer" or set to autostart so that it starts after power on.



Of course, the service can be stopped and started again, e.g. if reparameterization (see Grouping the information (Page 111) and Transferring the setup to MindSphere (Page 114)) is necessary.

5.8 Cloud service with MQTT

The digitalization environment is very varied. For this reason, SENTRON Powercenter 3000 supports integration of the communication-capable SENTRON devices and other Modbus devices (see section Modbus devices) in cloud systems that provide an MQTT interface.

Benefits of the MQTT interface: MQTT is the language of the Internet of Things (IoT). A low-voltage power distribution system can be connected to cloud systems via the MQTT interface of the SENTRON Powercenter 3000 and the connected devices.

With the necessary expertise, SENTRON Powercenter 3000 ≥V1.2 can be integrated via cloud technology and data preparation via HTML into other clouds, provided these support the **MQTT protocol** (Message Queuing Telemetry Transport) according to the **publisher / subscriber** principle.

In this case, SENTRON Powercenter 3000 is the publisher that publishes its information under the configured MQTT topic. The cloud service functions as an MQTT broker to which other applications can connect and subscribe to the relevant MQTT topics. The information that SENTRON Powercenter 3000 provides can be further processed in this way.

See:

- Microsoft Azure (https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-mqtt-support)
- Amazon Web Services (= AWS) (https://docs.aws.amazon.com/iot/latest/developerguide/topics.html)

Further cloud systems are also possible if the MQTT settings can be made to match in "Settings → Cloud → MQTT".

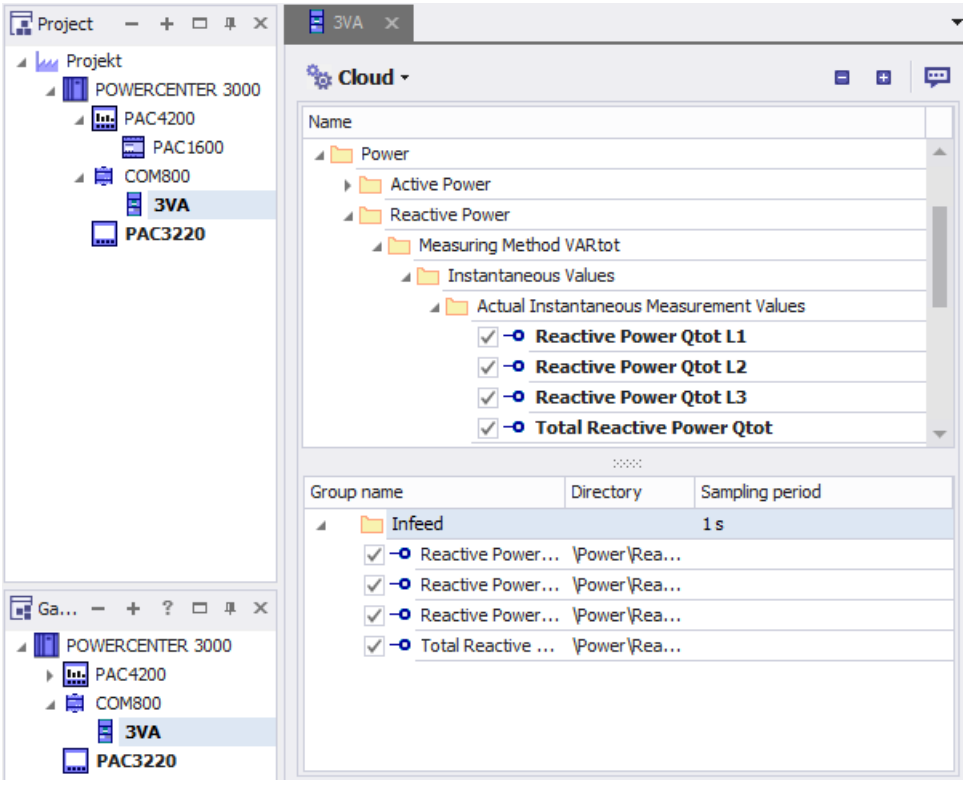
Performance features of SENTRON Powercenter 3000:

- Mapping of the connected SENTRON devices and Modbus devices to an MQTT publisher.
- Optimized data volume thanks to specific selection of the variables to be provided, see section Selecting values for the cloud (Page 116).
- Support of different login procedures, both with user name and password and with certificates for encryption, see section Connecting SENTRON Powercenter 3000 to the cloud (Page 117).
- Provision of data in the form of a JSON file, see section Analyzing the database (Page 118).
- Full provision of the attributes of a data point in the form of a JSON file, see section Structure of the SENTRON Powercenter 3000 data points (Page 121).
- If communication with the cloud system is interrupted, up to 250,000 data points are buffered in SENTRON Powercenter 3000 and are subsequently transmitted when communication becomes available.

5.8.1 Value selection for the cloud.

Create a project in SENTRON powerconfig in the normal way with SENTRON Powercenter 3000 and the associated devices.

Group the data points to be provided by the SENTRON Powercenter 3000 for the individual devices in the SENTRON powerconfig "Cloud" view and define the sampling interval.



Complete the project as far as you can and load it onto SENTRON Powercenter 3000. See section Commissioning with SENTRON powerconfig (Page 51).

5.8.2 Connecting SENTRON Powercenter 3000 to the cloud

Parameter settings are made via the web user interface "Settings → Cloud → MQTT".

In the upper part, the parameters relating to communication are set.

Including:

- Starting the MQTT service
- The name of the broker is cloud-specific:
  - Microsoft Azure: "{iothubhostname}", depending on the name of the IoT hub that the user has created.
  - AWS: e.g. "az2timzd5iqx8my-ats.iot.eu-central-1.amazonaws.com", in this case the name is not freely selectable (at the beginning).

In the middle part, the parameters relevant to identification and security, incl. the certificates required for encryption, are defined.

In the lower part of the setting range, forwarding of information is defined.

- The topic to which the measured variables are to be pushed as the payload in the described format. The topics may by cloud-specific:
  - Microsoft Azure: "devices/{MQTT-Client ID}/messages/events/", for example, "devices/powercenter3000_1/messages/events/ "
  - aws: Freely selectable, e.g. "myTopic"

Note

Knowledge of the specific cloud infrastructure and communication mechanisms is required for this parameter setting.

Ports 8883 or 1883 must be enabled for access in the IT network. See chapter Security performance features on the external Ethernet interface (Page 45).

5.8.3 Analysis of the database

For an application to be able to work sensibly, the available database must be made accessible to it, i.e. the possible data of the data publisher must be made available to the data subscriber.

The devices of the SENTRON Powercenter 3000 are shown in the project tree.

Information about the project tree can be read out at

http://{IP address}/api/v1/items

using any browser.

The individual items can then be analyzed with

http://{IP address}/api/v1/items/{item-id}

The following analysis methods are recommended:


```
{
  "count": 32,
  "total": 32,
  "_links": {
   "self": {
    "href": "/api/v1/items",
    "method": "GET"
   }
  },
  "_embedded": {
   "item": [
    {
     "id": "81969b12-4725-47b5-8e9c-0a5736fd64cd",
     "type_name": "Project",
     "name": "B166",
     "address": "",
     "parent_id": "00000000-0000-0000-0000-000000000000",
     "child_ids": [
      "659be757-222b-485c-964a-8dda6c42412d"
     ],
     "_links": {
      "self": {
       "href": "/api/v1/items/81969b12-4725-47b5-8e9c-0a5736fd64cd"
      }
     }
  },
  {
     "id": "659be757-222b-485c-964a-8dda6c42412d",
     "type_name": "powercenter3000",
     "name": "B166",
     "address": "192.168.2.36:80",
     "plant_id": "",
     "mbgw_address": "192.168.2.36:502/255",
     "parent_id": "81969b12-4725-47b5-8e9c-0a5736fd64cd",
     "afd63aa4-c685-4a77-8208-c3ce26c0b3ec",
     "child_ids": [
      "4045dd71-c5ac-4a67-ad58-89dc281daa8e",
      "fe0c9c0e-deb0-4dec-96cf-0078d14967a9",
      "6bc89b91-347b-40b9-baec-a6ff875363e6",
      "25b7aa44-92d2-454a-98c3-f19cf70e98c3",
      "2f178eb1-44b2-4f8a-ae49-937efa39e1da",
      "011df560-e700-49f7-8a1f-e817a5d48455"
     ],
     "_links": {
      "self": {
       "href": "/api/v1/items/659be757-222b-485c-964a-8dda6c42412d"
      }
     }
  },
  {
     "id": "afd63aa4-c685-4a77-8208-c3ce26c0b3ec",
     "type_name": "Folder",
     "name": "1.Floor",
     "address": "",
```

```
    "parent_id": "659be757-222b-485c-964a-8dda6c42412d",
    "child_ids": [
     "a51ea5dc-d0f6-4150-8dd5-f3a8851473e9",
     "de87cd09-f9df-4b96-8484-6e5dfaff3a83",
     "f0d651ac-3746-483b-9738-bac29c9220c8",
     "52e81910-810c-4036-bb41-852c70b2cdb4"
  ],
  "_links": {
   "self": {
    "href": "/api/v1/items/afd63aa4-c685-4a77-8208-c3ce26c0b3ec"
   }
  }
 },
 {
  "id": "a51ea5dc-d0f6-4150-8dd5-f3a8851473e9",
  "type_name": "PAC2200",
  "name": "F1.AirCon PAC2200",
  "plant_id": "B166.F1.AirCon",
  "address": "192.168.2.61:502",
  "mbgw_address": "192.168.2.36:502/1",
  "monitoring": {
   "state": "connected"
  },
  "parent_id": "afd63aa4-c685-4a77-8208-c3ce26c0b3ec",
  "child_ids": [],
  "_links": {
   "self": {
    "href": "/api/v1/items/a51ea5dc-d0f6-4150-8dd5-f3a8851473e9"
   }
  }
 },
```


Finally, it is possible to generate the project tree from SENTRON powerconfig again with the essential information, including:

- Device name
- Device type
- IP address
- Plant identifier
- And its internal **identifier**, which can be used to identify the data source.

See also

Connecting SENTRON Powercenter 3000 to the cloud (Page 117)

5.8.4 Structure of the SENTRON Powercenter 3000 data points

The subscribed data points are supplied with the following structure:

```
{
 "item_id": "ea86dfb4-cf6b-47c6-8261-8b215efcd1f3",
 "count": 1,
 "total": 1,
 "_embedded": {
  "item": [
   {
    "name": "active_power",
    "id": 80,
    "internal_name": "Power/W/Inst/Value/Sum",
    "display_name": "Total active power",
    "display_value": "906.3 W",
    "value": "906.315",
    "unit": "W",
    "quality": "valid",
   }
  ]
 }
}
```

Structure			Description
item_id			Identification of the device in the SENTRON Powercenter 3000. Further information about the item can be retrieved via: {IP-Adresse}/api/v1/items/{item_id}
count			Number of data points in the following list.
Total			Reserved
_embedded			Reserved
item			Data point
	name		Name of the data points in the device. If it is filled out, this name is identical for all SENTRON devices that offer this measured variable.
	id		Reference of the data point in the device.
	internal_name		Internal name in the SENTRON Powercenter 3000
	display_name		Name to be displayed on the user interface. This name is identical to the name in the web user interface of the SENTRON Powercenter 3000, i.e. text in the language matching the settings of the SENTRON Powercenter 3000 ("Settings → Miscellaneous").
	display_value		Data point value prepared for display in the display format, i.e. text in the language and time zone ("Settings → Miscellaneous") (notation, separator) in accordance with the web user interface of the SENTRON Powercenter 3000.
	value		Value of the data point in the stated unit ("unit"). This value is typically used for further processing.
	unit		Unit of the value, e.g. W = watt, kWh, etc. in ASCII format.
	quality		Current status values, as a string.
		valid	Valid
		invalid	Currently invalid. The source of the fault must be determined separately.
		not_supported	Value is not supported, for example, because the type or value is not supported in the current device setup.

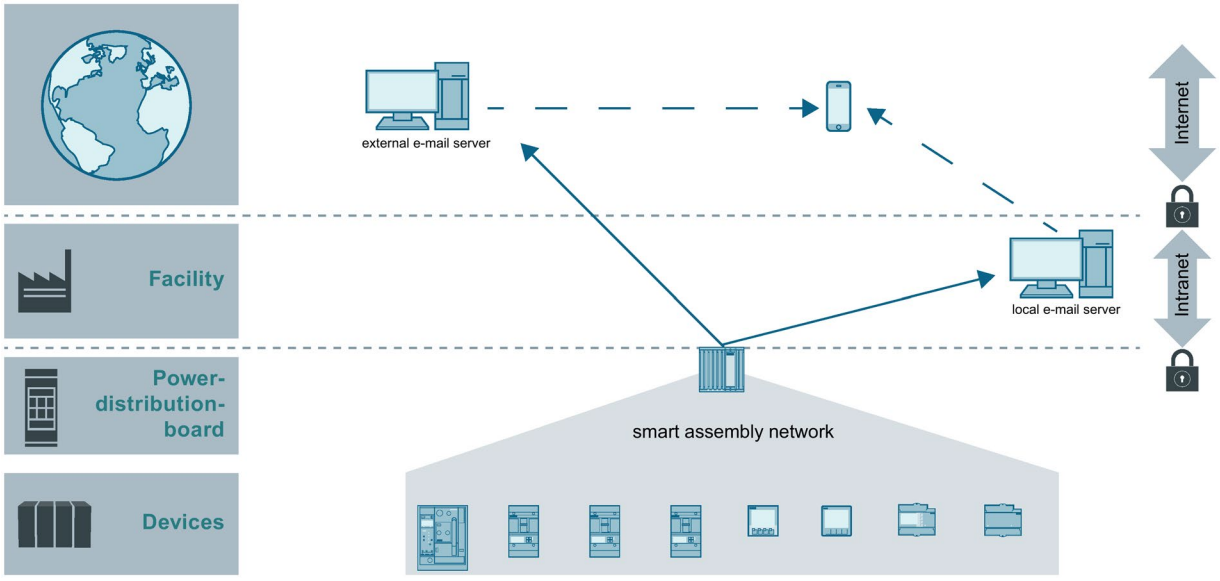
5.9 Notification of exceptional situations

Benefits of a notification:

Notification of an event is helpful if it is performed

- at the right place
- in a timely manner and
- in the right dosage.

SENTRON Powercenter 3000 provides notification signaling via the web user interface and via email.



Emails can be received any place, any time with modern devices, such as smartphones.

5.9.1 Setting the notifications

For the SENTRON Powercenter 3000, notification via the web user interface (see Messages (Page 84)) and by email can be activated.

This can be done either with SENTRON powerconfig or in the web user interface under "Settings → General → Notifications".

5.9.2 Connecting to an email server

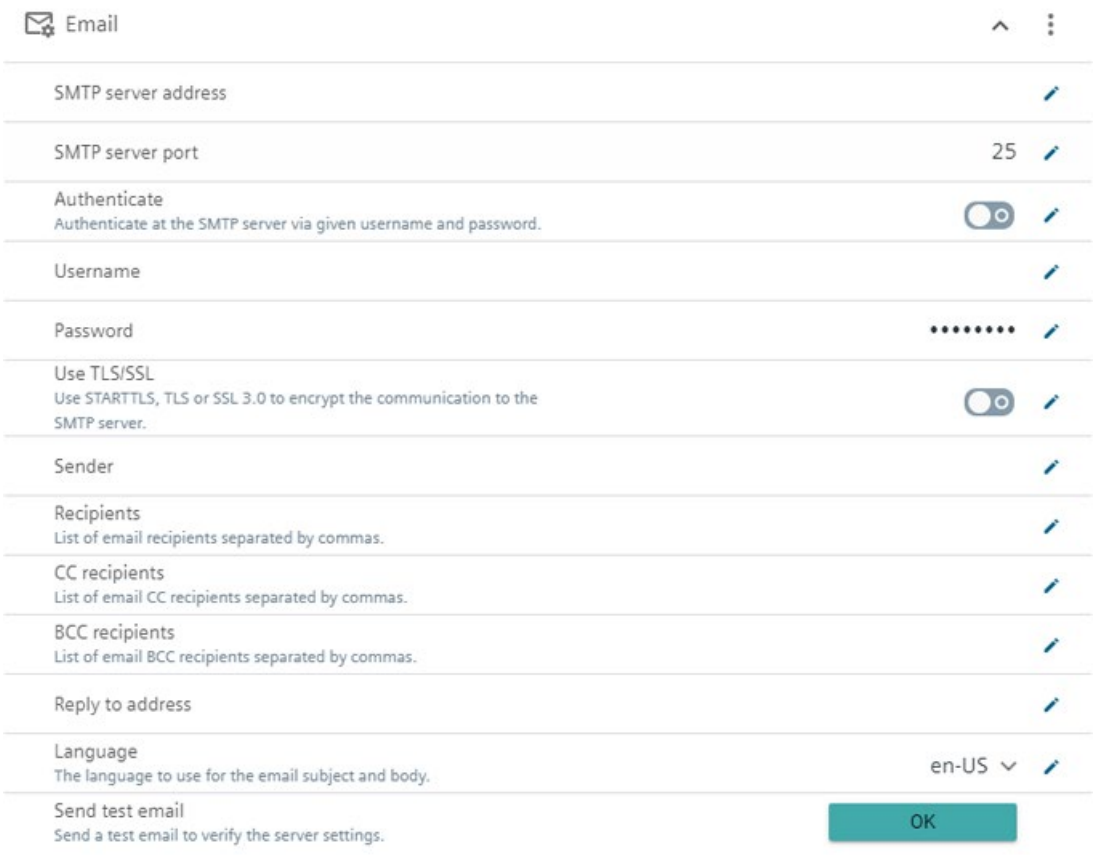
Messages can be acquired with SENTRON Powercenter 3000 (see Messages (Page 84)). These messages can be forwarded by email.

For this purpose, SENTRON Powercenter 3000 must be set up as a mail client for a mail server.

This can be done either with SENTRON powerconfig or in the web user interface under "Settings → General → Email".

If an email server is used that requires both user name and password, e.g. gmx or yahoo, the setup can be done only via the web user interface for security reasons.

On completion of setup or commissioning, a test email can be sent to test the settings.



5.9.3 Selection of events to be reported

The dosage of events to be reported is controlled by means of several steps.

1. For the individual branches of a power distribution system, the events to be reported can be set according to cause and severity on the SENTRON devices in SENTRON powerconfig using the "View" parameter in the Events section.
2. With SENTRON Powercenter 3000, the events to be reported can be further qualified according to possible causes such as

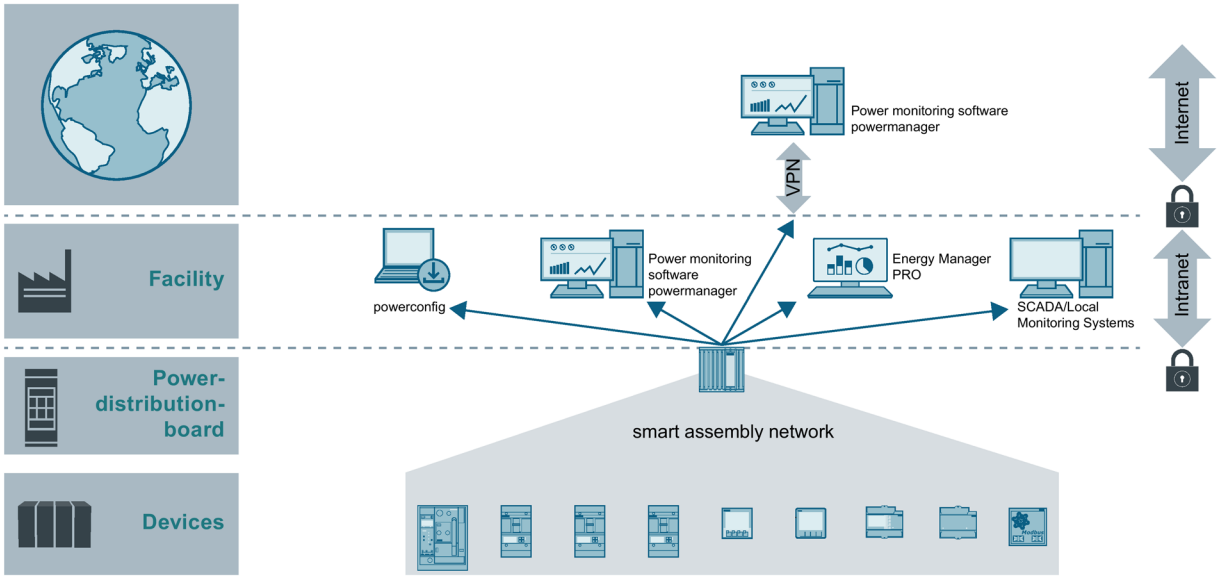
- Disruption of a function/service of SENTRON Powercenter 3000
- Circuit breaker tripping, alarm
- Device alarm, e.g. limit violation
- Operator action.

This can be done either with SENTRON powerconfig or in the web user interface under "Settings → General → Events".

This ensures that event messages focus on the essential information.

5.10 SENTRON Powercenter 3000 as a Modbus gateway

SENTRON Powercenter 3000 provides a Modbus TCP interface for a smart switchgear assembly. Not only Siemens systems such as SENTRON powerconfig, powermanager and SIMATIC Energy Manager PRO but also other SCADA, energy monitoring and maintenance management systems can communicate via this interface.



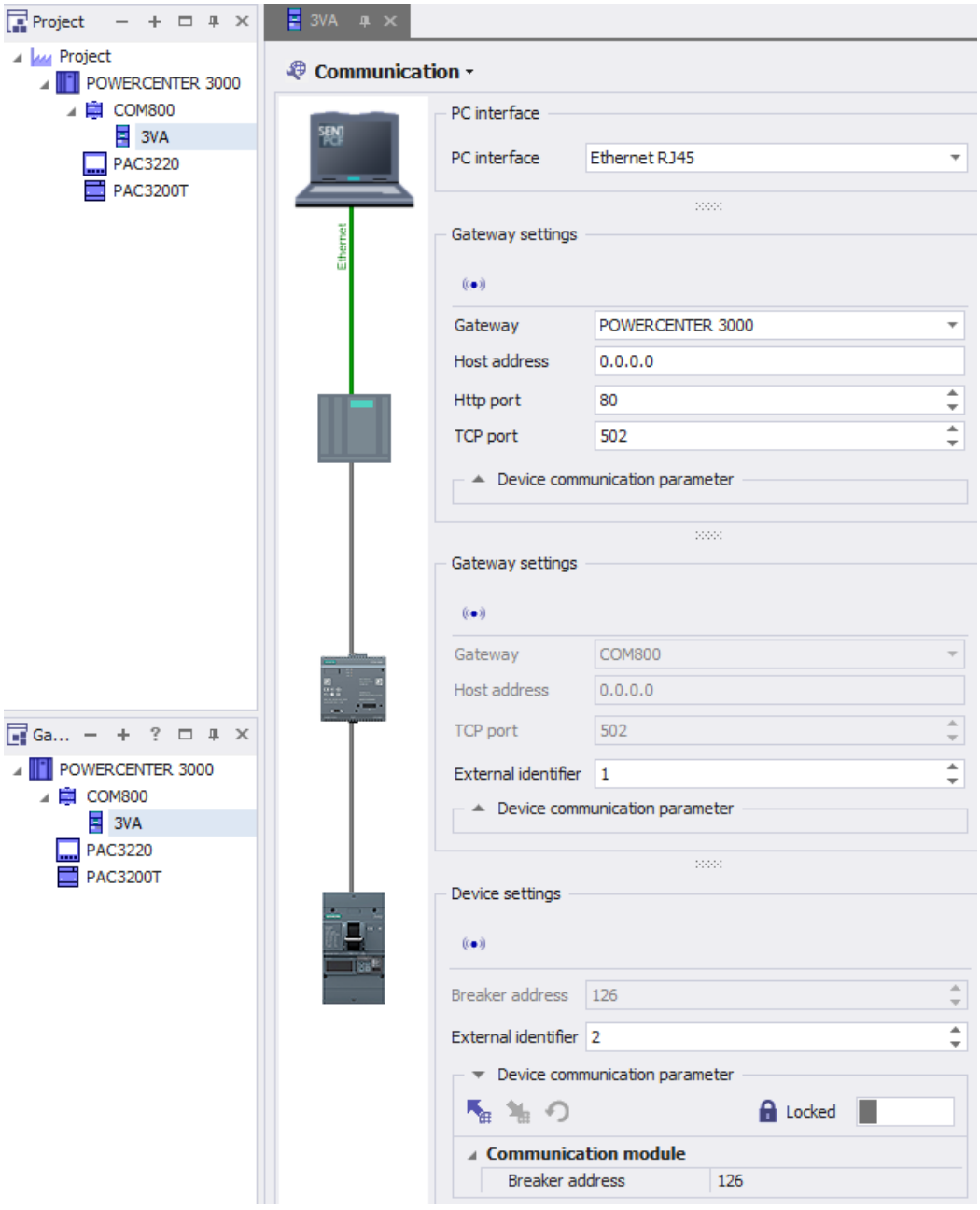
Benefits:

At many locations, there are software applications that obtain and process information via Modbus TCP, either from SIEMENS, such as powermanager, or from other vendors. With SENTRON Powercenter 3000, communication access with an IP address is offered to these applications.

5.10.1 Addressing via the SENTRON Powercenter 3000 gateway

In SENTRON powerconfig, an "External Identifier" can be assigned to each device that is connected to SENTRON Powercenter 3000.

This identifier identifies the device **independently** of its network address, such as switch address for 3VA, internal IP address for COM800, or Modbus RTU on RS485 networks.



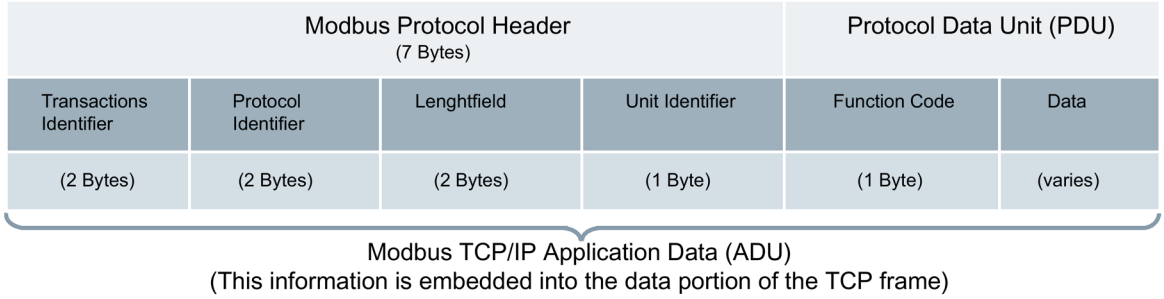
On a SENTRON Powercenter 3000, identifiers can be assigned in the value range 1 to 247. The number of devices actually supported on a SENTRON Powercenter 3000 is shown in the technical data. See Functional scope of the SENTRON Powercenter 3000 (Page 171).

The external identifiers are assigned automatically by SENTRON powerconfig and stored in the SENTRON Powercenter 3000 configuration. However, the external identifiers can also be configured, e.g. if the configuration has to be adapted to an existing software program. SENTRON powerconfig checks that the external identifiers are unique and requests that they are corrected if necessary.

Note

SENTRON powerconfig automatically uses the addressing method described below to access the devices on the smart assembly network. With powermanager, the IP address of the SENTRON Powercenter 3000 and communication via gateway must be activated and the external identifier entered as a unit address.

For addressing, the external identifier is put into the unit ID of the Modbus TCP protocol.



5.10.2 Method of operation of the SENTRON Powercenter 3000 Modbus TCP gateway

The Modbus TCP Gateway serializes all incoming access, irrespective of the particular applications (= TCP connections).

It is then

- possible that multiple applications may access the connected devices in parallel, and
- applications that impact each other adversely, e.g. because of write access to the same registers, must therefore be coordinated.

The performance is also restricted, in particular if the access is forwarded via a Modbus TCP/RTU gateway (PAC4200).

5.11 Time synchronization

Time is the basis of all information.

For this reason, SENTRON Powercenter 3000 offers various options for synchronizing the time or setting the respective time zone.

- Setup takes place via the web user interface: "Settings → General → Date / time".
- The time can also be set with SENTRON powerconfig ≥ V3.14 via the device menu.
- Requesting time via SNTP with up to 3 different NTP servers.

5.11.1 Time synchronization of the connected devices

The recording of processes over time is an important basis for digitalization. For this reason, SENTRON Powercenter 3000 synchronizes the date and time of day.

To do this, SNTP mode must be selected for the date/time in SENTRON powerconfig on the SENTRON devices and SENTRON Powercenter 3000 configured as the time source.

The following options exist:

- Synchronization of date/time of day by device request
- Synchronization of date/time of day by SNTP server broadcast
- Synchronization of date/time via Modbus commands
  If the "Time synchronization" service is activated, SENTRON Powercenter 3000 sets the time of all connected devices via Modbus unless the devices reject this due to a different configuration.

  So devices connected via Modbus RTU are also supported. This ensures that all lower-level devices use the same date/time settings which is important, especially for evaluations, e.g. of energy consumption. Presetting is carried out via Modbus commands in a fixed time grid. The "Time synchronization" function is activated via the web user interface: "Toolbar → Services overview (Settings)".

- If SNTP mode is active for a connected device, time synchronization is rejected by the device.

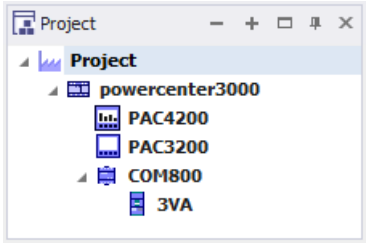
5.12 Saving and further processing setup

SENTRON Powercenter 3000 is typically configured via SENTRON powerconfig (see First commissioning (Page 68)).

The need to make (minor) changes locally can arise. This can be done via the web user interface under "Settings".

To archive, document, and further use these changes, the setup can be exported.
See "Settings → Actions → Project → Export project".

This project can be further processed with SENTRON powerconfig, e.g. printed out.



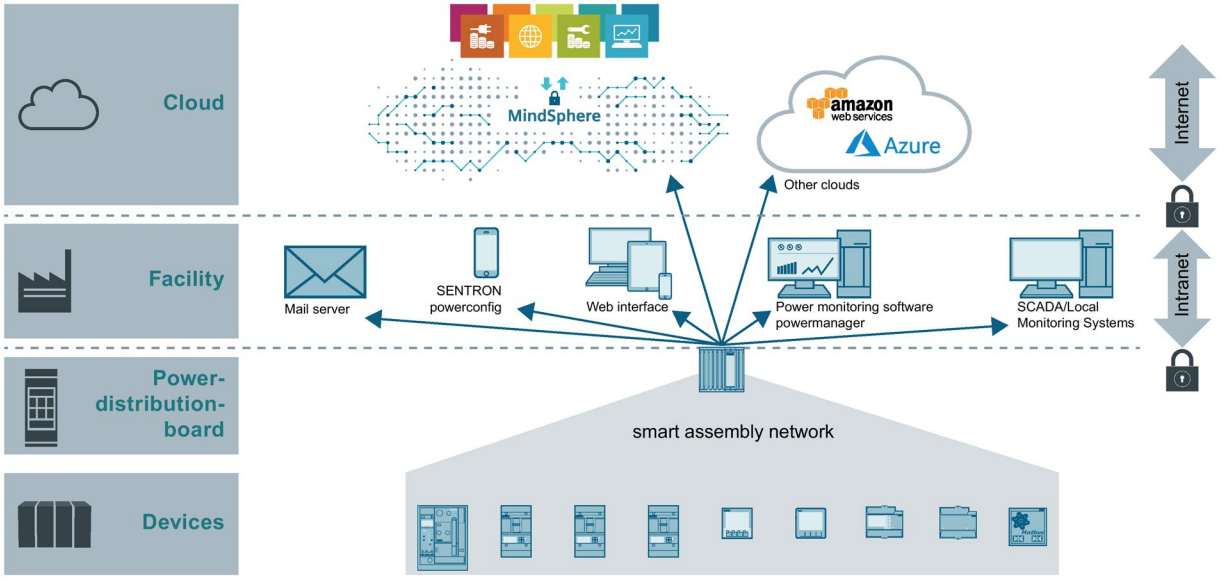
Application examples

6

SENTRON Powercenter 3000 can be used versatilely in industry, infrastructure and e.g. commercial buildings.

Its applications include

- Web-based representation of a smart switchgear assembly directly on the power distribution board or in the intranet
- The communications interface with software applications on site, e.g. powermanager or SENTRON powerconfig, or even SCADA systems (Supervisory Control and Data Acquisition)
- Cloud-based application, e.g. in the Siemens MindSphere with the SENTRON powermind application
- Other cloud systems
- Digitalization of existing low-voltage power distribution systems



In addition to this classic structuring, various software applications are possible on PCs or mobile devices.

Irrespective of the specific application, the external interface can be adapted to the security requirements of the network setup.

6.1 Network environments

So far, the devices of the low-voltage power distribution board have been operated in separate, protected networks. This means that, for further expansion, additional network concepts are required.

SENTRON Powercenter 3000 differs from previous SENTRON devices in that these external network structures are actively used.

See also

Further recommended security measures (Page 47)

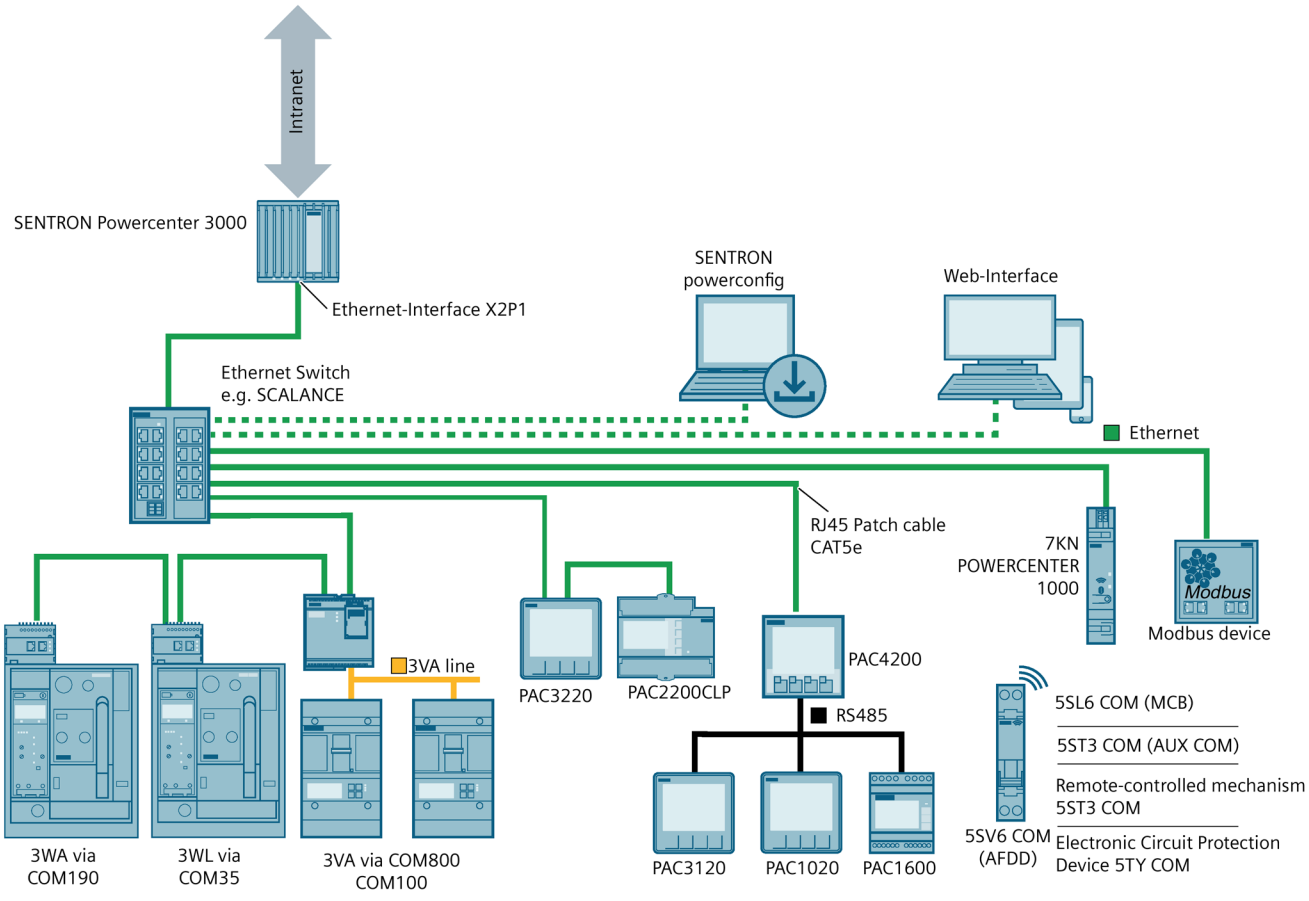
Communication with SENTRON powermind (Page 108)

Security features (Page 44)

6.1.1 Internet communication

It is assumed that the smart assembly network is a physically protected network installed in the switchboard that is accessible only via SENTRON Powercenter 3000. In particular, routers to additional networks are not recommended.

SENTRON Powercenter 3000 in the smart assembly network



The devices are networked with an Ethernet switch, e.g. SCALANCE, and RJ45 patch cables of quality CAT-5e or better.

SENTRON Powercenter 3000 supports the digitalization of existing, cost-optimized power distribution systems, in which Modbus devices from other manufacturers can be integrated in Ethernet and 7KT PAC1600 on RS485 networks.

The smart assembly network is connected to the internal Ethernet interface X2P1 of the SENTRON Powercenter 3000.

To commission the SENTRON devices, a free Ethernet interface should be used for a PC with SENTRON powerconfig on the smart assembly network.
The splx file produced in SENTRON powerconfig during commissioning is transferred in full to the SENTRON Powercenter 3000. SENTRON Powercenter 3000 then recognizes all connected devices.

Note

At the internal interface, all services, e.g. web user interface, Modbus gateway are activated on delivery. For this reason, commissioning for the first time must be performed via the internal Ethernet interface X2P1.

Unwanted services should be deactivated for security reasons (= hardening). See Settings → General → Internal communication (X1P2).

The smart assembly network is connected to the Ethernet interface X2P1.

Some SENTRON devices, e.g. the Switched Ethernet PROFINET extension module and PAC3220, have 2 Ethernet ports. These devices can be directly connected using a patch cable. This enables short cables to be used and reduces cabling work.

Note

The failure of one of the devices interrupts communication to the devices behind it. This can be avoided by building a ring with the Switched Ethernet module PROFINET and a SCALANCE switch with MRP (Media Redundancy Protocol).

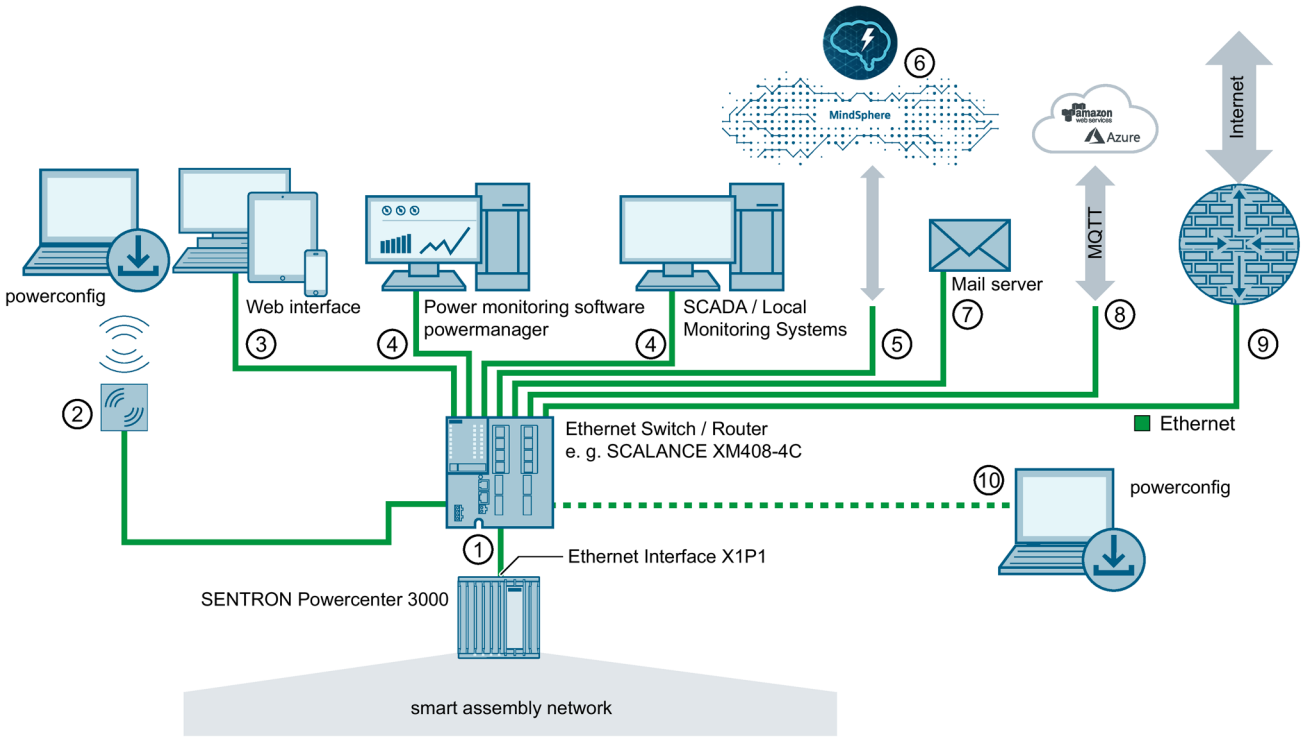
6.1.2 External communication

SENTRON Powercenter 3000 is used as a router from the smart assembly network to the external network

The SENTRON Powercenter 3000 should be operated only in a well-defined intranet.

An intranet is characterized by the fact that only trusted network nodes are connected or should be connected. Trustworthiness is supported by various security measures (see Security features (Page 44)). Options directly relating to the SENTRON Powercenter 3000 are presented here.

The intranet is connected to the Ethernet interface X1P1.



① SENTRON Powercenter 3000 is connected to a router via the external Ethernet interface X1P1. This router, e.g. SCALANCE XM408-4C, represents the intranet.

② If access via wireless LAN (WLAN, WiFi) is enabled, e.g. for SENTRON powerconfig, this WLAN should only be used for this purpose and be accessible to a restricted range of nodes.

③ Multiple web user interfaces can be operated on the external Ethernet interface of the SENTRON Powercenter 3000. Because the behavior and the setup of the SENTRON Powercenter 3000 are accessible via a web user interface, protection via an IP filter is also offered here. On no account must the web user interface of the SENTRON Powercenter 3000 be accessible from the Internet without protection.

- The web user interface can be protected via the login function for users with different roles and consequent rights.
- The web user interface can be restricted to pure display functions by web server write protection.

④ SENTRON powermanager, Energy Manager PRO and many third-party applications, e.g. SCADA systems, today communicate with SENTRON devices in the intranet via Modbus TCP and will continue to do so. These applications can continue to be used and expanded with SENTRON Powercenter 3000. Communication via the Modbus TCP gateway should only be permitted to nodes whose IP address/address range is entered in the IP filter (= firewall allowlist).

⑤ Communication with MindSphere is established by SENTRON Powercenter 3000. The target address is taken from the onboarding key of MindSphere. Connection to port 443 for the https communication protocol is enabled by default in most firewalls. Because of the https protocol, the data stream is encrypted and cannot therefore be decoded by third parties.

⑥ With powermind, SENTRON offers a MindSphere application for full transparency in low-voltage power distribution, which is supported by SENTRON Powercenter 3000 ≥ V1.1 in a special way.

⑦ Both a private email server in the intranet and a public email server in the Internet can be used.

⑧ Communication by means of MQTT with a defined cloud is established by SENTRON Powercenter 3000. Port 8883 must be enabled in the network infrastructure / firewall.

⑨ SENTRON Powercenter 3000 can generally communicate with partners on the Internet. In particular, activation of the write protection for the web user interface is advisable.

⑩ Alongside all other communication paths, access for an optional SENTRON powerconfig is expedient as long as the security risks are within reason. In this case, too, the IP filter with the firewall allowlist is recommended.

Note

At the external interface, all services, e.g. web user interface, are deactivated by default and have to be activated to be used. We recommend that only the services that are actually required are activated (= hardening). See "Settings → Actions → Services".

See also

Connecting to an email server (Page 123)

Further recommended security measures (Page 47)

Communication with SENTRON powermind (Page 108)

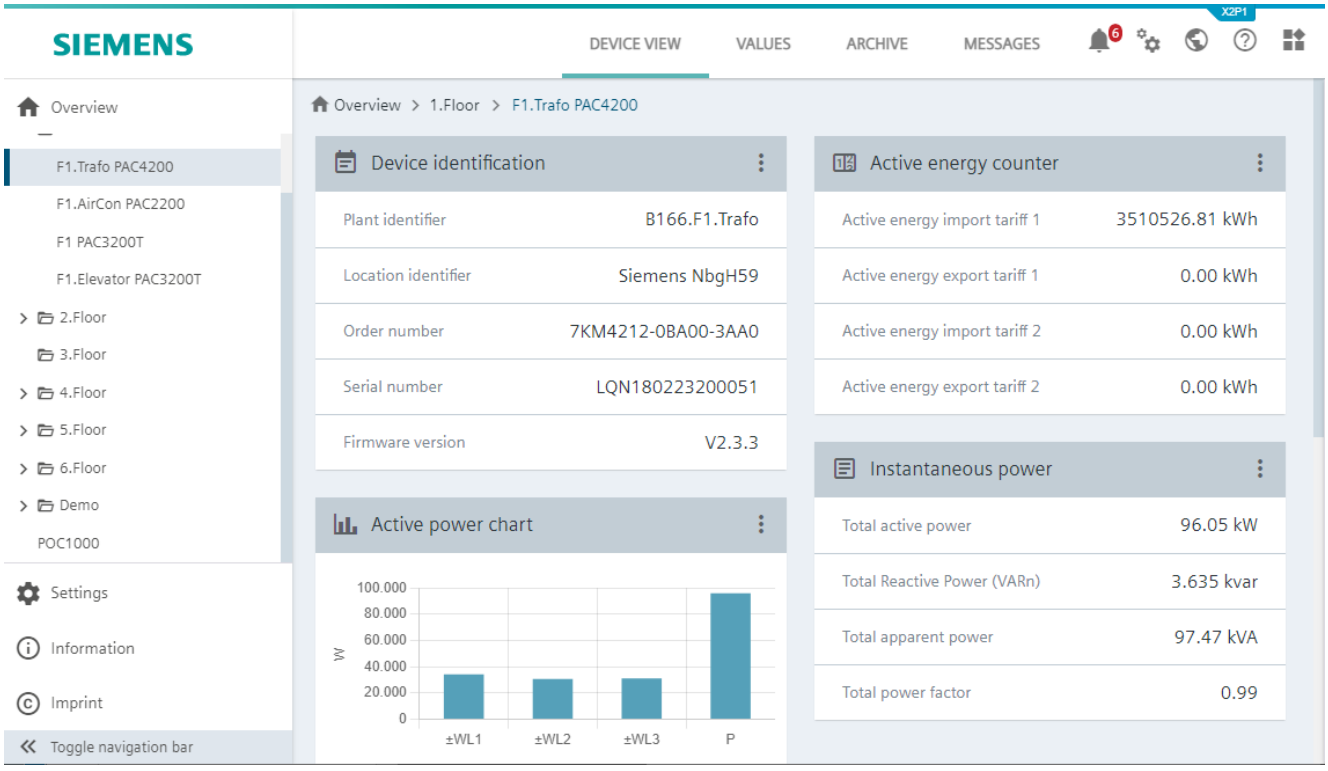
Cloud service with MQTT (Page 115)

6.2 Web-based applications

A web browser is already installed on many PCs and tablets and can be activated and operated with minimal IT skills. The web user interface is especially suitable for temporary applications because it is usually unnecessary to install any software. It suffices to enter the IP address or the hostname (see "Settings → General → Communication") in the address line of the browser if IP communication between web application and SENTRON Powercenter 3000 is assured.

For HTML5-capable web browsers, e.g. Chrome, SENTRON Powercenter 3000 provides a web user interface with which the power distribution information can be displayed clearly by the connected devices.

You will find the web user interface of the SENTRON Powercenter 3000 in Web user interface (Page 77).



6.2.1 Local visualization of a switchboard

The web user interface can be used both on the external Ethernet interface and the internal Ethernet interface.

With a web panel on SENTRON Powercenter 3000, it is easy to set up local visualization on a switchboard.

6.3 Entry into energy management in accordance with ISO 50001

Energy management is becoming more and more important. Software solutions require both investment and administration work.

SENTRON Powercenter 3000 provides a simple and low-cost entry-level solution for energy management in compliance with ISO 50001.

The energy values of the connected measuring instruments and circuit breakers can be archived for up to 14 months and exported

- periodically or
- on request

as a csv file. See section Exporting recorded data (Page 92).

These csv files can be stored for documentation and evaluated individually as required. They can be displayed as curves using standard tools, e.g. Excel.

Siemens also provides more advanced energy monitoring systems with powermanager and SENTRON powermind.

SENTRON Powercenter 3000 supports both powermanager, via the Modbus gateway (Page 125) function, and SENTRON powermind (Page 108).

SENTRON Powercenter 3000 therefore provides an entry into energy management that offers many options for expansion.

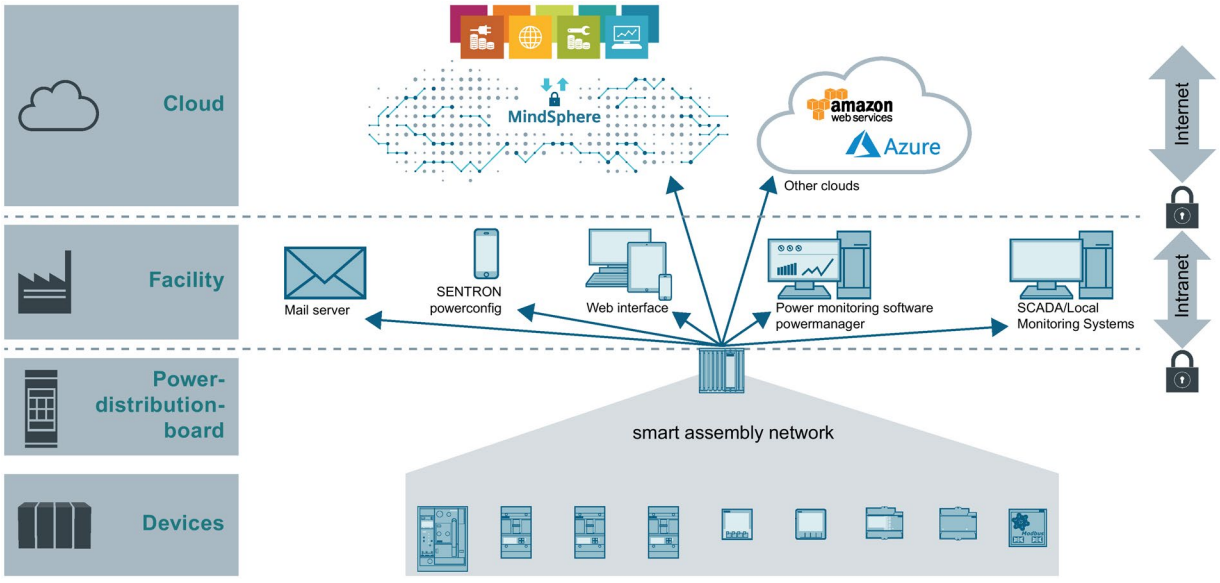
6.4 MindSphere for smart assembly network

In a power distribution board, many intelligent, communication-capable switchgear and measuring devices acquire different information.

Valuable conclusions can be drawn from this information, from power measurement data about the operating conditions to detailed device status. For this purpose, the information must be recorded and evaluated over a long time (e.g. one year).

For this, Siemens offers a cloud-based, open IoT (Internet of Things) operating system MindSphere (https://new.siemens.com/global/en/products/software/mindsphere.html).

The SENTRON MindSphere application is used via the MindSphere Application Center (https://new.siemens.com/global/en/products/software/mindsphere.html), where all information about the application can be found.



See also

Communication with MindSphere (Page 107)

6.4.1 SENTRON powermind

The optimized SENTRON powermind application is offered for low-voltage power distribution with a smart switchgear assembly. This application can be used to store and analyze values. The values are displayed in dashboards, curves and comparisons. See Communication with SENTRON powermind (Page 108).

SENTRON powermind is used via the MindSphere Application Center (https://new.siemens.com/global/en/products/software/mindsphere.html). This is where all information on the application can be found.

6.4.2 Other MindSphere applications

In addition to SENTRON powermind, there are many other MindSphere applications, e.g. Fleet-Manager, which is included in MindSphere as standard.

These applications can also be supplied with data from SENTRON Powercenter 3000. To do this, proceed as described in "MindSphere application support (Page 110)".

6.4.3 Security aspects of MindSphere communication

The utmost priority is given to security in the MindSphere system.

Communication is performed via a connection encrypted with TLS v1.2. Correct connection is assured via certificates. Exchange of access keys is performed in the onboarding dialog box. See Onboarding with SENTRON Powercenter 3000 (Page 112).

6.5 Integrating existing power distribution systems into the digitalization

Low-voltage power distribution systems are very long-lived.

They are expanded, converted and must be integrated into digitalization solutions that already exist or came about in another way.

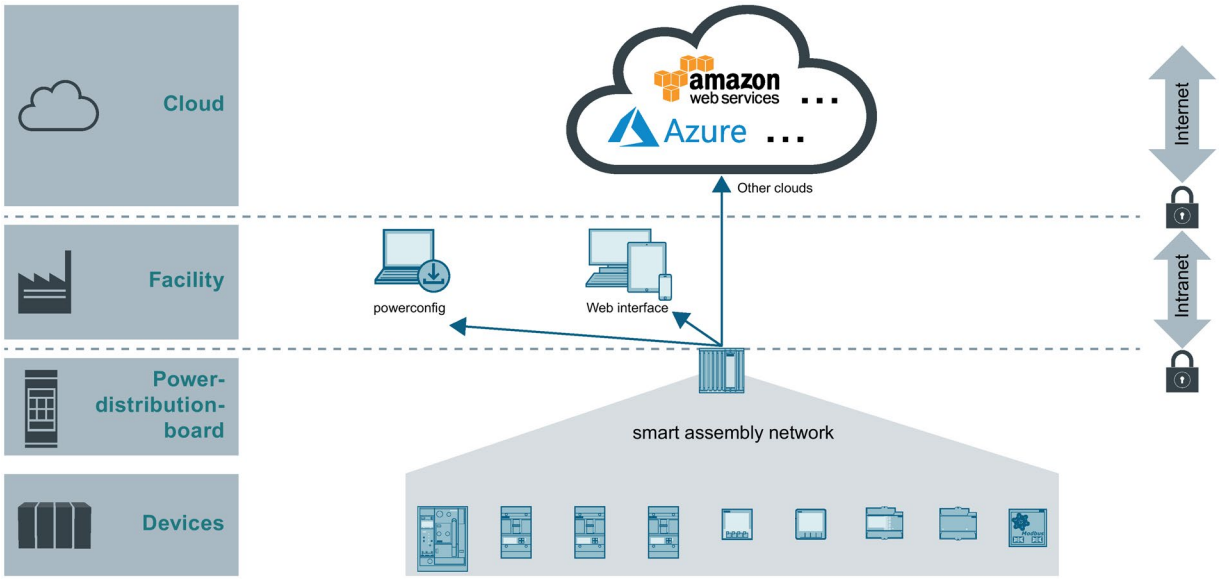
SENTRON Powercenter 3000 provides the following options for both upward (northbound) and downward (southbound) integration.

6.5.1 Cloud applications with SENTRON Powercenter 3000

Digitalization solutions, such as energy management and status monitoring, e.g. with SCADA systems (Supervisory Control and Data Acquisition), have so far often been implemented based on PCs.

For this purpose, SENTRON Powercenter 3000 provides the solution of using SENTRON Powercenter 3000 as a Modbus gateway (Page 125).

Comparable applications are currently being implemented in cloud-based systems. SENTRON Powercenter 3000 supports not only SENTRON powermind and MindSphere but also many other cloud systems, such as AWS (Amazon Web Services) and Microsoft Azure, through an MQTT interface that is as universal as possible. See section Cloud service with MQTT (Page 115)
MQTT (Message Queuing Telemetry Transport) is the language of cloud systems with the real world.



With SENTRON powerconfig, information about the individual devices that are to be offered or published in the cloud system by SENTRON Powercenter 3000 is defined.
Final connectivity between SENTRON Powercenter 3000 and the cloud system is established via the web user interface.

6.5.2 Integrating other Modbus devices into the digitalization

Because of the long life of low-voltage power distribution systems, an installation often consists of a collection of the most diverse devices.

Effective integration into the digitalization, be it a web user interface or the cloud connection, requires common, integrated structuring of the information.

SENTRON Powercenter 3000, in connection with SENTRON powerconfig, handles this situation by describing existing Modbus devices with SENTRON powerconfig in such a way that they can be included in the structure of the SENTRON devices. See section Modbus devices

The devices themselves remain unchanged.

SENTRON Powercenter 3000 provides the following digitalization services for Modbus devices:

- Display via the web user interface, see section Web user interface (Page 77)
  - grouped
  - in various languages
- Archiving at
  - 10-second and
  - 15-minute intervals
- Export of the archived values as csv files. See section Exporting recorded data (Page 92)
- Export of the 15-minute counter values. See section Exporting various 15 min average values from the archive chart (Page 96)
- Integration into cloud systems
  - SENTRON powermind, see section Communication with SENTRON powermind (Page 108)
  - For MindSphere, see section Communication with MindSphere (Page 107)
  - For other clouds, see section Cloud service with MQTT (Page 115)
- Protection through the security features of the SENTRON Powercenter 3000. See section Security features (Page 44)
- Access via the transparent Modbus gateway. See section SENTRON Powercenter 3000 as Modbus gateway (Page 125)
  This requires knowledge of the application and structure of the device.
- Time synchronization via SNTP / NTP if this is supported by the Modbus device.

6.6 Synchronized time of day, as the basis for digitalization

Acquired information can only be evaluated correctly if the time reference to reality is unambiguous. For example, it is important to know when load peaks occur because only then can causes be discovered and remedied.

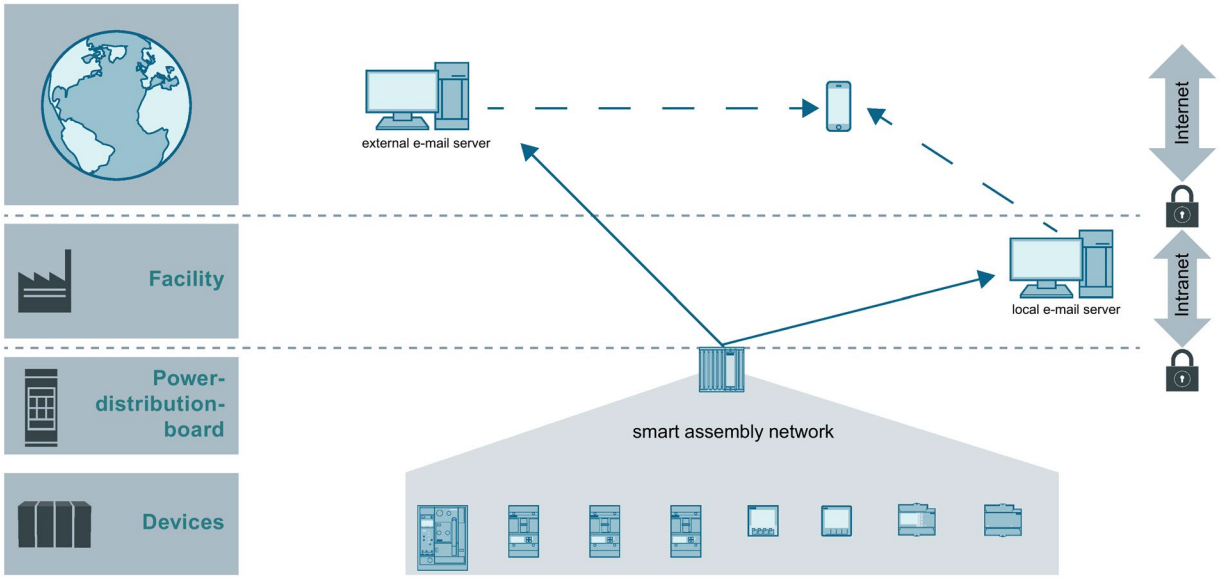
SENTRON Powercenter 3000 provides the following options for doing this:

1. Date and time, in the time zones, can be set and retained through power failures with battery backup.
2. SENTRON Powercenter 3000 can obtain the date and time of day from up to 3 different NTP servers, e.g. from the Internet via the external interface.
3. SENTRON Powercenter 3000 provides its date and time of day to the connected devices as an NTP server, both on request and as a broadcast.

You can find more information in section Time synchronization (Page 128).

6.7 Identifying and eliminating exceptional situations

An essential advantage of digitalization is the timely identification and response to exceptional situations, like those that repeatedly occur in electrical installations, before any damage occurs. This significantly increases the availability of the installation.



To acquire sporadic exceptional situations, i.e. events, economically and without great effort, notification via permanently available communication media such as smartphones and tablets is required.

Notifications from SENTRON Powercenter 3000 V1.1 or higher are provided via the web user interface and by email. See Notification of exceptional situations (Page 122). Only such prompt notification enables an employee to intervene before a failure occurs.

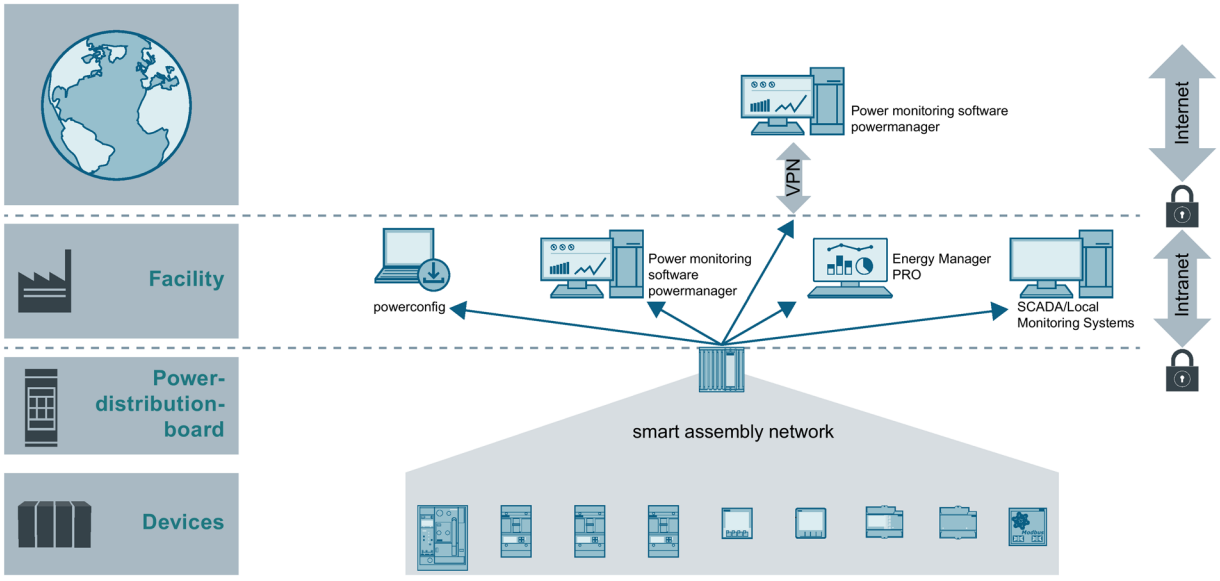
Notification of an event is effective if it takes place

- at the right place
- in a timely manner and
- in the right dosage.

SENTRON Powercenter 3000 provides notification signaling via the web user interface and via email. Emails can be received any place, any time with modern devices, such as smartphones.

6.8 Modbus TCP communication with higher-level applications

Via SENTRON Powercenter 3000, multiple higher-level applications can communicate with the connected devices via IP networks with Modbus TCP. See SENTRON Powercenter 3000 as a Modbus gateway (Page 125).



6.8.1 Security aspects of the SENTRON Powercenter 3000 as a gateway

The gateway function enables SENTRON Powercenter 3000 and the connected devices to be integrated into existing software applications.

The gateway function is transparent. Thus, the full scope of the addressed device is available to the software application.

The operator must make sure that only authorized applications have access.

The following measures are recommended:

- Use of VPN (VPN = Virtual Private Network), see also section Further recommended security measures (Page 47).
- IP filter in external routers, switches and firewalls
- IP filter (firewall allowlist) in SENTRON Powercenter 3000

You will find more information in Security features (Page 44).

6.9 Interface with a wireless LAN interface

The SENTRON Powercenter 3000 does not provide its own WLAN interface. For that reason, the wireless LAN interface is implemented with a WLAN access point that is connected to the X1P1 data interface.

To ensure the required accessibility and IT availability of the SENTRON Powercenter 3000, products that have suitable transmission ranges and redundancy measures as specified by the manufacturer must be used. To achieve this, the antenna equipment is best mounted on the outside of the switchboard.

For more information on wireless LAN for demanding industry applications, see: https://new.siemens.com/global/en/products/automation/industrial-communication/industrial-wireless-lan.html (https://new.siemens.com/global/en/products/automation/industrial-communication/industrial-wireless-lan.html)

6.9.1 Security aspects of the wireless LAN interface

It is much easier for unauthorized parties to access a wireless LAN than a cabled Ethernet.

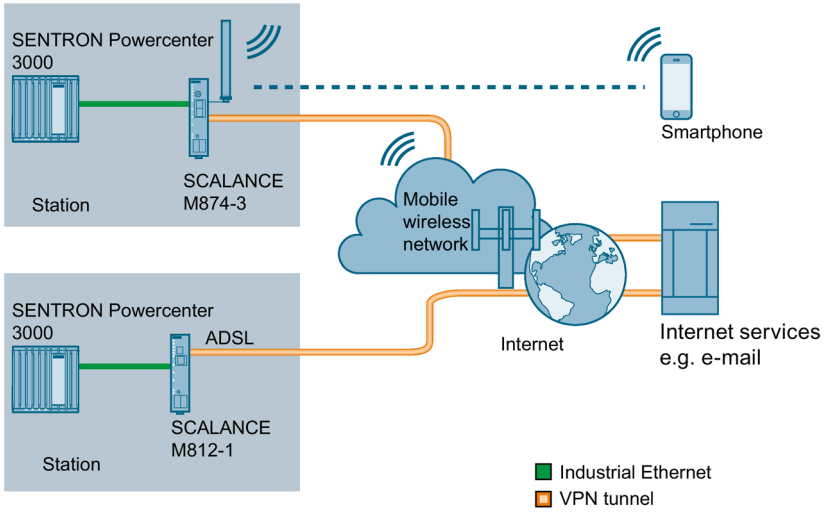
For this reason, the wireless LAN is only used for its specific purpose and is administered restrictively to ensure this.

6.10 Interface with a cellular network

Benefits: If a switchboard that works autonomously, i.e. without local network infrastructure, is to be included for monitoring and diagnostics, IP communication can be implemented by a secure, external remote router.

The remote router communicates with the smart switchgear assembly via the public network, e.g. mobile wireless network, through a tunnel (VPN = Virtual Private Network) with a remote VPN node. This node can be either a remote router or a SOFTNET Security Client if only one PC is to have access.

See Overview document: Secure remote access with VPN (https://support.industry.siemens.com/cs/ww/en/view/26662448)



Setting up a secure mobile wireless interface requires specialist knowledge that is not provided in this manual.

Service and maintenance

7

7.1 Repair instructions

This device cannot be repaired.

However, a nonconforming device should be returned to Siemens because only then is it possible to issue a credit note in the event of a warranty claim.

The device can be ordered as a spare part.

You will find details of the repair service on the Internet (https://support.industry.siemens.com/cs/ww/en/sc/2154).

7.2 Fault rectification

The complexity of digitalization requires that faults are handled in a specific way.

Here, you will find some instructions.

Fault	Possible measures
Device is not working (LEDs off).	• Check the 24 V DC supply • Check the fuse protection of the 24 V DC supply
No communication possible	• Check the status on the LEDs. See Operating displays of the devices (Page 19). • Check communication activities on the interfaces. See Data interfaces (Page 21). • Connect SENTRON powerconfig to one of the Ethernet interfaces and scan using the scan functions. – Ethernet → SENTRON Powercenter 3000 in the same subnet are found – Extended IP scan → Gradually expand the scan criteria. • Ping the default IP addresses 192.168.0.2 to X1P1 and 192.168.1.2 to X2P1 • Switch the device off and on again (Page 39).
Inexplicable display on the web user interface	• See Widget library, under Reset layout. • Empty the browser cache with CTRL-F5 or SHIFT-F5. • Check the browser version (see Contents of the web user interface (Page 78)) and update if necessary.
Forgotten login password for the admin web user interface	• See points 3 and/or 4 in the note in section Login on the SENTRON Powercenter 3000 (Page 88).
Restricted communication on the External Ethernet interface (Page 42).	• Check the firewall allowlist settings. • Check the status of the services. See Settings → Actions "Services". • Is the write protection for the web user interface activated? See Settings → General, Area "External communication (X1P1) Web server write protection". See Security performance features on the external Ethernet interface (Page 45).
No MindSphere communication	• Router problems when accessing the Internet, e.g. are the IP address and subnet mask correct? • IP address, network mask, gateway and DNS server correct? • Is the MindSphere service activated? See Settings → Actions in the Web user interface. • Port 433 on the firewall is not enabled? **Tips**: 1. In the web user interface in the SENTRON Powercenter 3000, right at the top in Project → Values → Diagnostics → Internet connection available: yes/no? 2. In Settings → Cloud → MindSphere, run "Test connection to MindSphere". If necessary, perform the onboarding process, see section Onboarding with SENTRON Powercenter 3000 (Page 112).

Fault	Possible measures
No gateway function	• Modbus gateway activated at the relevant interface? See Web user interface → Toolbar → Service overview (gearwheels), if necessary, activate the service under Web user interface → Settings → General. • Check the device connection status in the overview of the web user interface → if necessary, rectify communication faults on the internal communications interfaces. • Check the firewall settings • Check the setup of SENTRON powerconfig → If necessary, update and reload. **Tip**: By clicking on the ⓘ symbol, you can display the IP addresses of the devices on the navigation bar.
Multiple inexplicable effects	• Restart SENTRON Powercenter 3000. See Switching the device on/off (Page 39).
SENTRON Powercenter 3000 does not establish a connection to individual devices	• Version check[1)] could have failed → Update SENTRON Powercenter 3000. • Connect SENTRON powerconfig to the relevant interface and check accessibility. • Check the network settings, e.g. only one gateway should be entered.
Loaded project is not working	• Load a new or modified project via the web user interface. • If this does not lead to the desired result, SENTRON Powercenter 3000 can be reset via SENTRON powerconfig → Device menu → Reset → Devices (without comm. addr.) and the project deleted. • Alternatively, SENTRON Powercenter 3000 can be reset to the factory setting: To do so, press the on-off button five times at one-second intervals. For the position of the button, see Design of the devices (Page 18). SENTRON Powercenter 3000 can still be accessed via the configured IP address.
SENTRON Powercenter 3000 generally does not work as expected	• Reset SENTRON Powercenter 3000 via SENTRON powerconfig → Device menu → Reset → Device. The project and all communication parameters are deleted. • Alternatively, SENTRON Powercenter 3000 can be reset to the factory setting: To do so, press the on-off button five times at one-second intervals. For the position of the button, see Design of the devices (Page 18). SENTRON Powercenter 3000 can no longer be accessed via communication. First commissioning must be performed again. See First commissioning (Page 68).

1) SENTRON POWERCENTER 3000 communicates only with known device types and known versions, i.e. only with versions xy, where x and y must be known in the SENTRON Powercenter 3000. If the SENTRON Powercenter 3000 has been in use for a long time, a newly added device might have a newer, and therefore unknown, version.

See also

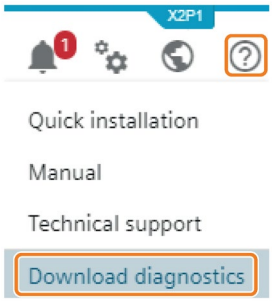
Firmware update (Page 153)

7.2.1 Diagnostic data

SENTRON Powercenter 3000 can be used in many different environments.

Services may not always function as desired.

Therefore, SENTRON Powercenter 3000 provides an encrypted zip file named diagnostics.zip which can be sent by email to Siemens Support for interpretation.



The level of detail of the diagnostic data can be set via "Settings → General → Diagnostics".

The more detail, the larger the loss of performance due to recording,

1. Debug: Used during development
2. Information: Very detailed recording
3. Alarms: Should be activated for analysis of sporadic faults, e.g. time-out.
4. Faults: Faults detected by the firmware are recorded. Default setting
5. Off: No diagnostic information is recorded. Maximum performance, for continuous operation.

7.3 Firmware update

In modern digitalization solutions, the "knowledge" is in the software; in the case of SENTRON Powercenter 3000, it is actually in the firmware. The firmware therefore contains not only the program of the SENTRON Powercenter 3000, but also "knowledge" about the features of the connectable devices.

For this reason, a firmware update of the SENTRON Powercenter 3000 is useful for all extended use, e.g. in additional devices.

Note

For SENTRON Powercenter 3000, signed firmware is used for security reasons. It is therefore not possible to load corrupt or manipulated firmware onto the device.
Nor is it possible to load earlier firmware with possible security vulnerabilities into the device, i.e. it cannot be downgraded.

If the firmware update does not work for some reason, the device remains at the current firmware version.

7.3.1 Find update

The firmware of the SENTRON Powercenter 3000 can be found in Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/109762951).

For the download, registration is required by legal regulations.

1. Read the current download information to find out about the innovations.
2. Load the download package (*.zip) and check the *.fwp file included with the SHA-256 checksum to ensure the integrity of the file.
3. Extract the firmware file (*.fwp) and save it onto a data storage medium (≥ 1.5 Gbytes) that is accessible to the SENTRON Powercenter 3000 via the web user interface.

7.3.2 Firmware update via Web user interface

The firmware update of the SENTRON Powercenter 3000 is triggered via the Web user interface.

For this purpose, the data storage medium / PC should be connected to SENTRON Powercenter 3000 via Ethernet as directly as possible.

1. Opening the Web user interface
2. Navigate via the page "Settings → Actions → Update Firmware" and select the above-mentioned firmware file (*.fwp).

The user data acquired so far (setup, archiving, web settings, ...) are retained.

The loaded setup is retained and active.

7.4 Replacing the backup battery

Prior to replacement

⚠ WARNING

Danger of explosion and danger of release of harmful substances

Improper handling of lithium batteries can result in explosion of the batteries.

Explosion of the batteries and the resulting release of harmful substances can result in serious injury. Worn batteries endanger the function of the device.

When handling lithium batteries, please note:

- Replace the battery every 5 years.
- Replace the lithium battery only with the type recommended by the manufacturer. The article number is A5E44491494.
- Do not throw batteries into a fire, do not solder on the body of the cell, do not recharge, open, or short-circuit batteries, do not connect batteries with incorrect polarity, do not heat batteries above 100 °C (212 °F), and protect batteries from direct sunlight, humidity and condensation.

⚠ CAUTION

Danger of burns

The surface of some devices can reach a temperature of over 70 °C (156 °F). These devices are marked with labels indicating this.

- Touching without protection can result in burns.
- Avoid touching the device directly during operation.
- Only touch the device with suitable protective gloves.

Note

Observe the local regulations for the disposal of used batteries.

Requirements

- The device has been removed.
- The device is disconnected from the power supply and all connecting cables are disconnected.
- The device has cooled down.

Tools

Replacement of the batteries can be performed using the following tools:

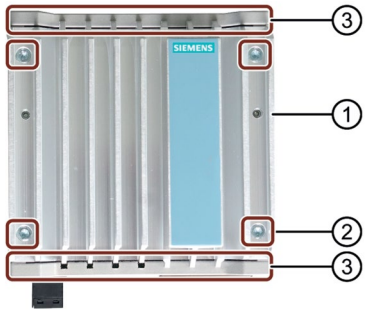
- T20 screwdriver
- T8 screwdriver
- Wrench, width across flats 1.5 mm

Replacing the backup battery

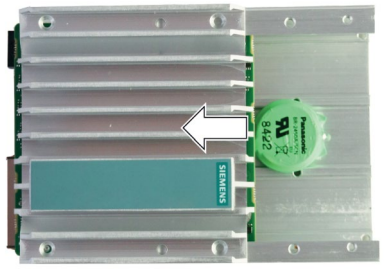
NOTICE
Deletion of time setting If the battery replacement takes longer than 30 s, the time setting is deleted. The device no longer runs synchronously. Time-controlled programs are no longer running or are running at the wrong time. This can result in damage to the plant. ● Reset the time setting on the device or use time synchronization.

Proceed as follows to replace the backup battery:

1. Remove the ground connection.
2. Unscrew the screws on the two connection sides ③ and remove the covers.
3. Unscrew the threaded pins ① on the heat sink.



4. Unscrew the remaining screws ② on the heat sink.
5. Slide out the heat sink in the direction of the arrow and place the enclosure part on the cooling fins.

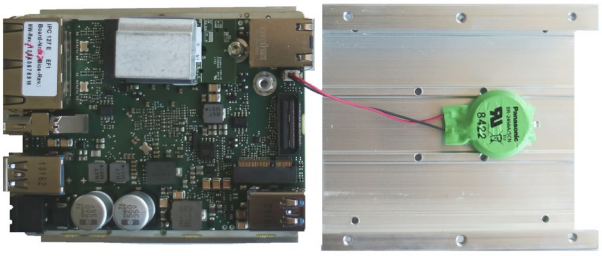


6. Remove the connector of the battery cable.
7. Remove the battery from the Velcro strap.

Installing the backup battery

Proceed as follows to install the new backup battery:

1. Insert the new battery by placing it on the Velcro strap.



Note

Make sure that the cable connection points towards the board.

2. Screw the cover of the enclosure side into place with the connectors.
3. Turn the heat sink over and slide it onto the underside of the enclosure.

Note

Make sure that the EMC seal is not displaced during the sliding process.

Make sure that the heat sink of the SSD rests straight on the bottom of the enclosure again after it has been installed.

4. Insert the threaded screws on the heat sink.
5. Screw the heat sink into place.
6. Screw the cover of the other enclosure side into place.
7. Install the ground connection.

7.5 Recycling and disposal

Disposal of waste electronic equipment

Waste electronic equipment must not be disposed of as unsorted municipal waste, e.g. household waste. When disposing of waste electronic equipment, the current local national/international regulations must be observed.

Disposal of batteries

Batteries must not be disposed of as unsorted municipal waste, e.g. household waste. When disposing of batteries, the current local national/international regulations must be observed.

FAQs

8

8.1 No firmware update via SENTRON powerconfig

With SENTRON powerconfig configuration software, no firmware update is offered for SENTRON Powercenter 3000. The firmware can be updated via the web user interface. See Web user interface (Page 77).

8.2 Version management between SENTRON powerconfig and SENTRON Powercenter 3000

The functional scope of both SENTRON Powercenter 3000 and SENTRON powerconfig is constantly increasing.

This is reflected by the different versions. The following applies to version management:

- Firmware update:
  - It is only possible to upgrade (no downgrading)
  - It is also possible to skip versions (e.g. to upgrade from version 1.3 to version 1.5)
- SPLX compatibility:

  SPLX versions from earlier versions can always be read, i.e.
  - SENTRON Powercenter 3000 can always read older splx versions
  - SENTRON powerconfig can always read older splx versions

Compatibility matrix

SENTRON Powercenter 3000 version	SENTRON powerconfig version
1.0	3.13
1.1	3.14
1.2	3.15
1.3, 1.3.1	3.16
1.4, 1.4.1	3.18
1.5	3.20
1.6	3.22
1.7	3.23
1.7.1	3.25
1.8	3.26

Note

When configuring the SENTRON Powercenter 3000, ensure that the SENTRON powerconfig versions are compatible as indicated in the figure above.

We recommend that you upgrade SENTRON Powercenter 3000 to the latest version by means of a firmware update.

Once created, configuration data can continue to be used from one version to the next.

The conversion to the current version, e.g. due to software/firmware updates, takes place automatically for both SENTRON powerconfig and SENTRON Powercenter 3000.

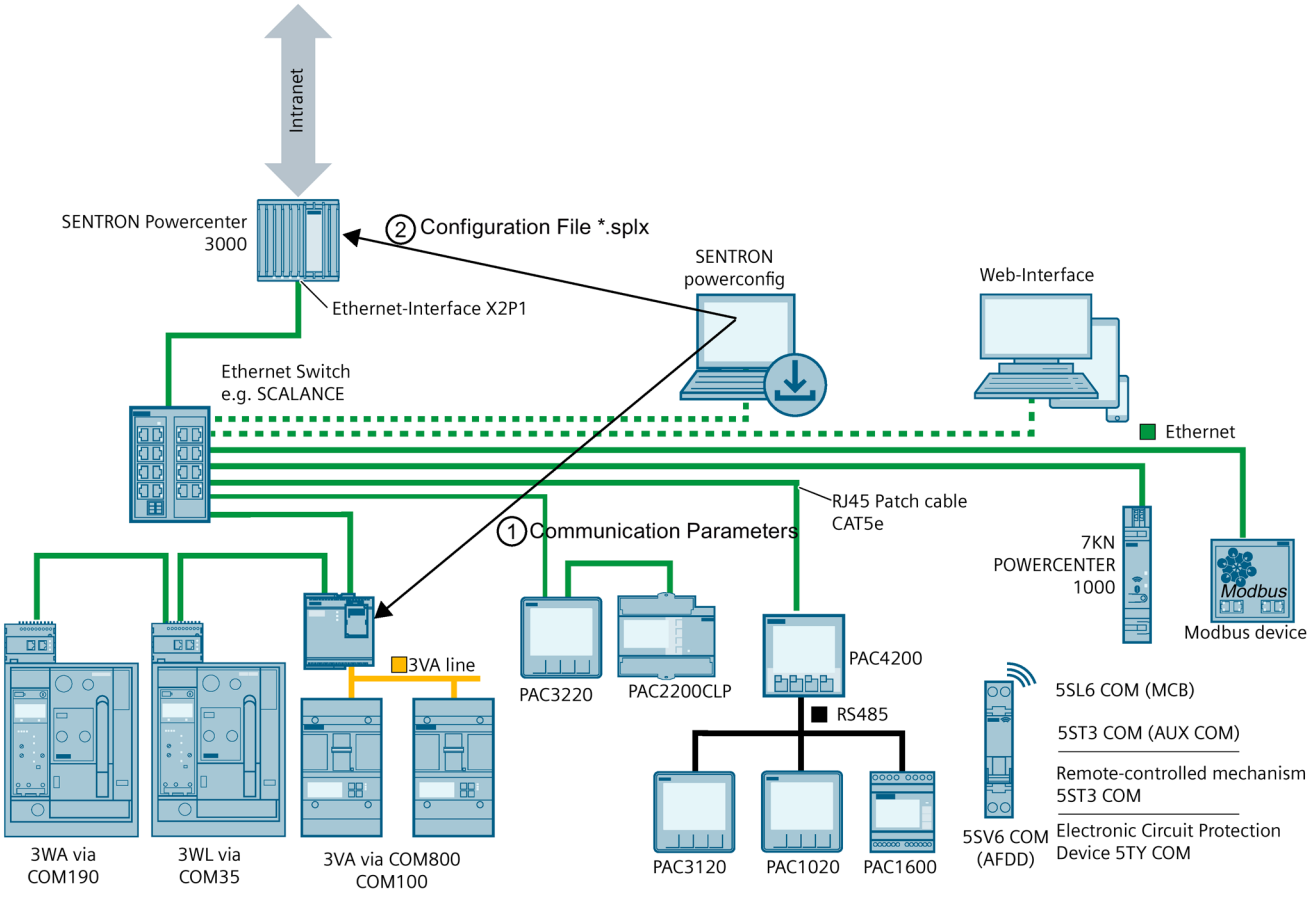
Newer SENTRON powerconfig versions support SENTRON Powercenter 3000 versions already installed.

The latest SENTRON Powercenter 3000 versions require the corresponding SENTRON powerconfig version. Independently of this, individual settings can be configured via the web user interface of the SENTRON Powercenter 3000.

The compatible powerconfig version is available via the download link (https://support.industry.siemens.com/cs/ww/en/view/109762951) for the current firmware of the SENTRON Powercenter 3000.

8.3 Modifications in smart assembly networks

In smart assembly networks, devices can be added and deleted, and communication parameters can be modified.



Note

After adding or deleting devices or after modifying the communication parameters ①, the setup file must be saved in SENTRON powerconfig and updated in SENTRON Powercenter 3000 ②.

Otherwise, the devices cannot be accessed in the smart assembly network or are reported as faulty.

8.4 Installation of upgrade licenses for SENTRON Powercenter 3000

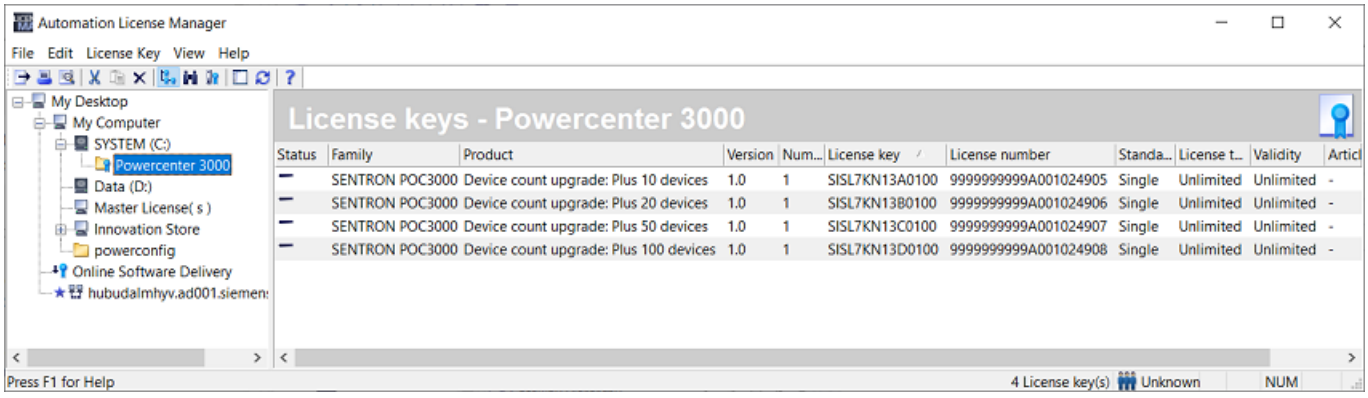
Software requirements

- Powercenter 3000 firmware V1.7.1
- Powerconfig V3.25
- Automation License Manager

Purchase the license under the following link (https://mall.industry.siemens.com/mall/en/en/Catalog/Products/10375782?tree=CatalogTree) .

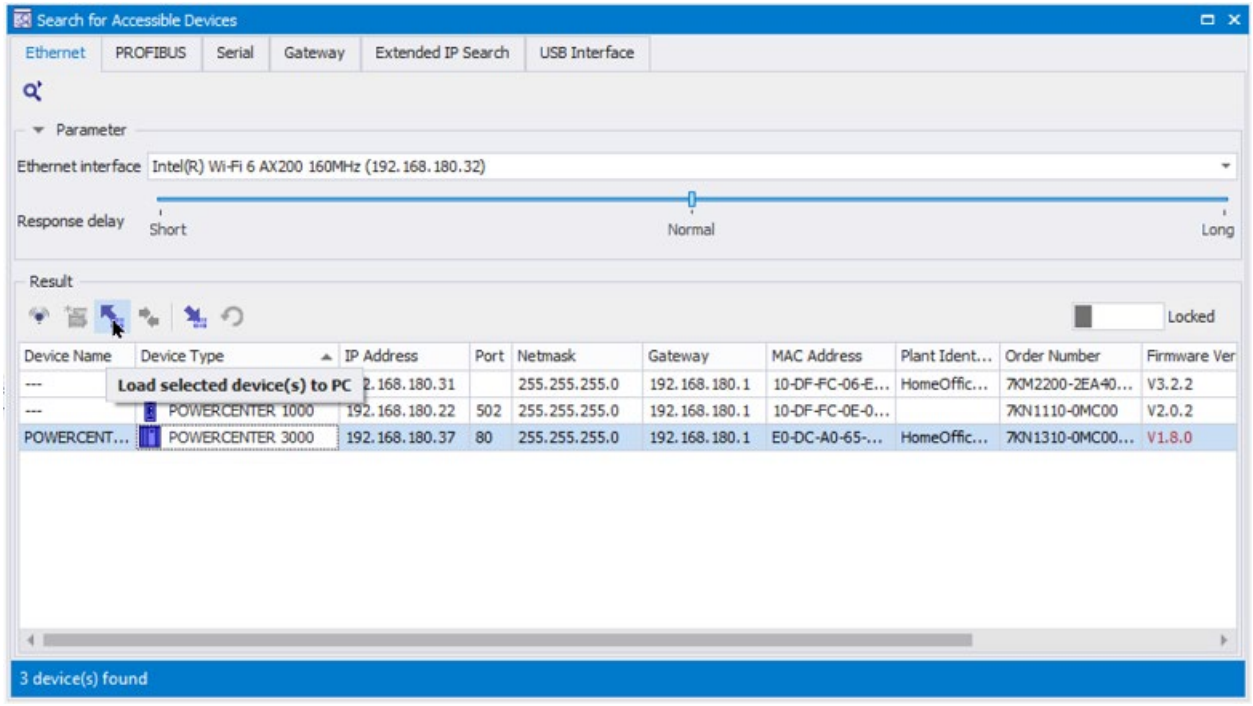
Copying license from Online Software Delivery (OSD)

1. Start the Automation License Manager and log in to Online Software Delivery by clicking on "Online Software Delivery".
2. Then use drag&drop to drag the purchased license from the Online Software Delivery license to "My Computer" on your desktop using the Automation License Manager software.

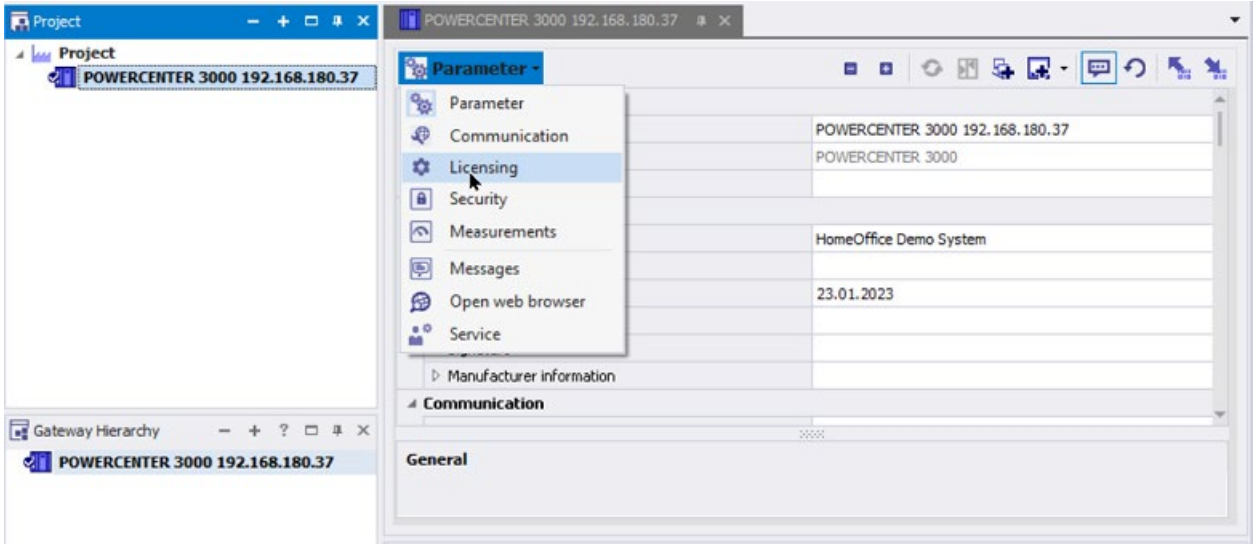


Applying license in Powercenter 3000 via Powerconfig

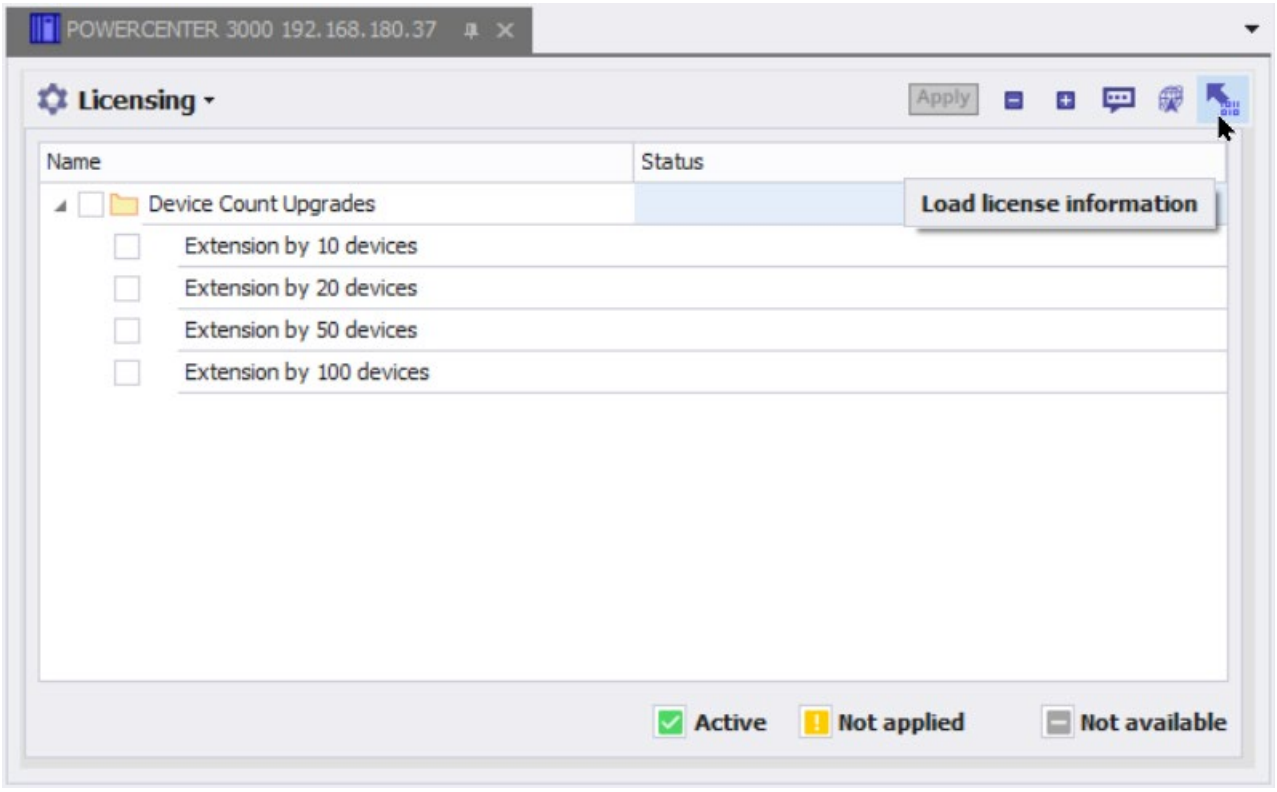
1. Start Powerconfig V3.25.
2. Use the "Search for accessible devices" function to identify Powercenter 3000 in the network.
3. Load Powercenter 3000 into the PC project from powerconfig.



4. In the project, open the "Licensing" menu under the Powercenter 3000 device.

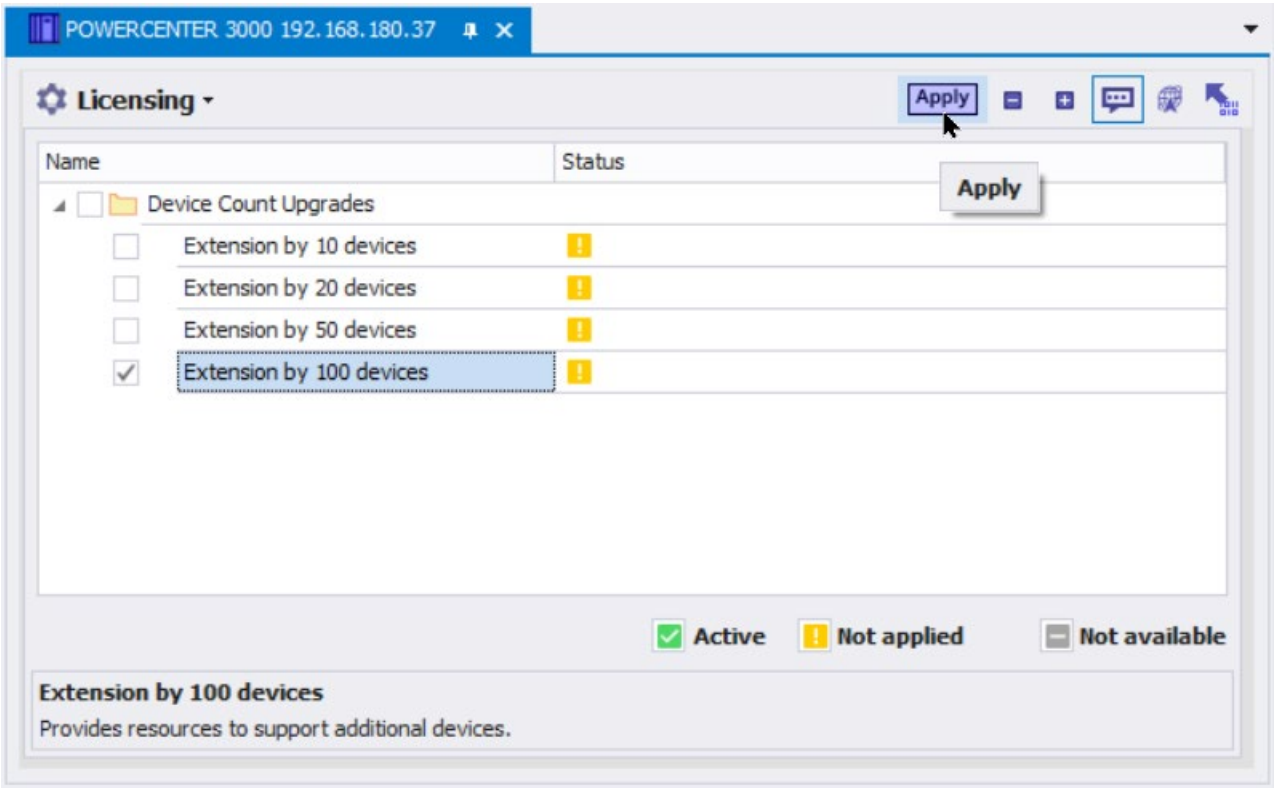


5. Click on "Load license information". This is how you retrieve the license status from the device.

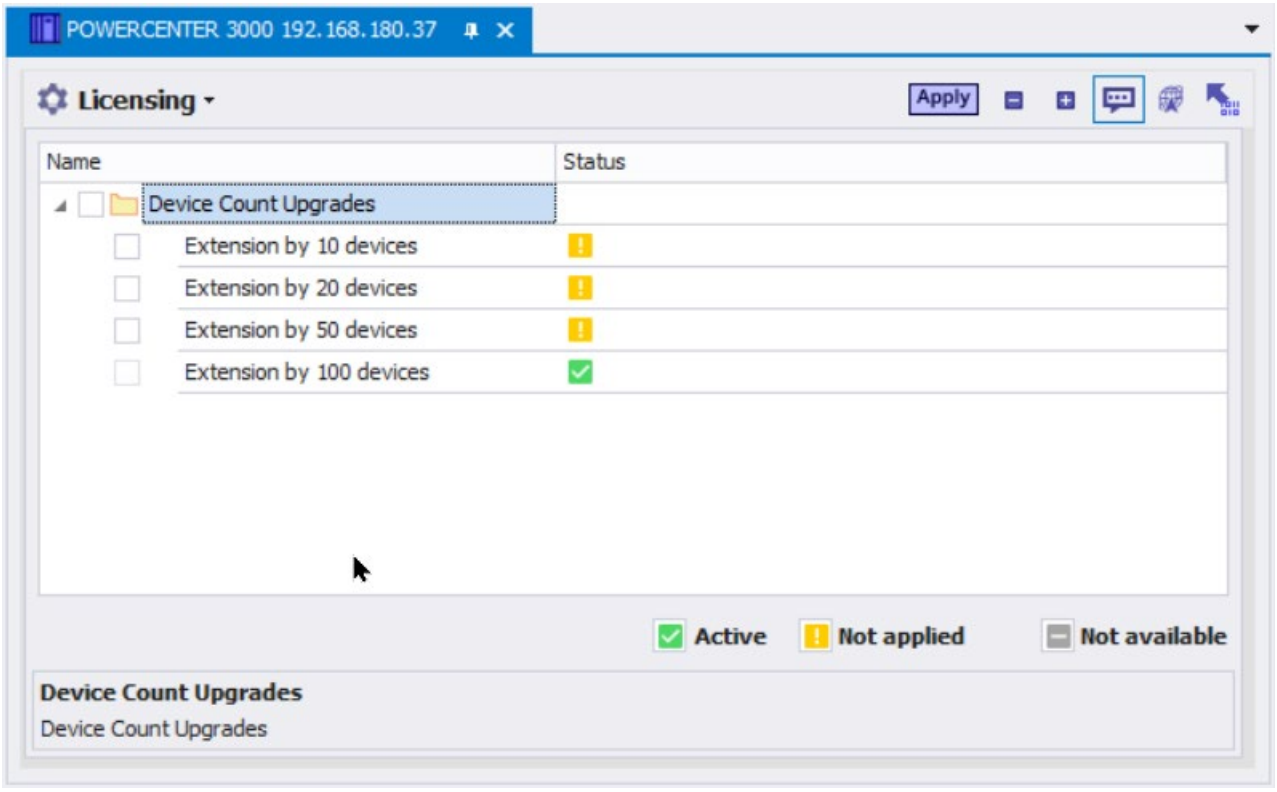


Depending on the licenses available, the relevant license types will be marked "Not applied".

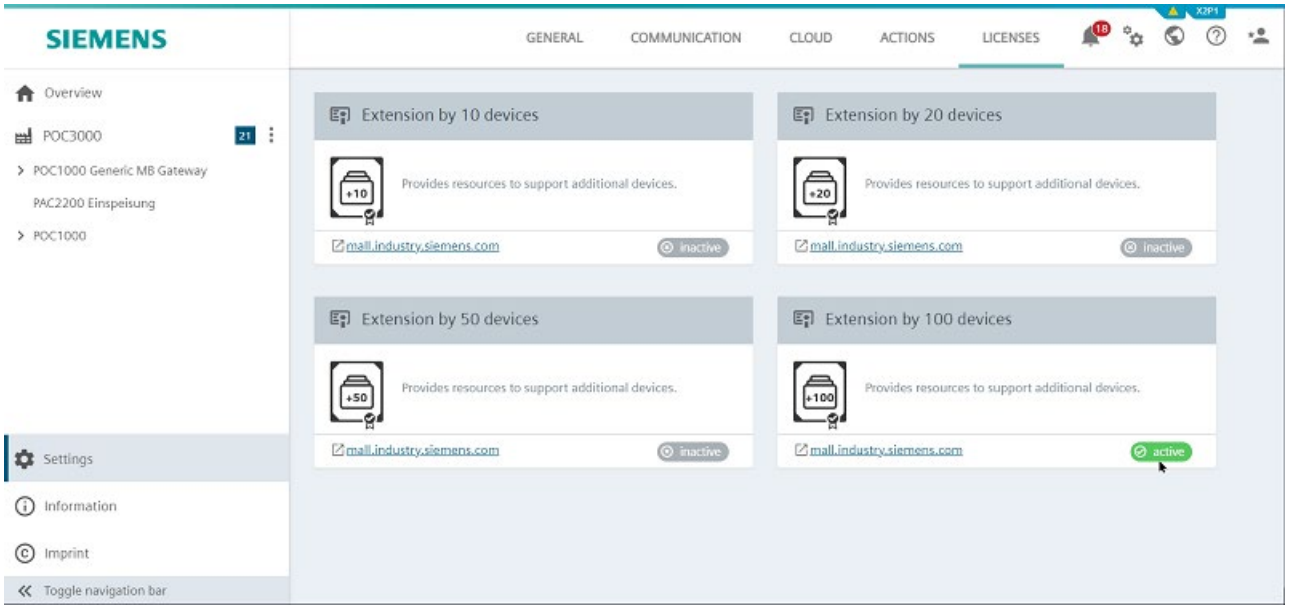
6. Select the license which you would like to apply and click on "Apply".



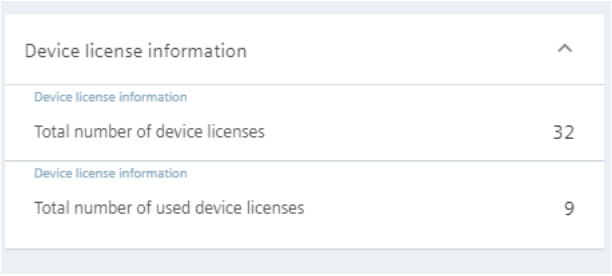
7. After transferring the license, the license is displayed with a check icon.



8. The license is displayed as "active" in Powercenter 3000.



The increased number of licenses will be visible.



Technical data

9

9.1 General technical data

Article number	See order documents
Weight without mounting bracket	Standard: approx. 482 g (1 lb.) with DIN rail adapter
Power supply	24 V DC (19.2 ... 28.8 V)
Short voltage interruption	Up to 5 ms backup time at full load Max. 10 events per hour; recovery time min. 1 s
Power consumption	max. 1.8 A at 24 V
Noise emission	<40 dB (A) according to DIN 45635-1
Degree of protection	IP40 according to IEC 60529
Protection class	Protection class I according to IEC 61140
Degree of pollution	Device is designed for environment with pollution degree 2
Quality assurance	According to ISO 9001

Note

Note the following if you are operating the device in accordance with IEC/EN/UL 61010-2-201:

- The device must only be connected to a 24 V DC power supply that meets the requirements of a safety extra low voltage (SELV/PELV) in accordance with IEC/EN/UL 61010-2-201.
- When operated outside an enclosure in accordance with UL/CSA 61010-2-201, the device must be supplied with NEC Class 2 or an energy-limited circuit in accordance with UL/CSA 61010-1.

Electromagnetic compatibility

Interference immunity to conducted interference on power cables	± 2 kV according to IEC 61000-4-4; burst ± 0.5 kV according to IEC 61000-4-5; surge symmetrical ± 1 kV according to IEC 61000-4-5; surge asymmetrical
Interference immunity on signal cables	± 1 kV according to IEC 61000-4-4; burst; length < 3 m ± 2 kV according to IEC 61000-4-4; burst; length > 3 m ± 2 kV according to IEC 61000-4-5; surge; length > 30 m
Interference immunity against electrostatic discharge	± 6 kV contact discharge according to IEC 61000-4-2 ± 8 kV air discharge according to IEC 61000-4-2
Immunity to interference due to radio-frequency radiation	10 V / m, 80 ... 2 GHz, 80 % AM according to IEC 61000-4-3 3 V / m, 2 ... 6 GHz, 80 % AM according to IEC 61000-4-3 10 V, 10 kHz ... 80 MHz, 80 % AM according to IEC 61000-4-6
Magnetic field	100 A / m, rms value 50 / 60 Hz according to IEC 61000-4-8

9.2 Range of functions of the SENTRON Powercenter 3000

The functional scope of the SENTRON Powercenter 3000 is extended from one version to the next.

The table below provides an overview of the previous versions and the current version.

Main functions	from version	Article number
Number of devices that can be connected: 32	V1.0	
The recorded 15-minute measured variables (energy counter, average values) are stored for up to 14 months of 30 days each: Memory depth = 40320 entries per device	V1.1	
Notification of exceptional situations via email and web user interface	V1.1	
The recorded 10-second measured variables (average values) are stored for a period of up to one day. Memory depth = 8640 entries per device	V1.1	
Buffer for MindSphere and other cloud systems between • 20 minutes for 200 data points / second • 20 hours for 200 data points / minute • 130 days for 20 data points / 15 minutes Memory depth = 250,000 database entries	V1.2	
Periodic data export	V1.2	
SENTRON powermind	V1.2	
MQTT Service	V1.2	
Modbus devices	V1.2	
Support of ten languages in the web user interface	V1.3	
Support of an admin and a guest login in the web user interface, with subsequent switchover to https	V1.3	
7KM PAC2200CLP	V1.3	
7KM PAC4200 with archiving and monitoring of the expansion module I(N), I(Diff), analog	V1.3	
Support of 3VA Condition Monitoring with 3VA V4.4 in the web user interface and in powermind	V1.3	
Support for Powercenter 1000	V1.4	
Support for 3WA	V1.4	
Network scan	V1.4	
Device editing in project tree	V1.4	
Alarms for limit violations and status changes	V1.4	
Support of additional devices in SENTRON powermind: Powercenter 1000, 3WA, PAC1600	V1.4.1	
Date/time synchronization of all devices via SENTRON Powercenter 3000	V1.4.1	
Adding devices manually (without network scan and without powerconfig)	V1.5	
Rearrangement of devices in the project	V1.5	
Optimizations in the archive chart	V1.5	
Configuration of data points for archiving	V1.5	
Print	V1.5	
Import of device subtypes for third-party manufacturers	V1.6	
Download option for the self-signed https certificate	V1.6	
Display of messages on several pages	V1.6	

Main functions	**from version**	**Article number**
Archive data are retained if type data are changed for third party devices	V1.7	
Monitoring of the archive function	V1.7	
Support for new miniature circuit breakers with RCM function	V1.7	
Support for new data model for powermind	V1.7	
Compatibility with Powerconfig V3.25	V1.7.1	
Support for 5ST3 COM remote operating mechanism	V1.8	
Support for 5TY COM electronic circuit protection device	V1.8	
Support for additional data points in COM devices for the archive function	V1.8	
Prevention of bulk messages in the web user interface	V1.8	
Optional functions		
Extension of the number of supported devices by 10, 20, 50 or 100	V1.7	

9.3 Environmental conditions

The temperature values were checked in accordance with IEC 60068-2-1, IEC 60068-2-2, and IEC 60068-2-14.
You will find the permissible mounting positions in Permissible mounting positions (Page 25).

Operation	Standard rail mounting (interfaces above / below) 0 °C to 50 °C / 55 °C (32 °F to 122 °F / 131 °F) *
Storage / shipping	-20 ... +60 °C (-4 to 140 °F)
Gradient	• Operation: Max. 10 ° / h (18 °F / h) • Storage: 20 °C / h (36 °F / h), no condensation
Relative humidity • Operation • Storage / shipping	Tested according to IEC 60068-2-78, IEC 60068-2-30 5 ... 85 % at 30 °C (86 °F), no condensation 5 ... 95 % at 25 / 55 °C (77 / 131 °F), no condensation
Air pressure • Operation / storage / transport	1080 ... 660 hPa (15.7 ... 9.6 psi), corresponds to a height of –1000 ... 3500 m (3280 ... 11,500 ft.)

* BIOS power switch on "High Temperature" and USB load max. 1 W.

Vibration resistance	Tested in accordance with IEC 60068-2-6
Operation	With DIN rail: • 10 ... 58 Hz: 0.0375 mm (.0015 in.) • 58 ... 200 Hz: 4.9 m / s² (.5 g)
Storage / shipping	• 5 ... 9 Hz: 3.5 mm (0.14 in.) • 9 ... 500 Hz: 9.8 m / s² (1 g)
Shock resistance	Tested according to IEC 60068-2-27
Operation	150 m / s² (15 g), 11 ms
Storage / shipping	250 m / s² (25.5 g), 6 ms

9.4 Current requirement of the components

Maximum permissible current consumption on additional components

Additional component		Maximum permissible current consumption + 5 V	Max. total power
USB device 3.0	High current	900 mA	5 W (for all USB devices)

Note

Device can overheat

The power supply cannot provide unlimited power. The additional components consume energy and produce heat.

The device can overheat and additional components can be damaged.

9.5 DC power supply

Technical data

Input voltage	24 V DC (19.2 to 28.8 V DC)
Protection class	Protection class I (device must be connected to ground conductors)

Typical power consumption

	Power consumption (at 24 V rated voltage)
Basic device with Intel Atom E3930	13 W

Dimensional drawings

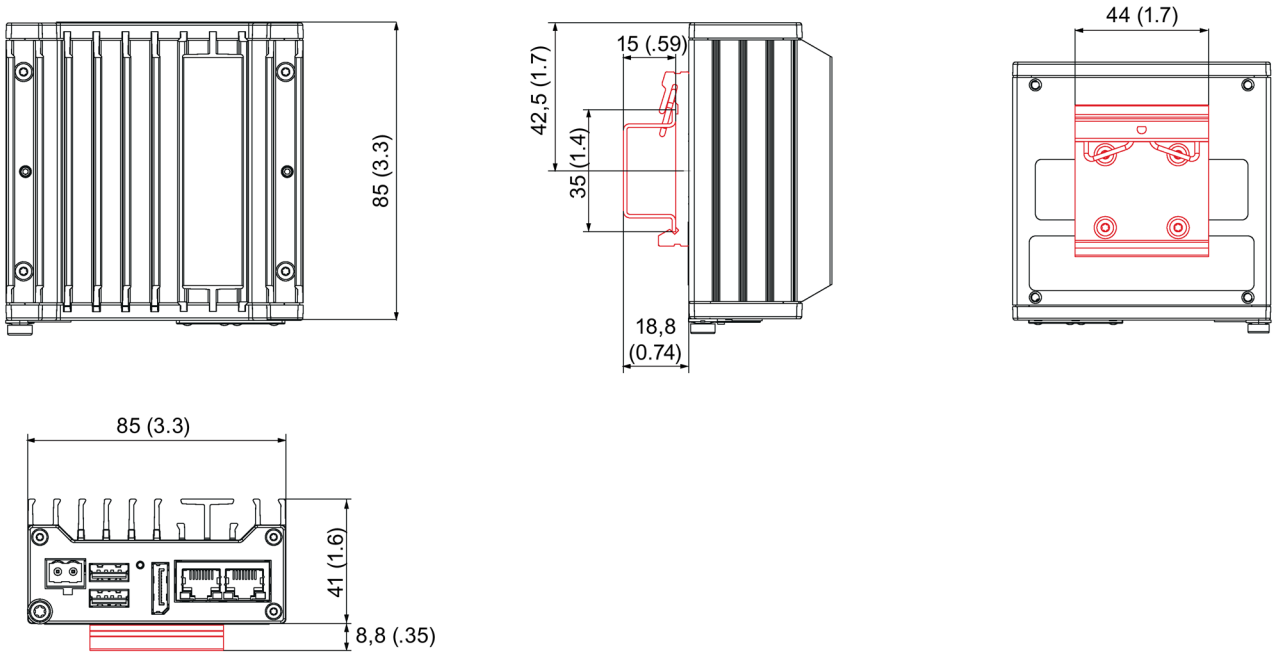
10

10.1 Dimensional drawing of basic device

Note

The mounting holes on the device are arranged symmetrically. The mounting parts can be mounted in all orientations of the device based on your requirements.

Mounting on DIN rails



All dimensions in mm (inch)

Appendix

A

A.1 List of abbreviations

Abbreviations

aws	amazon web services
EFI	**E**xtensible **F**irmware **I**nterface
IGD	**I**ntegrated **G**raphics **D**evice
LAN	**L**ocal **A**rea **N**etwork
MID	**M**easuring **I**nstruments **D**irective
MQTT	**M**essage **Q**ueuing **T**elemetry **T**ransport
MRP	**M**edia **R**edundancy **P**rotocol
NTP	**N**etwork **T**ime **P**rotocol
SCADA	**S**upervisory **C**ontrol **a**nd **D**ata **A**cquisition
URI	**U**niform **R**esource **I**dentifier
VPN	**V**irtual **P**rivate **N**etwork

A.2 ESD guidelines

A.2.1 Electrostatic sensitive devices (ESD)

ESD components are destroyed by voltage and energy far below the limits of human perception. Voltages of this kind occur as soon as a device or an assembly is touched by a person who is not electrostatically discharged. ESD components which have been subject to such voltage are usually not recognized immediately as being defective, because the malfunction does not occur until after a longer period of operation.

ESD Guidelines

NOTICE

Electrostatic sensitive devices

Electronic modules contain components that can be damaged by electrostatic discharge as a result of improper handling.

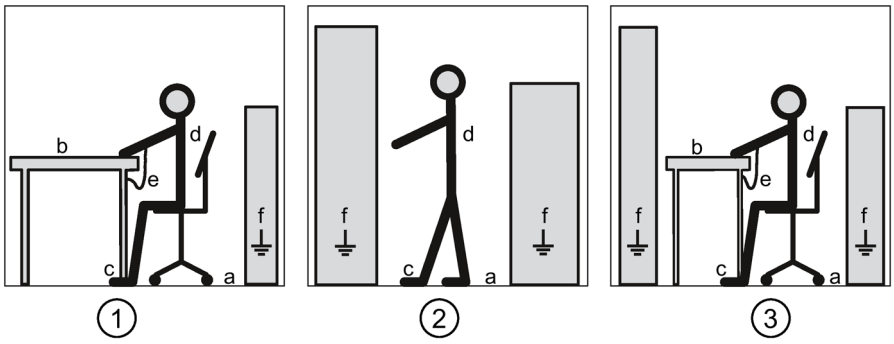
- You must discharge your body electrostatically immediately before touching an electronic module. To do this, touch a conductive, grounded object, e.g., a bare metal part of a switch cabinet or the water pipe.
- Always hold the component by the plastic enclosure.
- Electronic modules should not be brought into contact with electrically insulating materials such as plastic film, plastic parts, insulating table supports or clothing made of synthetic fibers.
- Always place electrostatic sensitive devices on conductive bases.
- Always store and transport electronic modules or components in ESD-safe conductive packaging, e.g. metalized plastic or metal containers. Leave the component in its packaging until installation.

NOTICE

Storage and transport

If you have to store or transport the component in non-conductive packaging, you must first pack the component in ESD-safe, conductive material, e.g., conductive foam rubber, ESD bag.

The diagrams below illustrate the required ESD protective measures for electrostatic sensitive devices.



(1) ESD seat

(2) ESD standing position

(3) ESD seat and ESD standing position

Protective measures

a Conductive floor

b ESD table

c ESD footwear

d ESD smock

e ESD bracelet

f Cubicle ground connection

A.3 Labels and symbols

A.3.1 Overview

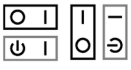
The following tables list all symbols you might find on your SIMATIC Industrial PC in addition to the symbols explained in the operating instructions.

The symbols on your device may differ in some details from the symbols that are depicted in the following tables.

A.3.2 Safety

Symbol	Meaning	Symbol	Meaning
	Warning, read and follow the documentation supplied		Lock is closed
	Caution, radio equipment		Lock is open
	Pull out the power plug before opening		Hole for the Kensington lock
	Caution ESD (components sensitive to electrostatic charge)		Warning, hot surface

A.3.3 Operator controls

Symbol	Meaning	Symbol	Meaning
	ON/OFF switch, without electrical isolation		Ejecting CD/DVD
	ON/OFF pushbutton, without electrical isolation		

A.3.4 Certificates, approvals and labels

You will find all available certificates, approvals and labels in the Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/cert).

Technical support

B

B.1 Service and support

You will find further information and support on the described products in the Internet at the following address:

- Technical support (https://support.industry.siemens.com/cs/ww/en)
- Industry Mall (https://mall.industry.siemens.com)

Current documentation

Always use the current documentation for your product. You will find the current edition of this manual and additional important documents by searching for the article number of your device in the Internet. Filter the entries if necessary by the entry type "Manual".

Tools and downloads

Regularly check so see whether updates and hotfixes for your device are available. You will find the download area in the Internet under the following link (https://support.industry.siemens.com/cs/ww/en/view/109762951).

Glossary

Asset

An asset is a digital representation of a machine or an automation system with one or more automation devices (e.g. PLCs) connected to MindSphere. MindSphere data collection and data provisioning is based on so-called (virtual) assets. An asset can be any element, e.g. a pump, a motor, a PLC, a complete machine tool, a production line, a robot, a crane, a vehicle, a wind turbine, etc. to name but a few examples. The data that describe an asset are acquired and communicated to MindSphere. These data are then made available for further processing and evaluation.

Asset manager

The asset manager is an Internet-based graphical user interface for the setup of assets. Depending on these setups, the following functions are available:

Setup of assets: Assets can be created, integrated in an onboarding process, modified, cloned, moved, deleted, or removed in an offboarding process.

Asset type

The asset type is a program or series of products of a certain manufacturer.

Automation system

A programmable controller (PLC) of the SIMATIC S7 system that comprises a central controller, one CPU and various input/output modules.

Backup

A copy of a program, a data storage medium, or a collection of data that is created either for the purpose of archiving or for protection against loss of irreplaceable data if the working copy is damaged or destroyed. Some applications automatically generate backup copies of data files and manage both the current version and the previous version on the hard disk.

Cache

Buffer memory in which the most frequently requested data are temporarily stored (buffered) to increase the speed of access.

CE marking

Communauté Européene: The CE symbol confirms the conformity of the product with all applicable EC directives, such as the EMC Directive.

Cold restart

A start operation that is started by switching on the computer. On a cold restart, the system typically performs a few basic hardware tests and then loads the operating system from the hard disk into the RAM -> Booting.

Controller

Built-in hardware and software that controls the mode of operation of a certain internal or peripheral device (e.g. keyboard controller).

Data point

Data points refer to elements (variables) via which values of data sources can be called (e.g. MindSphere, powermanager, etc.). They are combined in a relevant aspect. For example, "Temperature" and "Torque" are data points of the aspect "Energy_consumption". Data points are configured in the "asset manager". In the "Fleet-Manager", their values are visualized as time series.

Data source

A data source is a physical element of a device that can be monitored by MindSphere. Example: SENTRON Powercenter 3000.

Drivers

Parts of the operating system. They convert data of the user programs into specific formats that are required by the I/O devices (e.g. hard disks, monitors, printers).

EMC Directive

EU directive governing electromagnetic compatibility. Conformity is confirmed with the CE symbol and the EC certificate of conformity.

ESD guidelines

Guidelines for handling electrostatic sensitive devices.

Ethernet

Local area network (bus topology) for text and data communication at a data transfer rate of 10/100/1000 Mbps.

Execute Disable Capability

Hardware implementation to prevent conflicting memory access by programs and applications. It is only effective if it is supported by all the system components affected, such as the processor, operating system, and application software.

Extensible Firmware Interface

Describes the central interface between the firmware and the individual components of a computer and the operating system. The EFI is logically located under the operating system and is the successor of the PC-BIOS, mainly for 64-bit systems.

Fleet-Manager

Fleet-Manager is a visualization tool that offers an overview of the available assets and information (asset name, name of the customer, location). Your configured assets, aspects with data points in tables and a list of all queries, etc. are displayed in the Fleet-Manager.

Formatting

Formatting deletes all data on the data storage medium. Every data storage medium must be formatted before it is used for the first time.

Hub

A term from network technology. A device that connects communication cables to a central point and establishes a connection with all devices in the network.

Image

An Image is a copy, e.g. of hard disk partitions, that is backed up in a file and can be restored if necessary.

Integrated Graphics Device

A graphical interface integrated in the chip set.

Intel Active Management Technology

This technology provides diagnostics, management, and remote control of PCs. It is only effective if it is supported by all the system components affected, such as the processor, operating system, and application software.

Interface

- Connection between individual hardware elements, such as programmable controller, PCs, programming device, printer, or monitor by physical plug-in connections (cables).
- Connection between different programs to permit their use together.

LAN

Local Area Network: A LAN is a local area network that consists of a group of computers and other devices that are distributed over a relatively limited area and connected by

communication cables. The devices connected to a LAN are called nodes. Networks are used to share the use of files, printers, or other resources.

License key

License key is the electronic license stamp of a license. Siemens AG issues a license key for license-protected software.

Low-Voltage Directive

EC directive for the safety of products operated with low voltage (50 to 1000 V AC, 70 to 1500 V DC) that do not come under other directives. Conformity is confirmed with the CE symbol and the EC certificate of conformity.

Motherboard

The motherboard is the core of the computer. It is where data are processed and stored, interfaces and peripherals are controlled and managed.

Operating system

Generic term for all functions that control and monitor execution of user programs, allocation of resources to individual user programs and maintenance of the mode of operation in interaction with the hardware (e.g. Windows 10).

Pixel

A pixel is the smallest element that can be displayed on a screen or printed on a printer.

Plug and Play

The use of plug and play enables a device to configure itself automatically to communicate with I/O devices (e.g. screens, modems, and printers). Users can connect an I/O device (plug) and then run it (play) without having to configure the system manually. A plug-and-play PC requires a BIOS that supports plug and play and the expansion card must support the feature, too.

POST

A self-test performed by the BIOS after the computer has been switched on that, for example, examines the memory chips of the RAM or graphics card for possible errors. If errors are found during the test procedure, the computer indicates this with audible signals and displays the cause of the error on the screen.

Power management

The power management of a modern PC is able to control the power consumption of the most important components of the computer (e.g. screen, hard disk, and CPU) individually by restricting their activity depending on the current load of the system or the component. The power management in laptop computers is especially important.

Power options

With power options, you can lower the energy consumption of the computer and still keep the computer ready for immediate use. Can be customized in Windows under Settings > Control Panel > Power Options.

Programmable controller

The programmable controllers of the SIMATIC S7 system comprise a central controller, one or more CPUs and other modules (e.g. input/output modules).

PXE server

A Preboot Execution Environment-Server is part of the network environment and can supply software to connected computers before they boot. This software is, for example, operating system installations or maintenance tools.

RAL

Restricted Access Location: Installation of the device in an operating location with limited access, e.g. lockable control cabinet.

Reset

Hardware reset: Reset/restart of the SENTRON Powercenter 3000 using the pushbutton/switch or web user interface.

Restart

Restart of a computer already in operation that is done without switching off the power supply.

Restore function of the USB flash drive

The restore function is used to reset your system partition or the entire hard disk to the as-delivered condition in case of an error. The USB flash drive contains the image files required to do this and is bootable.

ROM memory

Read Only Memory. The ROM memory is a read-only memory in which each memory cell can be individually addressed. The stored programs or data are hard-programmed and are retained even through a power failure.

S.M.A.R.T

Self-Monitoring, Analysis and Reporting Technology (SMART or S.M.A.R.T.) is an industry standard that is incorporated in storage media. It enables permanent monitoring of important parameters and therefore early detection of incipient faults.

SATA

Serial ATA. An interface for hard disk drives and optical disk drives with serial data transmission.

SETUP (BIOS setup)

A program with which information is defined about the device setup (that is the expansion level of the hardware of the PC/PG). The device setup of the PC/PG is preset. Changes then have to be made when a memory expansion, new modules or drives are to be activated.

Setup files

They contain data that define what the setup will look like after restart. Such files are, for example, CONFIG.SYS, AUTOEXEC.BAT, and registration files.

Setup software

With the setup software, the device setup is updated when modules are installed. This is done either by copying the setup files supplied or by manual setup.

SSD

A Solid State Drive is a drive that can be installed like a conventional hard disk but does not contain a rotating disk or any other moving parts because only semiconductor modules with similar capacity are used. The advantages are robustness, short access times, low energy consumption and fast data transmission.

STEP 7

Programming software for generating user programs for SIMATIC S7 control systems.

Wake on LAN

Wake on Local area network. With this function, the PC can be started via the LAN interface.

Warm restart

A warm restart is understood as a restart after program termination. The operating system is reloaded and started again. A warm restart is performed with the hotkey CTRL + ALT+ DEL.

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