# SIEMENS

Manual

# SENTRON

## PROFINET Proxy SPP2000

Edition  03/2022

siemens.de/lowvoltage

# SIEMENS

## SENTRON

## PROFINET Proxy SPP2000

**Equipment Manual**

## 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.

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 AG. 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.

# Table of contents

# Introduction

# 1

## 1.1 Scope of delivery

The package includes:

- SENTRON PROFINET Proxy (SPP2000)
- Connection plug for the power supply
- Operating instructions SPP2000

Available accessories:

- SENTRON powerconfig software (https://support.industry.siemens.com/cs/ww/de/view/63452759)
- GSDML file (https://support.industry.siemens.com/cs/ww/en/view/109804702)

## 1.2 Latest information

**Up-to-the-minute information**

You can find further support on the Internet (http://www.siemens.de/lowvoltage/technical-assistance).

## 1.3 General safety instructions

**General safety instructions**

> ⚠ **DANGER**
>
> **Hazardous voltage.**
>
> **Will cause death or serious injury.**
>
> Turn off and lock out all power supplying this equipment before working on this device.

> ⚠ **WARNING**
>
> **Impairment of protection will result from improper use.**
> **Can cause death, serious personal injury, or equipment damage.**
>
> The device may be used only for the applications described in the catalog and the associated technical documentation.

**Note**

Only qualified personnel are permitted to install, commission or service this device.

- Wear the prescribed protective clothing.
- Observe the general equipment regulations and safety regulations for working on high-voltage installations (e.g. DIN VDE, NFPA 70E) as well as national or international regulations.
- Before commissioning the device, check that all the connections have been made correctly.
- Before power is applied to the device for the first time, it must have been located in the operating area for at least two hours in order to reach temperature balance and avoid humidity and condensation.
- The limits given in the technical specifications must not be exceeded even during commissioning or testing of the device.
- Condensation on the device is not permissible during operation.

**Note**

These operating instructions do not purport to cover all details or variations in equipment, or to provide for every possible contingency in connection with installation, operation, or maintenance. Should you require more information, or should particular problems arise that are not discussed in enough detail in the operating instructions, please contact Technical Support (https://www.siemens.com/lowvoltage/technical-support) for assistance.

**Safety-related symbols on the device**

| Symbol | Meaning |
|---|---|
|  | Electrical installation and maintenance by qualified personnel only |

## 1.4 Security information

Siemens provides products and solutions with industrial security 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 security 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 security measures that may be implemented, please visit (https://www.siemens.com/industrialsecurity).

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 keep up to date with all the latest product updates, subscribe to the Siemens Industrial Security RSS Feed at (https://www.siemens.com/industrialsecurity).

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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://support.industry.siemens.com/cs/us/en/ps).

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.

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## 1.6 Advanced training courses

Find out about training courses on offer on the following link.

Training for Industry (https://www.siemens.com/sitrain-lowvoltage)

Here you can choose from:

- Web-based training courses (online, informative, free)

- Classroom training courses (course attendance, comprehensive, subject to fee)

You also have the possibility of compiling your own training portfolio via **Learning paths**.

## 1.7 Further documentation

**Overview**

You can find more information about connection, parameterization, and addressing in conjunction with 7KM measuring devices in the following manuals:

- SENTRON PAC2200 and SENTRON PAC2200MID Power Monitoring Device

  - Manual (https://support.industry.siemens.com/cs/ww/en/view/109746835)

- SENTRON PAC2200CLP Power Monitoring Device

  - Manual (https://support.industry.siemens.com/cs/ww/en/view/109783220)

- SENTRON PAC3200T Power Monitoring Device

  - Manual (https://support.industry.siemens.com/cs/ww/en/view/109746833)

You can find more information on SIMATIC in the following manuals:

- SIMATIC "Configuring Hardware and Connections with STEP 7"

- SIMATIC TIA Portal V18 and higher

- TIA Portal Energy Suite

For more information, see (https://support.industry.siemens.com/cs/de/en/).

You can find more information on the PROFINET at:

- PROFIBUS and PROFINET documentation from PI International (http://www.profibus.com/)

- PROFIenergy profile (https://www.profibus.com/download/profienergy)

# Description

# 2

## 2.1 Area of application

The SPP2000 is used for connecting the following SENTRON devices (Modbus TCP) to the PROFINET network:

- PAC2200
- PAC2200MID
- PAC2200CLP
- PAC3200T

This integrates the devices into power management systems and automation systems, e.g.:

- TIA environment
- SIMATIC
- Other Profinet systems

With the support of PROFIenergy and Energy Suite Profile, the PAC devices can be simply integrated into energy management systems.

- Ethernet switch function for Modbus TCP communication of the aforementioned SENTRON devices.

**See also**

## 2.2 Features

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**Note**

The supported SENTRON devices are PAC2200, PAC2200MID, PAC2200CLP, and PAC3200T.

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The PROFINET Proxy SPP2000 has the following performance features:

- Connection between the supported SENTRON devices and further Ethernet stations by the integrated Ethernet switch.

- Via PROFINET IO, the supported SENTRON devices communicate with an IO controller (e.g. S7).
  This means:
  The SPP2000 (PROFINET IO device) supplies measured variables and statuses of the supported SENTRON devices to the PROFINET IO controller.
  The SPP2000 receives information, e.g. commands, from the PROFINET IO controller and forwards this information to the SENTRON devices.

- Due to the support by PROFINET IRT, the SPP2000 can be used directly in production automation networks, e.g. alongside SIMATIC S7, SINUMERIK, SINAMICS, and SIMOTION.

- Support for media redundancy (MRP: Media Redundancy Protocol) thanks to the integral Ethernet switch

- The SPP2000 offers the highest network class III.

- Supports S2 system redundancy for high-availability systems (H-systems)

- Supports PROFINET DR (Dynamic Reconfiguration) / Configuration in Run (CiR)

- With the SPP2000, the measured variables of the supported SENTRON devices can be read out and addressed via the standard PROFIenergy with the "Query_Measurement" service.

- Simple engineering with TIA or other engineering systems thanks to use of the GDSML files

- Optimal use of the process image of a controller thanks to the flexible selection of individual measured variables and statuses

- Application-specific profiles (e0 to e3) for energy management in cyclic data

- All previous functions of the supported SENTRON devices can be used via the integrated switch of the SPP2000. This allows use of powermanager and powerconfig.

- The 100 Mbps data rate is supported via the two RJ45 sockets.

- IP settings: IP address, subnet, gateway

  – With the powerconfig parameterization software

  – Via PROFINET DCP, e.g. in the TIA HW Config

- Generation of diagnostic and hardware interrupts

- Communication status display by LEDs

## 2.3 Structure
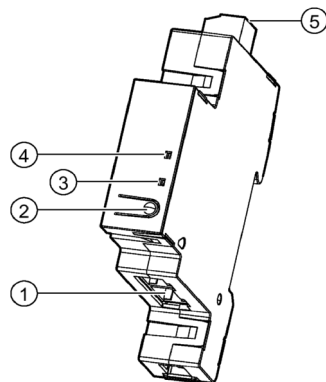


| | |
|---|---|
| ① | 2x RJ45 sockets |
| ② | Function button |
| ③ | COM-LED |
| ④ | PN-LED |
| ⑤ | Power supply connection 24 V DC and FE |

**Function button**

| Status | Description | Color COM LED | Color PN LED |
|---|---|---|---|
| Operated < 5 s | No function. | Unchanged. | Unchanged. |
| Operated > 5 s and < 10 s | Restarts the device. | Orange after 5 s. | Orange after 5 s. |
| Operated >10 s | Resets the device to the delivery state. | Red after 10 s. | Red after 10 s. |

**COM-LED**

The COM-LED visualizes the status of the connection to the lower-level devices, operation of the function button, an ongoing firmware update, and the detection function.

| Color | Status | Description | Actions to take |
|---|---|---|---|
| Without | Off | No function. | Check the supply voltage. |
| Red | Static ON | Failure or configuration error of at least one lower-level device. | Check the function or configuration (e.g. IP configuration) of the lower-level devices. |
| | | Resets the delivery state on operation of the function button >10 s. | Releasing the button when the LED is red triggers a reset to the factory settings. |
| Green | Static ON | Successful connection and correct configuration of all lower-level devices | — |
| Green | Flashing | The recognition function is performed. | End the recognition function. |
| Orange | Flashing | Firmware update is executed. | Wait until SPP2000 has restarted. |
| Orange | Static ON | Restart is performed when the function button is pressed >5 s. | Releasing the button when LED is orange triggers a restart. |

**PN-LED**

The PN-LED visualizes the PROFINET connection status, operation of the function button, and the recognition function button.

| Color | Status | Description | Actions to take |
|---|---|---|---|
| Without | Off | No function. | Check the supply voltage. |
| Orange | Static ON | No Ethernet connection. | Check the connection to the network |
| | | Restart is performed when the function button is pressed >5 s. | Releasing the button when LED is orange triggers a restart. |
| Red | Static ON | Ethernet connection has been established. No PROFINET communication. | Check the configuration or connection of the PROFINET IO controller or supervisor. |
| | | Resets the delivery state on operation of the function button >10 s. | Releasing the button when the LED is red triggers a reset to the factory settings. |
| Green | Static ON | PROFINET IO communication is up | — |
| Green | Flashing | The recognition function is performed. | End the recognition function. |

# Installation and removal

<div style="text-align: right; font-size: 2em; font-weight: bold;">3</div>

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| ⚠ WARNING |
| --- |
| **Using devices when they are damaged may result in death, serious injury, or damage to property.** |
| Do not install or start up damaged devices. |

| ⚠ CAUTION |
| --- |
| **Electrostatic discharge** |
| The device contains electronic components that can be irreparably damaged by electrostatic discharge. |
| When handling the module, make sure that all objects in the handling environment (persons, workstation and packaging) are properly grounded. |

## 3.1 Installation location

The SENTRON PROFINET Proxy is mounted on a TH35 rail (complying with EN 60715) and is intended for installation in permanently installed systems within closed rooms.

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**Note**

**Avoid condensation**

Sudden fluctuations in temperature can lead to condensation. Condensation can affect the function of the device. Store the device in the operating room for at least two hours before commencing installation.

---

| NOTICE |
| --- |
| **Faults are possible in the device** |
| Only use the SENTRON PROFINET Proxy if all connected nodes are located within one building and are supplied via a power supply system: |
| • In a LAN |
| • In a segment of the LAN |

## 3.2      Installation

Mount the SPP2000 on a TH35 mounting rail (according to EN 60715).

**Procedure**
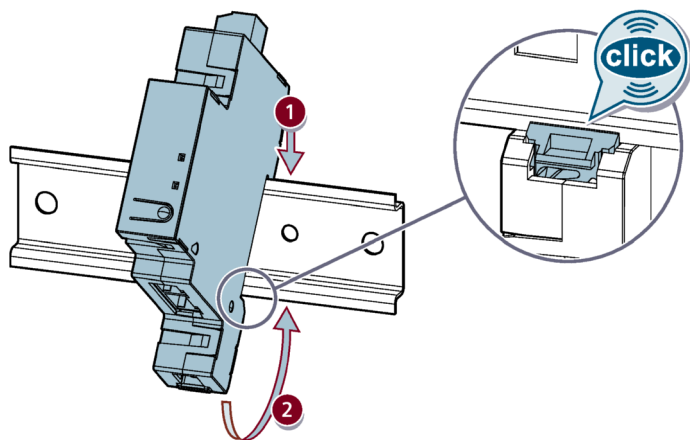


## 3.3      Removal

**Tool**

You require the following tools to remove the device:

- Flat-blade screwdriver

**Procedure**

# Connection

# 4
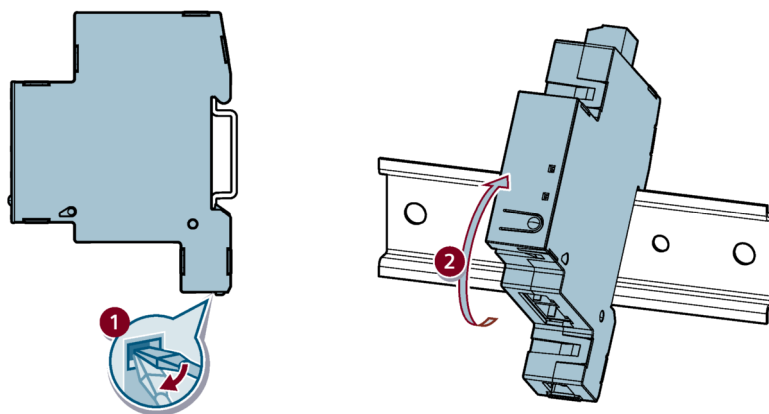
## 4.1 Safety information

**Instructions**

> ### ⚠ DANGER
>
> **Hazardous voltage!**
> **Will cause death, serious personal injury, or damage to property.**
>
> Turn off and lock out all power supplying this equipment before working on this device.

> **NOTICE**
>
> **Connection to the wrong supply voltage can cause irreparable damage to the device.**
>
> Before connecting the device, make sure that the line voltage matches the specifications on the rating plate.

**Note**

Only qualified personnel are permitted to install, commission or service this device.

- Wear the prescribed protective clothing. Observe the general equipment regulations and safety regulations for working with high-voltage installations (e.g. DIN VDE, NFPA 70E as well as national or international regulations).
- The limits given in the technical specifications must not be exceeded even during commissioning or testing of the device.
- Before connecting the device, check that the system voltage matches the voltage specified on the rating plate.
- Make sure that there is sufficient mechanical strain relief for the data cable.
- Before commissioning the device, check that all the connections have been made correctly.
- Before power is applied to the device for the first time, it must have been located in the operating area for at least two hours in order to reach temperature balance and avoid humidity and condensation.
- Condensation on the device is not permissible during operation.

**Note**

**Prevent capacitive and inductive interference.**

Make sure that all data and signal lines are routed separately from control and power supply lines. In order to avoid the risk of capacitive or inductive interference, these cables must never be routed in parallel.

**Note**

**Insulation test**

When performing an insulation test of the entire installation with AC or DC, the device should be disconnected before starting the test.

**Note**

**Supply voltage fuse protection.**

The miniature circuit breakers in the supply voltage are only used for cable protection. The method of cable protection must be selected according to the design of the supply cable.

We recommend 5SY miniature circuit breakers, 3RV motor starter protectors, or 5SB/3NA fuses, depending on the cable requirements and connection conditions.

- Install a miniature circuit breaker in the power supply line.
- Use only miniature circuit breakers up to 20 AC.
- Choose a miniature circuit breaker that conforms to the relevant regulations.

## 4.2 Notes on grounding the data cable for use with the PROFINET Proxy SPP2000

**Note**

**The upper limit values will be exceeded if the cable is not grounded**

Compliance with the technical limit values for noise radiation (CISPR11, class B) and noise immunity is only guaranteed if the cable is correctly grounded. The operator of the system is responsible for ensuring compliance with the statutory limit values (CE mark).

Make a shield connection on both sides as described here.

**Ethernet cable**

The Ethernet cable must be grounded in the vicinity of the basic device for data transmission according to the Fast Ethernet standard.

### Type of shield grounding

To do this, expose the foil shield of the data cable. Connect the exposed shield to a suitable grounding point on the control cabinet, preferably a shielding bus.
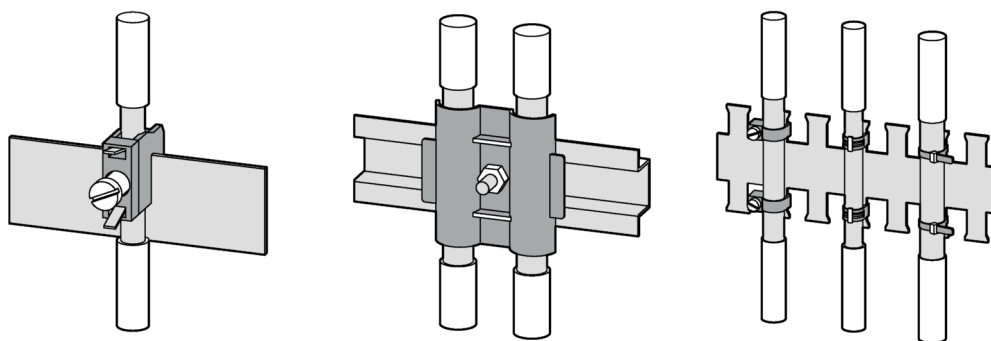


- Be careful not to damage the foil shield of the cable when removing the cable jacket.
- Fasten the exposed shield with a metal cable clamp or alternatively with a hose tie. The clamp must clasp around a large portion of the shield and provide good contact.
- To allow good contact, a tin-plated or galvanically stabilized surface is ideal.
  With galvanized surfaces, the contact should be achieved using suitable screw connections. A painted surface at the contact point is not suitable.

**Note**

**Loss of contact if the shield connection is incorrectly used for strain relief**

If the shield connection is used for strain relief, the grounding contact can deteriorate or be completely lost.

Don't use the contact point on the cable shield for strain relief.

## 4.3 Connection examples

An external supply voltage is required to operate the device. Please consult the Technical data (Page 73) or the rating plate for the permissible supply voltage type and level.

| NOTICE |
| --- |
| **Connection to the wrong supply voltage can cause irreparable damage to the device.** |
| Failure to heed this warning can result in damage to the device and the system. The limits given in the technical data and on the rating plate must not be exceeded even at startup or when testing the device. |

The SENTRON PROFINET Proxy is used as the PROFINET / Modbus TCP-Gateway. It is able to connect different SENTRON devices to the PROFINET IO.
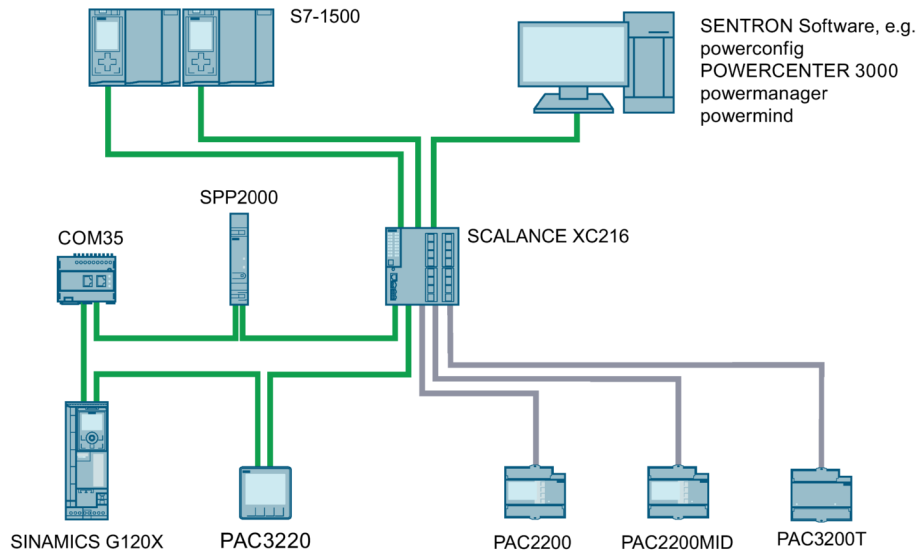
## Further connection example

The SPP2000 is used as a gateway for a PAC2200/3200T. Using a switch, up to 8 of the PAC devices mentioned can be integrated in TIA.
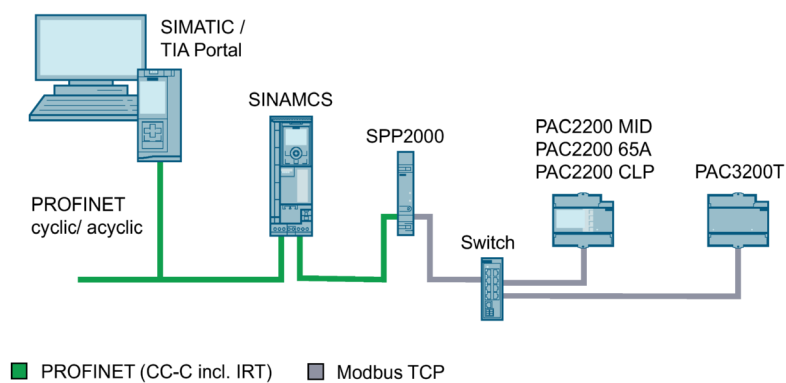


## Further connection example

The SPP2000 is integrated into the center of a PROFINET network with Conformance Class C. Up to the PAC devices mentioned, it uses PROFINET and Modbus TCP in parallel. A PROFINET ring topology is also possible.
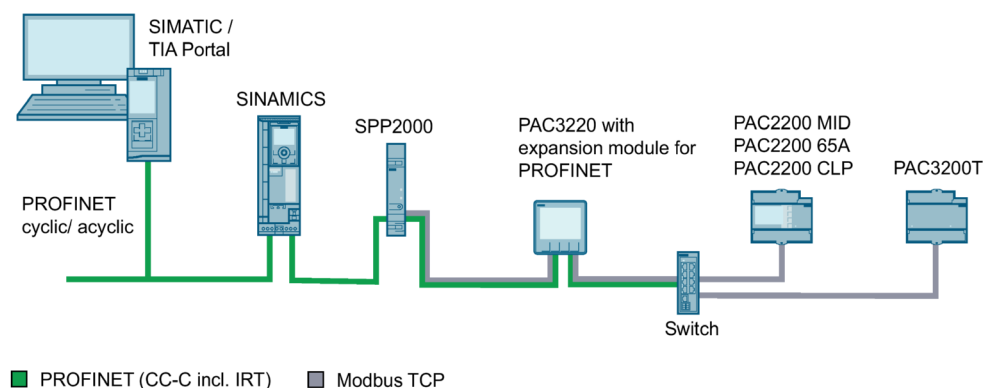
## Further connection example

As the previous connection example, but further PROFINET nodes can still be connected. The Modbus TCP segments of the PACs are separated from the PROFINET segment by a switch. The SPP2200 acts as a proxy of the PACs in the PROFINET network.

# Commissioning

<div style="text-align: right; font-size: 3em;">5</div>
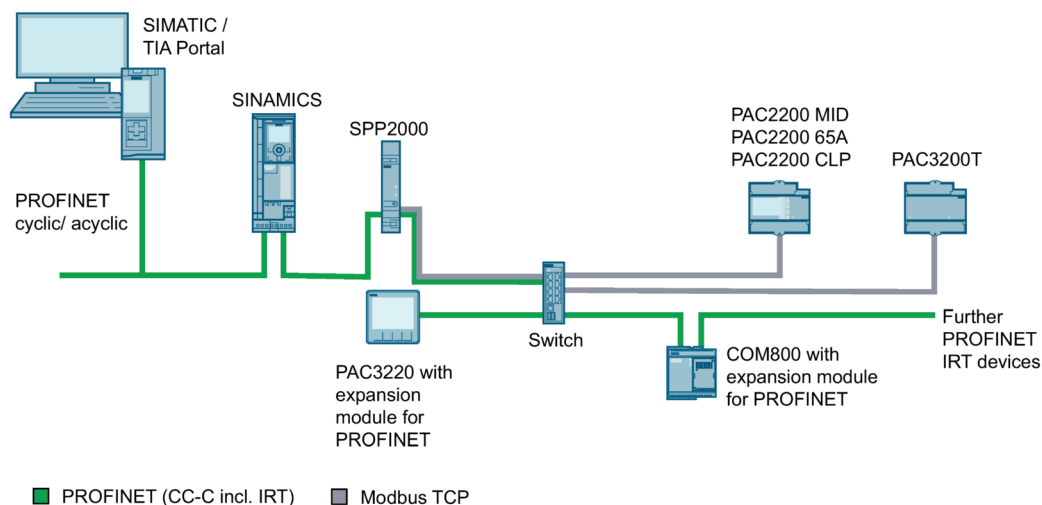
## 5.1 Requirements

**Requirements for commissioning**

The SENTRON PROFINET Proxy was correctly connected to the supply voltage and to the communication system.

---

**Note**

**Check the connections**

Incorrect connection can result in malfunctions and failure of the device. Before you start up the device, check that all the connections have been made correctly.

---

**Note**

**Insulation test**

When performing an insulation test of the entire installation with AC or DC, the device should be disconnected before starting the test.

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## 5.2 TIA hardware configuration via SPP2000 in the SIMATIC environment

**TIA hardware configuration of the 7KM PAC measuring device via SPP2000 in the SIMATIC environment**

You can configure the 7KM PAC measuring device via the SENTRON PROFINET Proxy in the SIMATIC environment as follows:

- Integration of the 7KM PAC measuring device with PROFINET into TIA via the device-specific **GSDML** file.

**Integration in the SIMATIC environment via GSDML file**
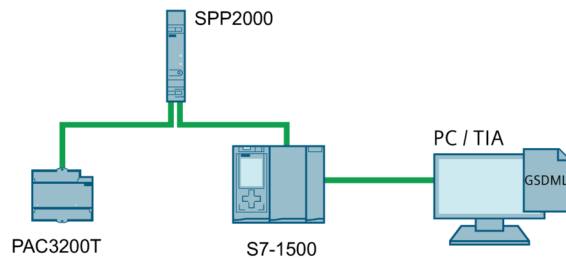


**Note**

**Configuration with other tools**

You can also use tools from other manufacturers for the configuration.

**Task of the GSDML file**

The GSDML file is the basis for the configuration of a device.

The GSDML file makes the following data available to the PROFINET IO controller:

- Measured variables
- Status and control information
- Communication characteristics

## Naming convention of the PROFINET GSDML file

The name of the PROFINET GSDML file is language-independent. All devices and all languages are described in it. The name of the GSDML file contains the following information:

Table 5- 1    Composition of the file name

| Fields | Meaning |
|--------|---------|
| 1 | "GSDML" |
| 2 | Version number of the GSDML file in the format Vx.y |
| 3 | Name of the manufacturer |
| 4 | Name of the device family |
| 5 | Issue date of the GSDML file in the format: YYYY.MM.DD |
| 6 | Optional issue time of the GSDML file in the format: hh.mm.ss <br> hh applies from 00 to 24. |
| 7 | Extension of the filename "XML" |

**Note**

You can find the latest version of the required GSDML file on the Internet (https://support.industry.siemens.com/cs/ww/en/view/109804702).

# 5.3 Configuration example

**Configuration example in the TIA Portal using the GSDML file**

1. Start the TIA configuration tool.

   – Confirm in the "Options" > "Manage generic station description files (GSD)" menu.
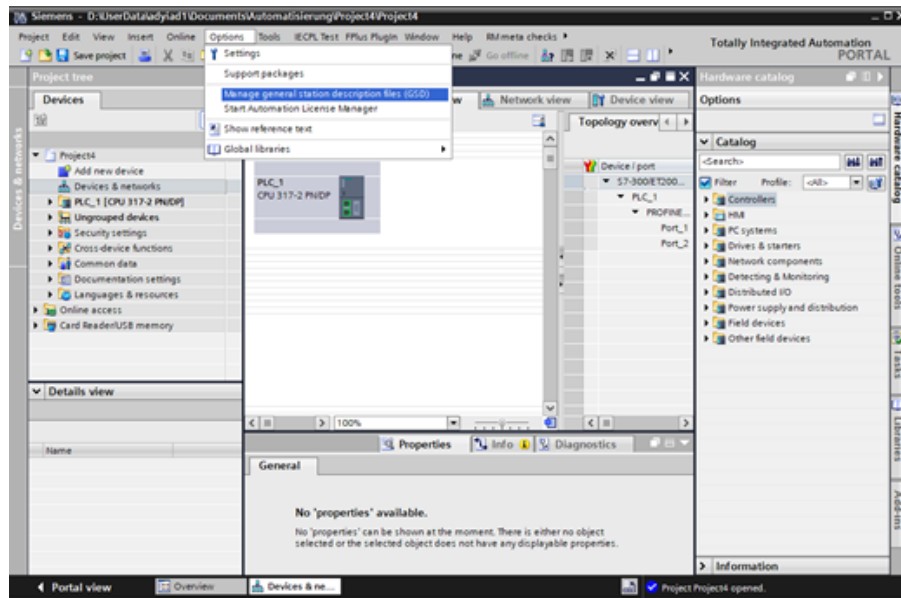


2. Select the directory in which the GSDML file is stored.

   – Confirm the selection and perform the installation.
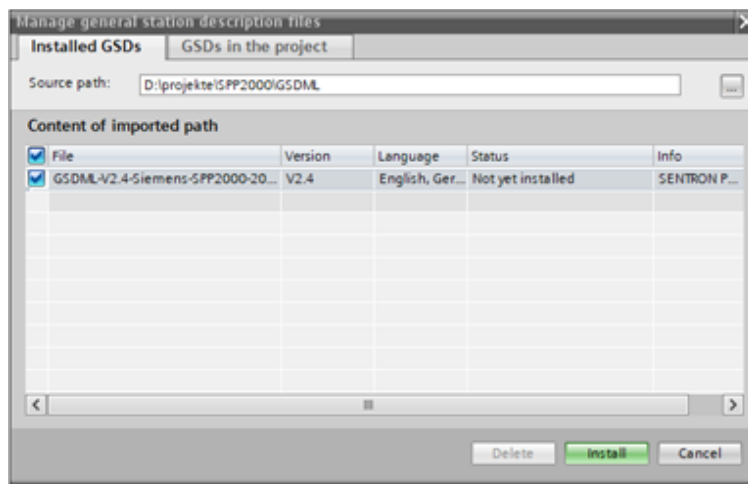
– On successful completion of the installation of the GSDML file, the following message is displayed:

"The installation was completed successfully."
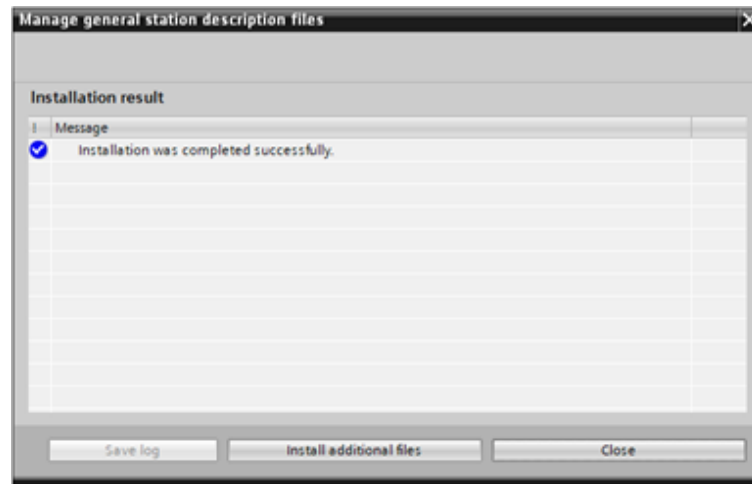


3. The SPP2000 is in the hardware tree at:

"PROFINET IO" > "Other field devices" > "PROFINET IO" > "Sensors" > "SIEMENS AG" > "SENTRON" > "SPP2000"
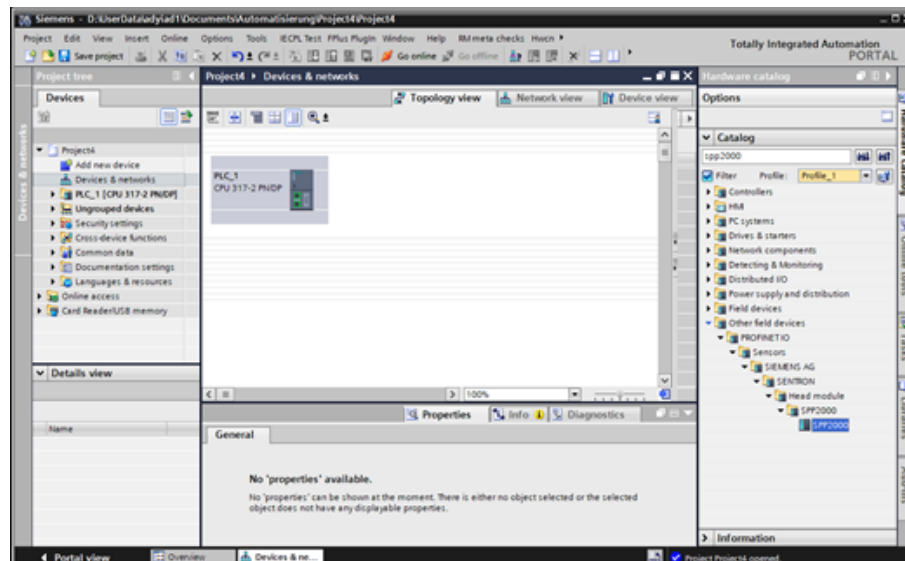
4. Drag the SPP2000 from the hardware tree onto the configuration surface.
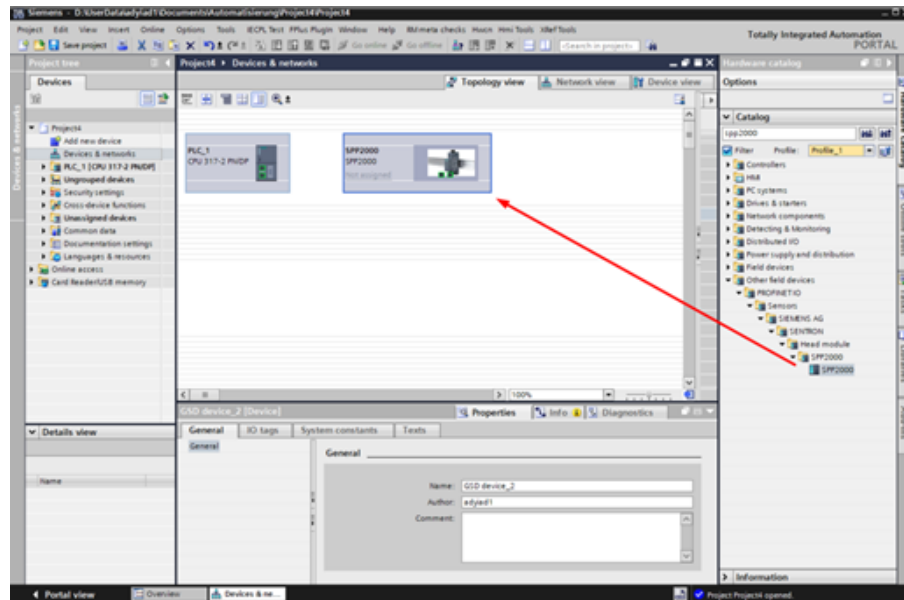


5. Define the communication parameters.

   – Assign a unique IP address, and a "device name" to the SPP2000.

   Note: The "device name" must be identical to the stored name in the device.
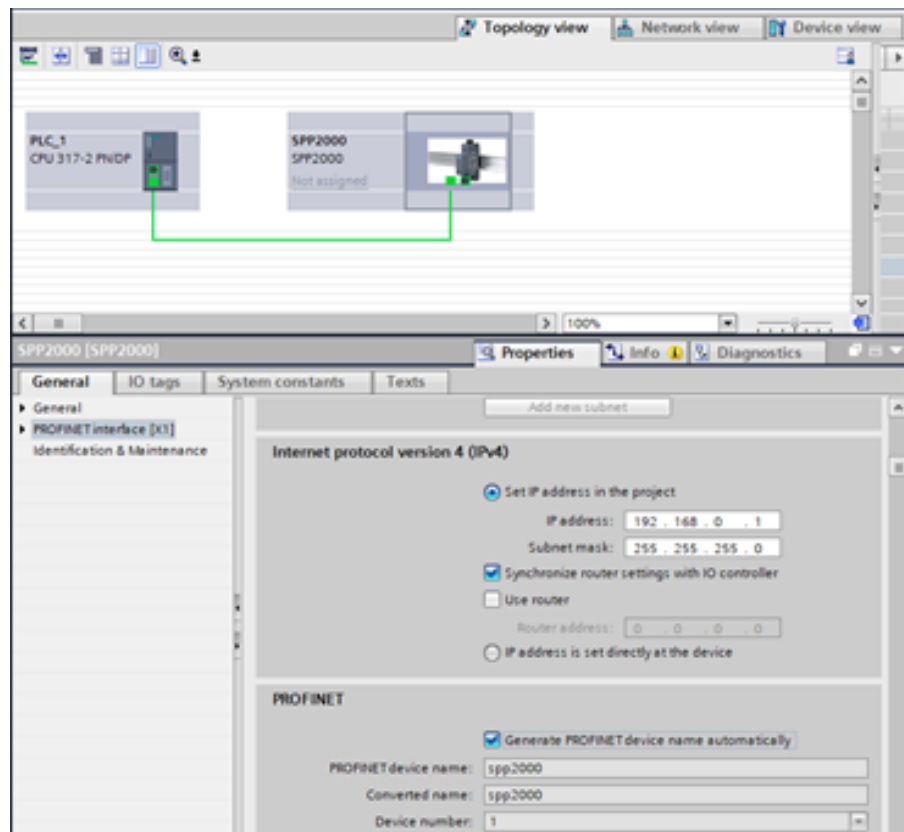
6. Integration of the PAC devices in the SPP2000:

In the SPP2000, up to eight PAC devices can be integrated. For that reason, SPP2000 provides eight slots.

From the catalog, the required PAC device can be inserted into the desired slot with a drag-and-drop operation.
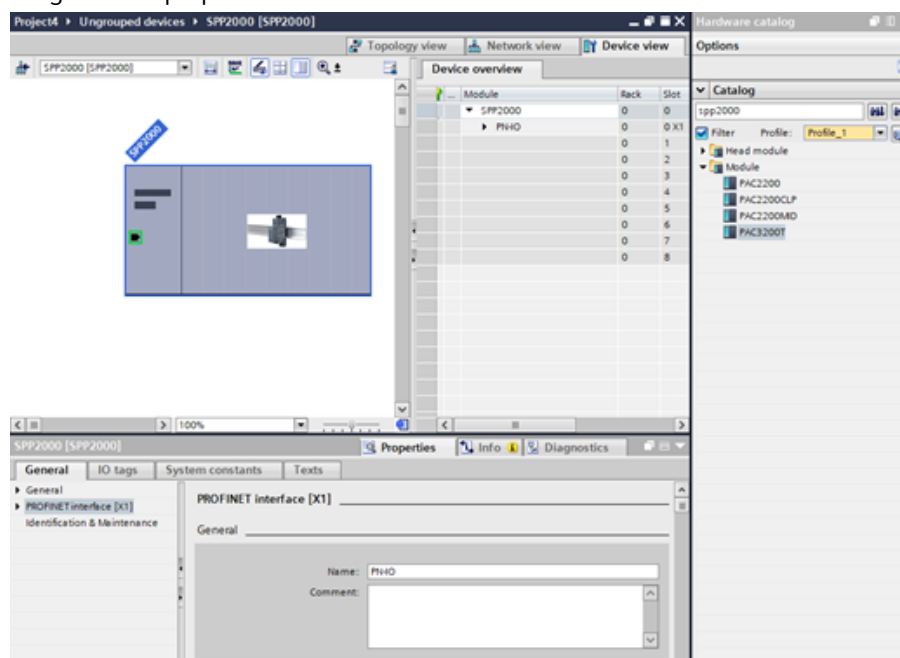
7. Setting the PAC communication parameters:

   Each PAC device has an "Ethernet interface" submodule in Subslot1. Via this module, the "IP address" and "Modbus port" of each PAC device are communicated to the SPP2000.

   Via these parameters, the SPP2000 will build up communication with the lower-level PAC device. The communication parameters entered must already be available in the PAC device.
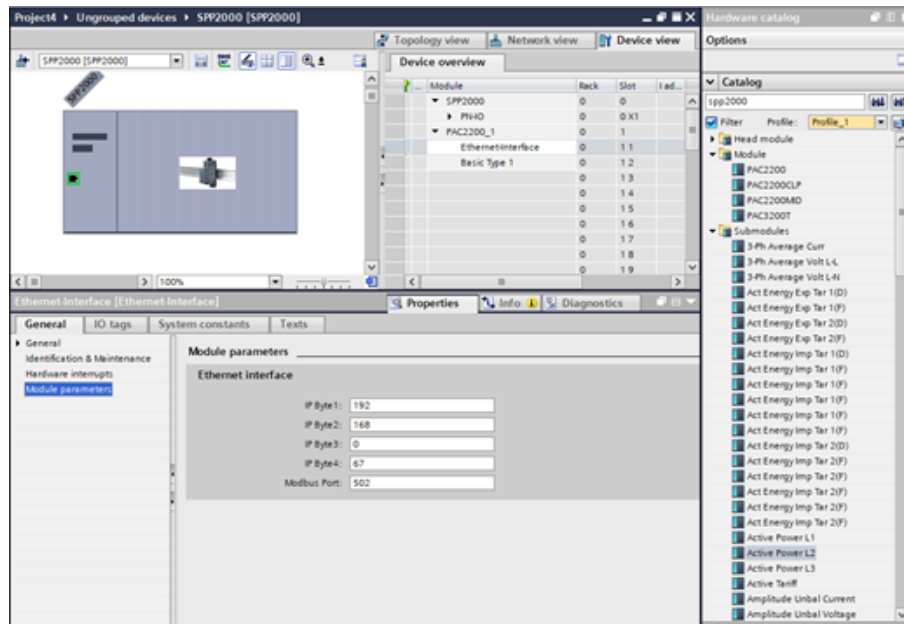
8. Defining the cyclic data management in the configured PAC devices:
   Note: The maximum data capacity of the inputs is 244 bytes.

   The SPP2000 provides nine subslots for the measurement modules for each PAC device (slot). You can select the required measurement module from the catalog with a drag-and-drop operation and add it to the desired device.
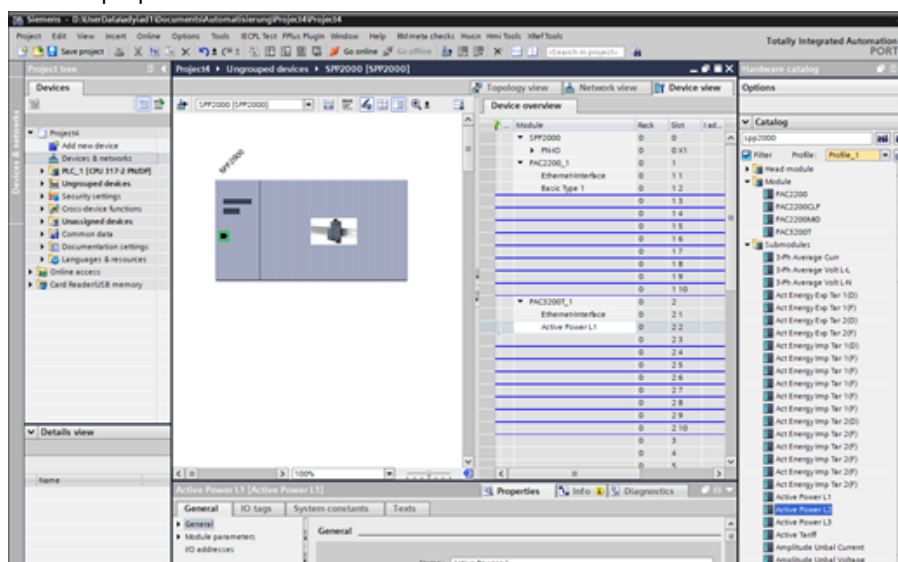


9. Compiling the configuration and loading to the controller:
   After the configuration, you can compile the project and load it into the control.

---

**Note**

In addition to the Ethernet interface, at least one additional submodule must be available for each PAC device.

---

# Data traffic 6

## 6.1 Measured variables and statuses

The measured variables and status information of the SENTRON devices are available to the higher-level power management system or automation system via SPP2000.

The measured variables include, for example:

- The measured values
- The maximum/minimum values of the measured values
- The energy values

The status information includes, for example:

- The set limit values
- The device statuses

You can find a detailed description of the measured variables in the manuals of the relevant SENTRON device.

The measured variables and status information are offered both in cyclic data traffic and acyclic data traffic.

**Transfer of measured variables and statuses**

The measured variables and statuses are transferred as follows:

- Cyclic data traffic via GSDML modules
- Acyclic data traffic via data sets
- Acyclic data traffic via PROFIenergy profiles

**See also**

Further documentation (Page 9)

Introduction (Page 5)

## 6.2 Cyclic data traffic

You will find further information about the individual data points of the PAC device in the manuals PAC2200CLP, PAC3200T, and PAC2200 / PAC2200MID.

**See also**

SENTRON PAC2200 and PAC2200MID manual
(https://support.industry.siemens.com/cs/ww/en/view/109746835)

SENTRON PAC2200CLP manual
(https://support.industry.siemens.com/cs/ww/en/view/109783220)

SENTRON PAC3200T manual
(https://support.industry.siemens.com/cs/ww/en/view/109746833)

### 6.2.1 Cyclic data traffic on PROFINET IO

**Description**

In cyclic data traffic, each telegram transfers an optional number of user data. Cyclic data exchange is especially suitable for transferring information that is required continuously and quickly. The device is under the time control of PROFINET Real-Time (RT).

- The PROFINET IO-Controller specifies the parameterizable update time.
- The SPP2000 supports update times of 1 to 512 ms.

All available data types that PROFINET can transfer are defined in the GSDML file for the respective SENTRON device. Basic types with predefined measured variables are predefined in the GSDML for time-saving commissioning and efficient data transfer. Further individual measured variables are available, the user can insert them additionally.

---

**Note**

**Note the quantity structure**

The maximum quantity structure of the SPP2000 is 240 bytes of input data and 2 bytes of output data per PAC device.

---

## 6.2.2 Basic type 1

**Structure**

The structure of basic type 1 is fixed. The length of basic type 1 is 20 bytes of input data and 2 control bytes (output data). The following information is transferred in basic type 1.

Table 6- 1    Structure of basic type 1

| Byte | Data value | Format | Unit |
|---|---|---|---|
| 0 ... 3 | Status information | Unsigned long | — |
| 4 ... 7 | Current L1 | Float | A |
| 8 ... 11 | Current L2 | Float | A |
| 12 ... 15 | Current L3 | Float | A |
| 16 ... 19 | Total active power | Float | W |

## 6.2.3 Basic type 2

**Structure**

The structure of basic type 2 is fixed. Basic type 2 is 24 bytes long.

Basic type 2 is an extension of basic type 1. This means that you can easily add basic type 1 and basic type 2 during the project design phase. You can also use basic type 2 as a separate unit.

Table 6- 2    Basic type 2 transfers the following input data

| Byte | Data value | Format | Unit |
|---|---|---|---|
| 0 ... 3 | Voltage L1-L2 | Float | V |
| 4 ... 7 | Voltage L2-L3 | Float | V |
| 8 ... 11 | Voltage L3-L1 | Float | V |
| 12 ... 19 | Active energy import tariff 1 | Double | Wh |
| 20 ... 23 | Total power factor | Float | — |

## 6.2.4 Basic type 3

### Structure

The structure of basic type 3 is fixed. Basic type 3 is 116 bytes long.

Basic type 3 contains the control bytes.

---

**Note**

Basic type 3 is only available for PAC3200T.

---

Table 6- 3    Basic type 3 transfers the following input data:

| Byte | Data value | Format | Unit |
|------|-----------|--------|------|
| 0 ... 3 | Status information | Unsigned long | — |
| 4 ... 7 | Voltage L1-N | Float | V |
| 8 ... 11 | Voltage L2-N | Float | V |
| 12 ... 15 | Voltage L3-N | Float | V |
| 16 ... 19 | Voltage L1-L2 | Float | V |
| 20 ... 23 | Voltage L2-L3 | Float | V |
| 24 ... 27 | Voltage L3-L1 | Float | V |
| 28 ... 31 | Current L1 | Float | A |
| 32 ... 35 | Current L2 | Float | A |
| 36 ... 39 | Current L3 | Float | A |
| 40 ... 43 | Power factor L1 | Float | — |
| 44 ... 47 | Power factor L2 | Float | — |
| 48 ... 51 | Power factor L3 | Float | — |
| 52 ... 55 | THD voltage L1 | Float | % |
| 56 ... 59 | THD voltage L2 | Float | % |
| 60 ... 63 | THD voltage L3 | Float | % |
| 64 ... 67 | THD current L1 | Float | % |
| 68 ... 71 | THD current L2 | Float | % |
| 72 ... 75 | THD current L3 | Float | % |
| 76 ... 79 | Line frequency | Float | Hz |
| 80 ... 83 | 3-phase average current | Float | A |
| 84 ... 87 | Total apparent power | Float | VA |
| 88 ... 91 | Total active power | Float | W |
| 92 ... 95 | Total reactive power (VARn) | Float | Var |
| 96 ... 99 | Total power factor | Float | — |
| 100 ... 103 | Amplitude unbalance voltage | Float | % |
| 104 ... 107 | Amplitude unbalance current | Float | % |
| 108 ... 111 | Length of last period | Unsigned long | s |
| 112 ... 115 | Neutral current | Float | A |

**See also**

## 6.2.5 Energy data profile e0

Energy data profile e0 is a simple profile which can be used to create criteria for a trend analysis based on the current.

| Byte | Data value | Format | Unit |
|------|------------|--------|------|
| 0..3 | Current L1 | Float | A |
| 4..7 | Current L2 | Float | A |
| 8..11 | Current L3 | Float | A |

## 6.2.6 Energy data profile e1

Energy data profile e1 is a basic profile for devices which cannot calculate energy. Only devices which measure three-phase symmetrical loads should be included in this profile.

| Byte | Data value | Format | Unit |
|------|------------|--------|------|
| 0..3 | Total active power | Float | W |

## 6.2.7 Energy data profile e2

Energy data profile e0 satisfies all the typical requirements necessary for energy management.

| Byte | Data value | Format | Unit |
|------|------------|--------|------|
| 0..3 | Total active power | Float | W |
| 4..7 | Total active energy import | Float | Wh |
| 8..11 | Total active energy export | Float | Wh |

## 6.2.8    Energy data profile e3

Energy data profile e3 satisfies all the typical requirements necessary for energy management.

| Byte | Data value | Format | Unit |
|------|------------|--------|------|
| 0..3 | Active power L1 | Float | W |
| 4..7 | Active power L2 | Float | W |
| 8..11 | Active power L3 | Float | W |
| 12..15 | Reactive power L1 | Float | var |
| 16..19 | Reactive power L2 | Float | var |
| 20..24 | Reactive power L3 | Float | var |
| 25..31 | Total active energy import (tariff 1) | Double | Wh |
| 32..39 | Total active energy export (tariff 1) | Double | Wh |
| 40..47 | Total reactive energy import (tariff 1) | Double | varh |
| 48..55 | Total reactive energy export (tariff 1) | Double | varh |
| 56..59 | Voltage UL1-N | Float | V |
| 60..63 | Voltage UL2-N | Float | V |
| 64..67 | Voltage UL3-N | Float | V |
| 68..71 | Voltage UL1-UL2 | Float | V |
| 72..75 | Voltage UL2-UL3 | Float | V |
| 76..79 | Voltage UL3-UL1 | Float | V |
| 80..83 | Current L1 | Float | A |
| 84..87 | Current L2 | Float | A |
| 88..91 | Current L3 | Float | A |
| 92..95 | Power factor L1 | Float | - |
| 96..99 | Power factor L2 | Float | - |
| 100..103 | Power factor L3 | Float | - |

### 6.2.9 Freely available measured variables

The SPP2000 has the following freely available measured variables in addition to the predefined basic types

| Data point PAC2200 | Data point PAC3200T | Format |
|---|---|---|
| Voltage PH-N L1 | Voltage PH-N L1 | Float |
| Voltage PH-N L2 | Voltage PH-N L2 | Float |
| Voltage PH-N L3 | Voltage PH-N L3 | Float |
| Voltage PH-PH L1-L2 | Voltage PH-PH L1-L2 | Float |
| Voltage PH-PH L2-L3 | Voltage PH-PH L2-L3 | Float |
| Voltage PH-PH L3-L1 | Voltage PH-PH L3-L1 | Float |
| Current L1 | Current L1 | Float |
| Current L2 | Current L2 | Float |
| Current L3 | Current L3 | Float |
| Apparent power L1 | Apparent power L1 | Float |
| Apparent power L2 | Apparent power L2 | Float |
| Apparent power L3 | Apparent power L3 | Float |
| Active power L1 | Active power L1 | Float |
| Active power L2 | Active power L2 | Float |
| Active power L3 | Active power L3 | Float |
| Reactive power L1 (Q1) | Reactive power L1 (Q1) | Float |
| Reactive power L2 (Q1) | Reactive power L2 (Q1) | Float |
| Reactive power L3 (Q1) | Reactive power L3 (Q1) | Float |
| Power factor L1 | Power factor L1 | Float |
| Power factor L2 | Power factor L2 | Float |
| Power factor L3 | Power factor L3 | Float |
| - | THD voltage L1 | Float |
| | THD voltage L2 | Float |
| | THD voltage L3 | Float |
| | THD current L1 | Float |
| | THD current L2 | Float |
| | THD current L3 | Float |
| Frequency | Frequency | Float |
| Average voltage PH-N | Average voltage PH-N | Float |
| Average voltage PH-PH | Average voltage PH-PH | Float |
| Average current | Average current | Float |
| Total apparent power | Total apparent power | Float |
| Total active power | Total active power | Float |
| Total reactive power (Q1) | Total reactive power (Q1) | Float |
| Total power factor | Total power factor | Float |
| Neutral current | Neutral current | Float |
| - | Amplitude unbalance voltage | Float |
| | Amplitude unbalance current | Float |
| | Limit violations | Unsigned long |
| Device diagnostics and status | Device diagnostics and status | Unsigned long |
| Status of digital outputs | Status of digital outputs | Unsigned long |

| Data point PAC2200 | Data point PAC3200T | Format |
|---|---|---|
| Status of digital inputs | Status of digital inputs | Unsigned long |
| Active tariff | Active tariff | Unsigned long |
| - | Operating hours counter | Unsigned long |
| Counter (configurable) | Counter (configurable) | Unsigned long |
| Relevant parameter changes counter | Relevant parameter changes counter | Unsigned long |
| Daily profile counter | Daily profile counter | Unsigned long |
| Monthly profile counter | Monthly profile counter | Unsigned long |
| Annual profile counter | Annual profile counter | Unsigned long |
| Cumulated active power import in the current period | - | Float |
| - | Counter of all parameter changes | Unsigned long |
| | Limits bit array changes counter | Unsigned long |
| | Configurable energy counter value (if parameterized as energy import) | Unsigned long |
| | Displacement factor L1 ("cos phi") | Float |
| | Displacement factor L2 ("cos phi") | Float |
| | Displacement factor L3 ("cos phi") | Float |
| | Displacement factor SUM ("cos phi") | Float |
| | THD voltage L1-L2 | Float |
| | THD voltage L2-L3 | Float |
| | THD voltage L3-L1 | Float |
| | Cumulated active power import in the current period | Float |
| | Cumulated reactive power import in the current period | Float |
| | Cumulated active power export in the current period | Float |
| | Cumulated reactive power export in the current period | Float |
| | Maximum active power in the current period | Float |
| | Minimum active power in the current period | Float |
| | Maximum reactive power in the current period | Float |
| | Minimum reactive power in the current period | Float |
| | Real load profile period length | Unsigned long |
| | Instant of the last completed period | Unsigned long |
| OID | OID | Unsigned long |
| Date/time | Date/time | Unsigned long |
| Total active energy import tariff 1 | Total active energy import tariff 1 | Double |
| Total active energy import tariff 2 | Total active energy import tariff 2 | Double |
| Total active energy export tariff 1 | Total active energy export tariff 1 | Double |
| Total active energy export tariff 2 | Total active energy export tariff 2 | Double |
| Total reactive energy import tariff 1 | Total reactive energy import tariff 1 | Double |
| Total reactive energy import tariff 2 | Total reactive energy import tariff 2 | Double |
| Total reactive energy export tariff 1 | Total reactive energy export tariff 1 | Double |

| Data point PAC2200 | Data point PAC3200T | Format |
|---|---|---|
| Total reactive energy export tariff 2 | Total reactive energy export tariff 2 | Double |
| Total apparent energy tariff 1 | Total apparent energy tariff 1 | Double |
| Total apparent energy tariff 2 | Total apparent energy tariff 2 | Double |
| Secondary total active energy import (MID register) | Secondary total active energy import | Double |
| Secondary total active energy export (MID register) | Secondary total active energy export | Double |
| Total active energy import (MID register) | Total active energy import | Double |
| Total active energy export (MID register) | Total active energy export | Double |
| Total active energy import tariff 1 | Total active energy import tariff 1 | Float |
| Total active energy import tariff 2 | Total active energy import tariff 2 | Float |
| Total active energy export tariff 1 | Total active energy export tariff 1 | Float |
| Total active energy export tariff 2 | Total active energy export tariff 2 | Float |
| Total reactive energy import tariff 1 | Total reactive energy import tariff 1 | Float |
| Total reactive energy import tariff 2 | Total reactive energy import tariff 2 | Float |
| Total reactive energy export tariff 1 | Total reactive energy export tariff 1 | Float |
| Total reactive energy export tariff 2 | Total reactive energy export tariff 2 | Float |
| Total apparent energy tariff 1 | Total apparent energy tariff 1 | Float |
| Total apparent energy tariff 2 | Total apparent energy tariff 2 | Float |
| Secondary total active energy import (MID register) | Secondary total active energy import (MID register) | Float |
| Secondary total active energy export (MID register) | Secondary total active energy export (MID register) | Float |
| Total active energy import | Total active energy import (MID register) | Float |
| Total active energy export | Total active energy export (MID register) | Float |

## 6.2.10 Status information in the cyclic channel

### Status information

In cyclic data traffic, the status information is sent on every data exchange at the beginning of a basic type 1 and basic type 3 data structure. You can add the status information as individual modules separately during configuration. The status information is treated as diagnostics data of the individual device.

Table 6- 4    Structure of the 4 bytes of the status information - static diagnostics

| Byte | Bit | Description |
|---|---|---|
| Byte n<br>System status | 0 | No synchronization pulse/telegram |
| | 1 | Device configuration menu active -> reserved |
| | 2 | Voltage overload |
| | 3 | Current overload |
| | 4 | Date/time inaccurate |
| | 5 | Device is being updated |
| | 6 | The device is hardware write-protected |

| Byte | Bit | Description |
|---|---|---|
|  | 7 | Modbus communication is password-protected |
| Byte n + 1<br>Device status | 0 | Reserved |
|  | 1 | Maximum pulse rate exceeded |
|  | 2 | Device status |
|  | 3 | Device status |
|  | 4 | Device status |
|  | 5 | Logbook full (for CLP only) |
|  | 6 | SNTP not synchronized |
|  | 7 | Wait for user interaction |
| Byte n + 2<br>Device diagnostics | 0 | Relevant parameter changes |
|  | 1 | Limit array changed, for PAC3200T only |
|  | 2 | Maximum pulse rate exceeded |
|  | 3 | Restart of the device |
|  | 4 | Resetting of energy counter by user |
|  | 5 | Global device diagnostics |
|  | 6 | Global device diagnostics |
|  | 7 | Global device diagnostics |
| Byte n + 3<br>Component diagnostics | 0 | Reserved |
|  | 1 | Reserved |
|  | 2 | Reserved |
|  | 3 | Reserved |
|  | 4 | Reserved |
|  | 5 | Reserved |
|  | 6 | Reserved |
|  | 7 | Reserved |

The diagnostics information remains active until acknowledged. The status information remains active as long as the cause exists. Status information is not acknowledged.

## 6.2.11 Control bytes

**Description**

The control bytes are delivered with basic type 1 and basic type 3 as standard. Alternatively, you can add the control bytes separately as individual modules during configuration.

These commands can be used to clear the memory contents or to change the tariff, for example. When you set a bit, the function belonging to the bit is activated. You must reset

the control bit afterwards. The PROFINET IO controller sends these commands to the PROFINET IO device.

---

**Note**

**Commands can be lost**

If you change a bit of the control byte with a cycle < 1 second, commands can be lost. Changes to bits only become effective with a cycle of ≥ 1 second.

---

**Structure**

Table 6- 5     Structure of the control bytes

| Byte | Bit | Activation | Description | | PAC2200 | PAC2200 MID | PAC2200 CLP | 3200T |
|------|-----|-----------|-------------|--|---------|-------------|-------------|-------|
| Byte n | 0 | Rising edge transition[1] | Reset the maximum values | | | | | ✔ |
| | 1 | Rising edge transition[1] | Reset the minimum values | | | | | ✔ |
| | 2 | Rising edge transition[1] | Reset the energy counters | | | | | ✔ |
| | 3 | Rising edge transition[1] | Acknowledge device diagnostics | | ✔ | ✔ | ✔ | ✔ |
| | 4 | Rising edge transition[1] | Synchronization of the demand period | | ✔ (via CLOCK) | ✔ | | ✔ |
| | 5 | — | Reserved | | | | | |
| | 6 | — | Reserved | | | | | |
| | 7 | — | Reserved | | | | | |
| Byte n + 1 | 0 | Rising edge transition[1] | Switch to high tariff (HT) | | ✔ | ✔ | ✔ | ✔ |
| | 1 | Rising edge transition[1] | Switch to low tariff (LT) | | ✔ | ✔ | ✔ | ✔ |
| | 2 | Level sensitive | Switch output 0.0: | • ON = 1<br>• OFF = 0 | ✔ | ✔ | ✔ | ✔ |
| | 3 | — | Reserved | | | | | |
| | 4 | — | Reserved | | | | | |
| | 5 | — | Reserved | | | | | |
| | 6 | — | Reserved | | | | | |
| | 7 | — | Reset of the daily/monthly energy counter memory | | ✔ | ✔ | | ✔ |

1) Only a change from 0 to 1 activates this function, e.g. changing bit 8 from 0 to 1 brings about a changeover to the highest tariff. The value 1 or a reset from 1 to 0 has no effect.

**Note**

**Only one set of control bytes**

There can only be one set of control bytes per device. If you add basic type 1 or basic type 3 during the parameterization stage, then you must not add control bytes separately.

# 6.3 Acyclic data traffic

**Description**

In addition to cyclic data traffic, acyclic data can be transferred, e.g. parameters, diagnostics information, commands, further data. Acyclic data transfer takes place in parallel with cyclic data traffic.

You can use acyclic data traffic by means of the following methods:

- SIMATIC S7 CPUs contain system function blocks (RDREC, WRREC, RALAM). With these, the CPUs can read and write the data sets individually, and read the alarm messages.

## 6.3.1 Addressing scheme

Addressing of the data sets is performed via the physical slot and subslot addresses of each subdevice (PAC devices), which are defined modularly in the configuration.

**Modular system design**

In acyclic data traffic, all data sets enabled for write or read accesses are assigned to the modules. You can address these data sets with the help of the slot/subslot number and the data set index.

The slot/subslot number addresses the device and the index addresses the data sets belonging to the device. Each device can have its own data sets or different data set structures.

| Designation | SlotNumber | SubSlotNumber |
|---|---|---|
| SPP2000 | 0 | 0x0001 |
| Module/PAC devices | 0x0001..8 | 0x0001 |

You can address each device individually via its slot/subslot to access special information of the device, e.g. the I&M data of each device.

Slot 0 SubSlot 1 for IM0 of the SPP2000          Slot 1..8 SubSlot 1 for IM0 of the PAC device
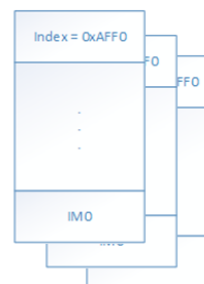
## 6.3.2    Content of the data sets

**Available data sets**

Table 6- 6    List of data sets

| DS index | Description | Access | Device |
|---|---|---|---|
| 47 | Flexible data access, reading | RW | PACs |
| 48 | Flexible data access, writing | W | PACs |
| 51 | SENTRON PAC device overview | RW | PACs |
| 93 | Commands | W | PACs |
| 131 | Device parameters | RW | PACs |
| 132 | Parameterization of limits | RW | PAC3200T |
| 162 | Device configuration | R | SPP2000 |
| 205 | Energy counters | RW | PACs |
| 206 | Load profiles | R | PACs |
| 207 | Read logbook, flexible | RW | PACs |

| Abbreviation | Meaning |
|---|---|
| R | Read |
| W | Write |
| RW | Read / write |

### 6.3.3 Flexible data access: Reading/writing of data sets

With flexible data access, the read and write accesses defined for Modbus are mapped in data sets DS47, DS48, and DS207, and transferred via PROFINET IO.

Due to transmission of the DS47 (Read DS request) or DS207 (Read logbook request) by the PROFINET IO controller, the SPP2000 is requested to read and provide the requested data from the lower-level SENTRON device.

When DS48 (Write DS request) is transferred by the PROFINET IO controller, the SPP2000 is requested to write the transferred values to the SENTRON device.

**Procedure**
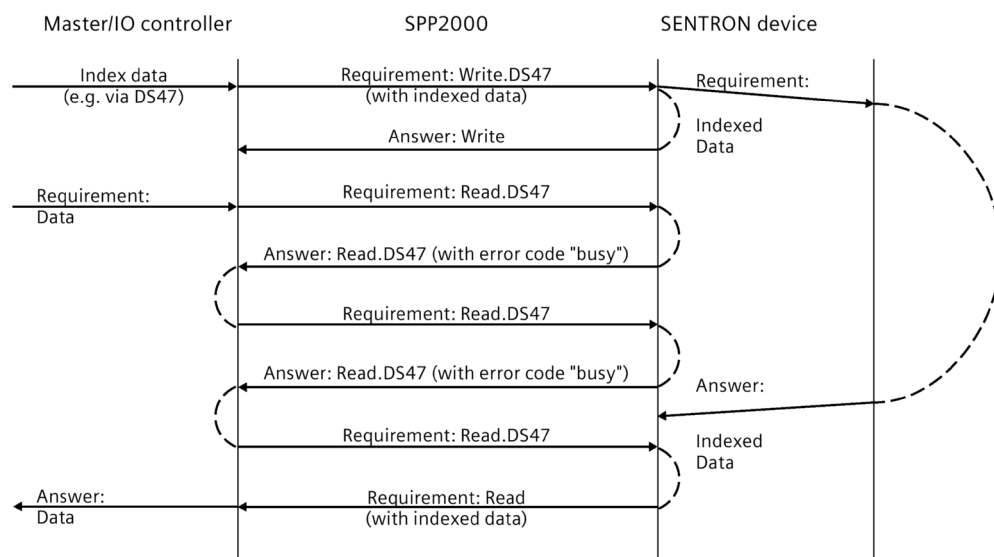


Figure 6-1       Example: Reading DS47

The controller indexes the data with the Write DS47/48 or DS207 request. During this procedure, the list of data points to be read/written is written to the SPP2000 (=indexed). The data set may have a maximum length of 240 bytes. The addressing of the data set is performed via the slot/subslot address of each PAC device.

All new, flexible read requests (Read DS) of other controllers are rejected with the error code 0xB5 (not indexed).
All following Read DS requests of this controller and the new indexing attempts of all other controllers are rejected with the error code 0xC2 (Busy) until the requested data from SPP2000 have been provided and the original controller has fetched the requested data.

The following chapters show the data structures of all data sets for read and write accesses for the SENTRON devices.
You can find the register addresses and data formats in the manuals for the 7KM PAC

measuring device used.
An overview of these manuals is provided in chapter Further documentation (Page 9).

---

**Note**

**Maximum length of the data structures for read/write access**

The data structures that you want to read/write access may have a maximum length of 240 bytes.

---

## Use of flexible data access with a SIMATIC S7 controller

You can find an example of an application for using flexible data access in the PLC programs of a SIMATIC S7 controller and the blocks associated with it in an FAQ at Internet (https://support.industry.siemens.com/cs/ww/en/view/109765658).

## Use of flexible data access with a PG/PC

You can execute the read and write accesses to the data sets of the SENTRON devices defined in chapters DS47 data set for flexible read access (Page 48), DS48 data set for flexible write access (Page 49) and DS207 data set for flexible logbook access (Page 58) by means of an application program from any PG/PC with a PROFINET IO interface.

You can find a detailed description of how to integrate the program in your PG/PC in the following documents on the Internet:

- SIMATIC NET System Manual: PC Software – Industrial Communication with PG/PC Volume 1 – Basics (https://support.industry.siemens.com/cs/ww/en/view/77376110)

- SIMATIC NET Programming Manual: PC Software – Industrial Communication with PG/PC Volume 2 – Interfaces (https://support.industry.siemens.com/cs/ww/en/view/77378184)

### 6.3.4 DS47 data set for flexible read access

You can flexibly read access the data scope of the SENTRON PAC devices you are using by means of data set DS47.

This data set only applies to the SENTRON PAC devices. The corresponding slot/subslot address must therefore be used for writing and reading.

Table 6- 7    Structure of data set DS47 – read request

| Byte | Length (bits) | Format | Data (examples) | Description |
|---|---|---|---|---|
| 0 | 16 | Unsigned short | 0x0001 | Register address for value 1 * |
| 2 | 8 | Unsigned char | 0x00 | Device address 1 ** |
| 3 | 8 | Unsigned char | 0x02 | Register number 1 *** |
| 4 | 16 | Unsigned short | 0x0321 | Register address for value 2 * |
| 6 | 8 | Unsigned char | 0x00 | Device address 2 ** |
| 7 | 8 | Unsigned char | 0x04 | Register number 2 *** |
| ... | | | | |
| max. 240 | | | | |

* You can find the register address of the measured variable or the status in the manual for the device you are using.

** Internal device address.
    For SPP2000 = 00.
    The lower-level PAC devices are addressed via slot/subslot for the entire data set. For this reason, always enter the value "0".

*** Enter the number of registers here. One register is the equivalent of 2 bytes; two registers are the equivalent of 4 bytes, etc.

Table 6- 8    Structure of data set DS47 – read response

| Byte | Length (bits) | Format | Data (examples) | Description |
|---|---|---|---|---|
| 0 | 16 | Float | 65.6 | Value 1, e.g. current L1 |
| 3 | 8 | Double | 123456789.01 | Value 2, e.g. active energy import |
| 11 | ... | | | |
| ... | | | | |
| max. 240 | | | | |

The Read response supplies the requested values in the order of their request.

### 6.3.5 DS48 data set for flexible write access

You can write individual data items, such as counter statuses and commands, to the SENTRON devices by means of data set DS48.

This data set only applies to the SENTRON PAC devices. The corresponding slot/subslot address must therefore be used for writing.

The table below shows how to set values for the imported and exported active energy of a PAC3200T, e.g. following replacement of a device.

Table 6- 9    Structure of data set DS4 – write request

| Byte | Length (bits) | Format | Data (examples) | Description |
|---|---|---|---|---|
| 0 | 16 | Unsigned short | 0x0321 | Register address for value 1 * |
| 2 | 8 | Unsigned char | 0x00 | Device address 1 ** |
| 3 | 8 | Unsigned char | 0x04 | Register number 1 *** |
| 4 | 64 | Double | 123456789.01 | Value for register address 1 |
| 12 | 16 | Unsigned short | 0xC351 | Register address for value 2 * |
| 14 | 8 | Unsigned char | 0x00 | Device address 2 ** |
| 15 | 8 | Unsigned char | 0x02 | Register number 2 *** |
| 16 | 64 | Unsigned long | 4 | Value for register address 2 |
| 24 | ... | | | |
| ... | | | | |
| max. 240 | | | | |

* You can find the register address of the measured variable or the status in the manual for the device you are using.
** Internal device address.
  For SPP2000 = 00.
  The lower-level PAC devices are addressed via slot/subslot for the entire data set. For this reason, always enter the value "0".
*** Enter the number of registers here. One register is the equivalent of 2 bytes; two registers are the equivalent of 4 bytes, etc.

### 6.3.6 DS51 SENTRON PAC device overview

Via data set DS51, the current measured values and the status of the SENTRON PAC devices can be read out.

This data set only applies to the SENTRON PAC devices. The corresponding slot/subslot address must therefore be used for reading.

Table 6- 10    Structure of data set DS51 - read access only

| Byte | Length (bits) | Format | Description |
|---|---|---|---|
| 0 | 32 | Unsigned long | Status information |
| 4 | 32 | Float | Voltage L1-N |
| 8 | 32 | Float | Voltage L1-N |

| Byte | Length (bits) | Format | Description |
|---|---|---|---|
| 12 | 32 | Float | Voltage L1-N |
| 16 | 32 | Float | Voltage L1-L2 |
| 20 | 32 | Float | Voltage L2-L3 |
| 24 | 32 | Float | Voltage L3-L1 |
| 28 | 32 | Float | Current L1 |
| 32 | 32 | Float | Current L2 |
| 36 | 32 | Float | Current L3 |
| 40 | 32 | Float | Apparent power L1 |
| 44 | 32 | Float | Apparent power L2 |
| 48 | 32 | Float | Apparent power L3 |
| 52 | 32 | Float | Active power L1 |
| 56 | 32 | Float | Active power L2 |
| 60 | 32 | Float | Active power L3 |
| 64 | 32 | Float | Reactive power L1 |
| 68 | 32 | Float | Reactive power L2 |
| 72 | 32 | Float | Reactive power L3 |
| 76 | 32 | Float | Power factor L1 |
| 80 | 32 | Float | Power factor L2 |
| 84 | 32 | Float | Power factor L3 |
| 88 | 32 | Float | Line frequency |
| 92 | 32 | Float | 3-phase average voltage PH-N |
| 96 | 32 | Float | 3-phase average voltage PH-PH |
| 100 | 32 | Float | 3-phase average current |
| 104 | 32 | Float | Total apparent power |
| 108 | 32 | Float | Total active power |
| 112 | 32 | Float | Total reactive power (Q1) |
| 116 | 32 | Float | Total power factor |
| 120 | 32 | Float | Current tariff |
| 124 | 32 | Float | Active energy import tariff 1 |
| 128 | 32 | Float | Active energy import tariff 2 |
| 132 | 32 | Float | Active energy export tariff 1 |
| 136 | 32 | Float | Active energy export tariff 2 |
| 140 | 32 | Float | Reactive energy import tariff 1 |
| 144 | 32 | Float | Reactive energy import tariff 2 |
| 148 | 32 | Float | Reactive energy export tariff 1 |
| 152 | 32 | Float | Reactive energy export tariff 2 |
| 156 | 32 | Float | Apparent energy tariff 1 |
| 160 | 32 | Float | Apparent energy tariff 2 |
| Total bytes: 164 | | | |

### 6.3.7 DS93 commands

Data set DS93 contains command information.

This data set only applies to the SENTRON PAC devices. The corresponding slot/subslot address must therefore be used for reading.

Table 6- 11 Structure of data set DS93 – write access only

| Byte | Bit position | Length (bits) | Format | Description | PAC 2200 | PAC 2200 MID | PAC 2200 CLP | PAC 3200T | SPP 2000 |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | 16 | Unsigned16 | Reserved (number of commands) | | | | | |
| 2 | 0 | 1 | Bit | Reset the maximum values[1] | | | | ✓ | |
| 2 | 1 | 1 | Bit | Reset the minimum values[1] | | | | ✓ | |
| 2 | 2 | 1 | Bit | Reset the energy counter[1] | | | | ✓ | |
| 2 | 3 | 1 | Bit | Acknowledge diagnostics bits[1] | ✓ | ✓ | ✓ | ✓ | |
| 2 | 4 | 1 | Bit | Load profile synchronization[1] | ✓ | ✓ | | ✓ | |
| 2 | 5 | 1 | Bit | Reserved | | | | | |
| 2 | 6 | 1 | Bit | Reserved | | | | | |
| 2 | 7 | 1 | Bit | Reserved | | | | | |
| 3 | 0 | 1 | Bit | Switch tariff (high tariff)[2] | ✓ | ✓ | ✓ | ✓ | |
| 3 | 1 | 1 | Bit | Switch tariff (low tariff)[2] | ✓ | ✓ | ✓ | ✓ | |
| 3 | 2 | 1 | Bit | Switch outputs (if parameterized)[2] | ✓ | ✓ | ✓ | ✓ | |
| 3 | 3 | 1 | Bit | Reserved | | | | | |
| 3 | 4 | 1 | Bit | Reserved | | | | | |
| 3 | 5 | 1 | Bit | Reserved | | | | | |
| 3 | 6 | 1 | Bit | Reserved | | | | | |
| 3 | 7 | 1 | Bit | Reset the daily/monthly energy counter memory[1] | ✓ | ✓ | | ✓ | |
| 4 | 0 | 1 | Bit | Reset the device to factory settings[1] | ✓ | ✓ | | ✓ | |
| 4 | 1 | 1 | Bit | Reset device (without changing the IP address)[1] | ✓ | ✓ | | ✓ | |
| 4 | 2 | 1 | Bit | Reset SPP2000 to factory setting[1] | | | | | ✓ |
| 4 | 3 | 1 | Bit | Reserved | | | | | |
| 4 | 4 | 1 | Bit | Reserved | | | | | |
| 4 | 5 | 1 | Bit | Reserved | | | | | |
| 4 | 6 | 1 | Bit | Reserved | | | | | |
| 4 | 7 | 1 | Bit | Reserved | | | | | |
| 5 | | 8 | Unsigned8 | Reserved | | | | | |
| | Total bytes: 6 | | | | | | | | |

1) "1" means: The action is executed.
   "0" means: The action is not executed.
2) If present and parameterized.
   "1" means: Signal = 1
   "0" means: Signal = 0

## 6.3.8 DS131 PAC device parameters

Via data set DS131, the parameterization of the limits of the individual PAC device can be read and modified.

This data set only applies to the SENTRON PAC devices. The corresponding slot/subslot address must therefore be used for reading.

Table 6- 12   Structure of data set DS131 - read access and write access

| Byte | Length (bits) | Format | Description | PAC2200 | PAC2200 MID | PAC2200 CLP | PAC3200T |
|------|---------------|--------|-------------|---------|-------------|-------------|----------|
| 0 | 32 | Unsigned16 | Rated current display range | R/W | R/W | R/W | |
| 4 | 32 | Unsigned long | Connection type | R/W | R/W | R/W | R/W |
| 8 | 32 | Unsigned long | Voltage transformer (1=yes; 0=no) | | | | R/W |
| 12 | 32 | Unsigned long | Primary voltage | | | | R/W |
| 16 | 32 | Unsigned long | Secondary voltage | | | | R/W |
| 20 | 32 | Unsigned long | Primary current | R/W | R/W | R/W | R/W |
| 24 | 32 | Unsigned long | Secondary current | R/W | R/W | R/W | R/W |
| 28 | 32 | Float | Zero point suppression | | | | R/W |
| 32 | 32 | Unsigned long | Load profile demand period | R/W | R/W | R | R/W |
| 36 | 32 | Unsigned long | Synchronization via bus | R/W | R/W | R | R/W |
| 40 | 32 | Unsigned long | DI types of use | R/W | R/W | R/W | R/W |
| 44 | 32 | Unsigned long | Input transition vs. pulse | | | | R/W |
| 48 | 32 | Unsigned long | Input type index | R/W | R/W | R/W | R/W |
| 52 | 32 | Unsigned long | Input pulse ratio (pulses per kWh/kvarh) | R/W | R/W | R/W | R/W |
| 56 | 32 | Unsigned long | Group assignment of digital output | R/W | R/W | R/W | R/W |
| 60 | 32 | Unsigned long | Digital output action | R/W | R/W | R/W | R/W |
| 64 | 32 | Unsigned long | Output limit value index | | | | R/W |
| 68 | 32 | Unsigned long | Output transition vs. pulse | | | | R/W |
| 72 | 32 | Unsigned long | Output pulse type index | R/W | R/W | R/W | R/W |
| 76 | 32 | Unsigned long | Output pulse ratio (pulses per kWh/kvarh) | R/W | R/W | R/W | R/W |
| 80 | 32 | Unsigned long | DO - Pulse length | R/W | R/W | R/W | R/W |
| 84 | 32 | Unsigned long | Dialog language | R/W | R/W | R/W | R/W |
| 88 | 32 | Unsigned long | Phase labels (EU/US) | R/W | R/W | R/W | R/W |
| 92 | 32 | Unsigned long | Configurable counter source | R/W | R/W | R/W | R/W |
| 96 | 32 | Unsigned long | Display contrast | R/W | R/W | R/W | |
| 100 | 32 | Unsigned long | Display backlight level (normal mode) | R/W | R/W | R/W | |
| 104 | 32 | Unsigned long | Display backlight level (dimmed mode) | R/W | R/W | R/W | |
| 108 | 32 | Unsigned long | Time until dimmed | R/W | R/W | R/W | |
| 112 | 32 | Unsigned long | Digital output timeout | R/W | R/W | R/W | R/W |

| Byte | Length (bits) | Format | Description | PAC2200 | PAC2200 MID | PAC2200 CLP | PAC3200T |
|---|---|---|---|---|---|---|---|
| 116 | 32 | Unsigned long | Default menu number | R/W | R | R | |
| 120 | 32 | Unsigned long | Timeout for return to default menu | R/W | R | R | |
| 124 | 32 | Unsigned long | Date format index | R/W | R/W | R/W | R/W |
| 128 | 32 | Unsigned long | Daylight saving time index | R/W | R/W | R/W | R/W |
| 132 | 32 | Unsigned long | Offset for time zone | R/W | R/W | R/W | R/W |
| 136 | 32 | Unsigned long | Output - pulse divider | R/W | R/W | R/W | R/W |
| 140 | 32 | Unsigned long | Input - pulse divider | R/W | R/W | R/W | R/W |
| 144 | 32 | Unsigned long | Invert display | R/W | R/W | R/W | |
| 148 | 32 | Unsigned long | Change current L1 direction yes/no | R/W | R | R | R/W |
| 152 | 32 | Unsigned long | Change current L2 direction yes/no | R/W | R | R | R/W |
| 156 | 32 | Unsigned long | Change current L3 direction yes/no | R/W | R | R | R/W |
| 160 | 32 | Unsigned long | I(N) on display | R/W | R/W | R/W | |
| max. 164 | | | | | | | |

This data set is always readable and writable over the entire length (164 bytes).

- Ignore the fields not supported by the selected device.

## 6.3.9 DS132 limit parameters

Via data set DS132, the parameterization of the limits of the individual PAC3200T can be read and modified.

This data set only applies to the PAC3200T device. The corresponding slot/subslot address must therefore be used for reading.

Table 6- 13    Structure of data set DS132 - read access and write access

| Byte | Length (bits) | Format | Description |
|---|---|---|---|
| 0 | 32 | Unsigned long | Setting parameter limit 0 On/Off |
| 4 | 32 | Float | Setting parameter limit 0 hysteresis |
| 8 | 32 | Unsigned long | Setting parameter limit 0 delay |
| 12 | 32 | Unsigned long | Setting parameter limit 0 operand index (no/AND/OR) |
| 16 | 32 | Unsigned long | Setting parameter limit 0 index of data list |
| 20 | 32 | Float | Setting parameter limit 0 value |
| 24 | 32 | Unsigned long | Setting parameter limit 0 mode >=/< |
| 28 | 32 | Unsigned long | Setting parameter limit 1 On/Off |
| 32 | 32 | Float | Setting parameter limit 1 hysteresis |
| 36 | 32 | Unsigned long | Setting parameter limit 1 delay |
| 40 | 32 | Unsigned long | Setting parameter limit 1 operand index (no/AND/OR) |
| 44 | 32 | Unsigned long | Setting parameter limit 1 index of data list |

| Byte | Length (bits) | Format | Description |
|---|---|---|---|
| 48 | 32 | Float | Setting parameter limit 1 value |
| 52 | 32 | Unsigned long | Setting parameter limit 1 mode >=/< |
| 56 | 32 | Unsigned long | Setting parameter limit 2 On/Off |
| 60 | 32 | Float | Setting parameter limit 2 hysteresis |
| 64 | 32 | Unsigned long | Setting parameter limit 2 Delay |
| 68 | 32 | Unsigned long | Setting parameter limit 2 operand index (no/AND/OR) |
| 72 | 32 | Unsigned long | Setting parameter limit 2 index of data list |
| 76 | 32 | Float | Setting parameter limit 2 Value |
| 80 | 32 | Unsigned long | Setting parameter limit 2 Mode >=/< |
| 84 | 32 | Unsigned long | Setting parameter limit 3 On/Off |
| 88 | 32 | Float | Setting parameter limit 3 Hysteresis |
| 92 | 32 | Unsigned long | Setting parameter limit 3 Delay |
| 96 | 32 | Unsigned long | Setting parameter limit 3 operand index (no/AND/OR) |
| 100 | 32 | Unsigned long | Setting parameter limit 3 index of data list |
| 104 | 32 | Float | Setting parameter limit 3 value |
| 108 | 32 | Unsigned long | Setting parameter limit 3 mode >=/< |
| 112 | 32 | Unsigned long | Setting parameter limit 4 On/Off |
| 116 | 32 | Float | Setting parameter limit 4 hysteresis |
| 120 | 32 | Unsigned long | Setting parameter limit 4 delay |
| 124 | 32 | Unsigned long | Setting parameter limit 4 operand index (no/AND/OR) |
| 128 | 32 | Unsigned long | Setting parameter limit 4 index of data list |
| 132 | 32 | Float | Setting parameter limit 4 value |
| 136 | 32 | Unsigned long | Setting parameter limit 4 mode >=/< |
| 140 | 32 | Unsigned long | Setting parameter limit 5 On/Off |
| 144 | 32 | Float | Setting parameter limit 5 hysteresis |
| 148 | 32 | Unsigned long | Setting parameter limit 5 delay |
| 152 | 32 | Unsigned long | Setting parameter limit 5 operand index (no/AND/OR) |
| 156 | 32 | Unsigned long | Setting parameter limit 5 index of data list |
| 160 | 32 | Float | Setting parameter limit 5 value |
| 164 | 32 | Unsigned long | Setting parameter limit 5 mode >=/< |
| max. 168 | | | |

### 6.3.10 DS162 device configuration

Via data set DS162, the configuration of the SPP2000 and the lower-level devices and their communication statuses are read.

This data set only applies to the SPP2000. For reading, use the address of slot "0" and subslot "1".

Table 6- 14      Structure of data set DS162 - read access

| Byte | Length (bits) | Format | Description |
|---|---|---|---|
| 0 | 16 | Unsigned16 | Device type SPP2000 |
| 2 | 16 | Unsigned16 | PN_connection counter |
| 4 | 32 | 1*char 3*u8 | IM0 firmware version |
| 8 | 32 | 4*u8 | Build version |
| 12 | 32 | Unsigned32 | IP address |
| 16 | 32 | Unsigned32 | Subnet mask |
| 20 | 32 | Unsigned32 | Gateway address |
| 24 | 16 | Unsigned16 | Modbus port |
| 26 | 16 | Unsigned16 | Slot 1 device type |
| 28 | 16 | Unsigned16 | Slot 1 communication status |
| 30 | 32 | 1*char 3*u8 | Slot 1 IM0 firmware version |
| 34 | 32 | Unsigned32 | Slot 1 IP address |
| 38 | 16 | Unsigned16 | Slot 1 Modbus port |
| 40 | 16 | Unsigned16 | Slot 2 device type |
| 42 | 16 | Unsigned16 | Slot 2 communication status |
| 44 | 32 | 1*char 3*u8 | Slot 2 IM0 firmware version |
| 48 | 32 | Unsigned32 | Slot 2 IP address |
| 52 | 16 | Unsigned16 | Slot 2 Modbus port |
| 54 | 16 | Unsigned16 | Slot 3 device type |
| 56 | 16 | Unsigned16 | Slot 3 communication status |
| 58 | 32 | 1*char 3*u8 | Slot 3 IM0 firmware version |
| 62 | 32 | Unsigned32 | Slot 3 IP address |
| 66 | 16 | Unsigned16 | Slot 3 Modbus port |
| 68 | 16 | Unsigned16 | Slot 4 device type |
| 70 | 16 | Unsigned16 | Slot 4 communication status |
| 72 | 32 | 1*char 3*u8 | Slot 4 IM0 firmware version |
| 76 | 32 | Unsigned32 | Slot 4 IP address |
| 80 | 16 | Unsigned16 | Slot 4 Modbus port |
| 82 | 16 | Unsigned16 | Slot 5 device type |
| 84 | 16 | Unsigned16 | Slot 5 communication status |
| 86 | 32 | 1*char 3*u8 | Slot 5 IM0 firmware version |
| 90 | 32 | Unsigned32 | Slot 5 IP address |
| 94 | 16 | Unsigned16 | Slot 5 Modbus port |
| 96 | 16 | Unsigned16 | Slot 6 device type |
| 98 | 16 | Unsigned16 | Slot 6 communication status |
| 100 | 32 | 1*char 3*u8 | Slot 6 IM0 firmware version |
| 104 | 32 | Unsigned32 | Slot 6 IP address |

| Byte | Length (bits) | Format | Description |
|---|---|---|---|
| 108 | 16 | Unsigned16 | Slot 6 Modbus port |
| 110 | 16 | Unsigned16 | Slot 7 device type |
| 112 | 16 | Unsigned16 | Slot 7 communication status |
| 114 | 32 | 1*char 3*u8 | Slot 7 IM0 firmware version |
| 118 | 32 | Unsigned32 | Slot 7 IP address |
| 122 | 16 | Unsigned16 | Slot 7 Modbus port |
| 124 | 16 | Unsigned16 | Slot 8 device type |
| 126 | 16 | Unsigned16 | Slot 8 communication status |
| 128 | 32 | 1*char 3*u8 | Slot 8 IM0 firmware version |
| 132 | 32 | Unsigned32 | Slot 8 IP address |
| 136 | 16 | Unsigned16 | Slot 8 Modbus port |
| max. 138 | | | |

With the "Device type" enumeration, the type of the inserted device can be read out.

| Format | Device type |
|---|---|
| 1 | SPP2000 |
| 2 | PAC2200 |
| 3 | PAC2200MID |
| 4 | PAC2200CLP |
| 5 | PAC3200T |

With the "Communication state" enumeration, the status of the internal communication between SPP2000 and PAC device can be read out.

| Value | Communication state | Description |
|---|---|---|
| 0x00 | DEV_NOT_CONFIGURED | Device is not configured via PLC |
| 0x01 | DEV_NOT_CONNECTED | Device is configured but not connected |
| 0x02 | DEV_CONNECTED | Device is connected and is checking set/actual configuration |
| 0x03 | DEV_INTEGRATED | Device is connected and configuration is OK |
| 0x10 | DEV_IP_PORT_CHG | IP configuration and/or Modbus port modified |

### 6.3.11 DS205 energy counter

Via data set DS205, all energy counters of the PAC device that are in Double format can be read out and only set in the PAC3200T.

This data set only applies to the SENTRON PAC devices. The corresponding slot/subslot address must therefore be used for reading.

Table 6- 15    Structure of data set DS205 - read access and write access

| Byte | Length (bits) | Format | Description | PAC2200 | PAC2200 MID | PAC2200 CLP | PAC3200T |
|---|---|---|---|---|---|---|---|
| 0 | 64 | Double | Active energy import tariff 1 | R | R | R | R/W |
| 8 | 64 | Double | Active energy import tariff 2 | R | R | R | R/W |
| 16 | 64 | Double | Active energy export tariff 1 | R | R | R | R/W |
| 24 | 64 | Double | Active energy export tariff 2 | R | R | R | R/W |
| 32 | 64 | Double | Reactive energy import tariff 1 | R | R | R | R/W |
| 40 | 64 | Double | Reactive energy import tariff 2 | R | R | R | R/W |
| 48 | 64 | Double | Reactive energy export tariff 1 | R | R | R | R/W |
| 56 | 64 | Double | Reactive energy export tariff 2 | R | R | R | R/W |
| 64 | 64 | Double | Apparent energy tariff 1 | R | R | R | R/W |
| 72 | 64 | Double | Apparent energy tariff 2 | R | R | R | R/W |
| max. 80 | | | | | | | |

**Note**

For writing energy counters, fill all fields of the energy counter that are not to be overwritten with 0xFFFFFFFFFFFFFFFF.

### 6.3.12 DS206 load profiles

Via data set DS206, the current measured values of the load profile period of the SENTRON PAC devices last stored can be read out.

This data set only applies to the SENTRON PAC devices. The corresponding slot/subslot address must therefore be used for reading.

Table 6- 16    Structure of data set DS206 - read access only

| Byte | Number of bits | Format | Description |
|---|---|---|---|
| 0 | 32 | Float | Cumulated active power import |
| 4 | 32 | Float | Cumulated reactive power import |
| 8 | 32 | Float | Cumulated active power export |
| 12 | 32 | Float | Cumulated reactive power export |
| 16 | 32 | Float | Maximum value of active power |
| 20 | 32 | Float | Minimum value of active power |

| Byte | Number of bits | Format | Description |
|---|---|---|---|
| 24 | 32 | Float | Maximum value of reactive power |
| 28 | 32 | Float | Minimum value of reactive power |
| 32 | 32 | Unsigned long | Real load profile period length |
| 36 | 32 | Unsigned long | Instant of the last completed period |
| Total bytes: 40 | | | |

## 6.3.13 DS207 data set for flexible logbook access

Via data set DS207, the historic data, such as the load profile or the events stored in a logbook, can be read out of a PAC device.

This data set only applies to the SENTRON PAC devices. The corresponding slot/subslot address must therefore be used for reading.

You can find more precise information about the load profiles and logbook events in the Manual (Page 9) of the relevant PAC device.

Table 6- 17　Structure of data set DS207 - write access only

| Byte | Number of bits | Format | Description |
|---|---|---|---|
| 0 | 8 | Unsigned8 | Data log identifier |
| 1 | 8 | Unsigned8 | Data identifier |
| 2 | 32 | Unsigned32 | OID |
| 6 | 8 | Unsigned8 | Number of entries |
| Total bytes: 7 | | | |

The "data log identifier" is defined system-wide for all PAC devices. With it, the data memory in the PAC device to be read out can be selected.
The "Data Identifier" and the "OID (Object ID)" determine which data from the selected data memory are sent in the response data sets.

### Definition "data log identifier"

Table 6- 18　Definition "data log identifier"

| Data log identifier description | Data log identifier number | PAC2200 | PAC2200MID | PAC2200CLP | PAC3200T |
|---|---|---|---|---|---|
| Load profile memory | 0x00 | | | ✔ | |
| Daily profile memory | 0x04 | ✔ | ✔ | ✔ | ✔ |
| Monthly profile memory | 0x05 | ✔ | ✔ | ✔ | ✔ |
| Annual profile memory | 0x06 | ✔ | ✔ | ✔ | ✔ |
| Event memory | 0x01 | | | ✔ | |

## Definition "Data Identifier"

The "Data Identifier" determines which collection of measured values (or events) are sent in the data sets of the response telegram.

Metering channel 1: Active energy or active power import

Metering channel 2: Active energy or active power export

Table 6- 19     Definition "Data Identifier"

| Data identifier PAC2200 Description | Data log identifier Number | Applicable to data log |
|---|---|---|
| All events | 0x00 | 0x01 |
| Metering channel 1 to 2 (demand average) | 0x63 | 0x00 |
| Metering channel 1 (demand average) | 0x64 | 0x00 |
| Metering channel 2 (demand average) | 0x65 | 0x00 |
| Metering channels 1 to 2 (cumulated demand average) | 0x66 | 0x00 |
| Metering channel 1 (cumulated demand average) | 0x67 | 0x00 |
| Metering channel 2 (cumulated demand average) | 0x68 | 0x00 |
| Metering channels 1 to 2 (energy portion) | 0x69 | 0x00,0x04,0x05,0x06 |
| Metering channel 1 (energy portion) | 0x6A | 0x00,0x04,0x05,0x06 |
| Metering channel 2 (energy portion) | 0x6B | 0x00,0x04,0x05,0x06 |
| Metering channels 1 to 2 (energy portion) and 4 energy counter states import/ export tariff 1 and tariff 2 | 0x6C | 0x00,0x04,0x05,0x06 |
| Metering channels 1 to 2 (energy portion) and 2 energy counter states import/ sum of exports from tariff 1 and tariff 2 | 0x6D | 0x00,0x04,0x05,0x06 |
| Energy counter states import/ export for tariff 1 and tariff 2 | 0x70 | 0x00,0x04,0x05,0x06 |
| Energy counter states import/ export for tariff 1 | 0x71 | 0x00,0x04,0x05,0x06 |
| Energy counter states import/ export for tariff 2 | 0x72 | 0x00,0x04,0x05,0x06 |

## Definition "Object ID" (OID)

Every data set of a historical data memory in the PAC device can be addressed by this OID, which is unique in the device. A special entry (or a number of entries which are inserted in the telegram one after the other) can be read.

The greatest existing OID is available cyclically for each data memory via the module "OID active period" or acyclically via the DS47.

If OID 0x00000000 is requested, the PMD returns the oldest valid OID with the associated data set. If a non-existent "data log identifier" or "OID" (except 0) is requested, the SPP2000 outputs an error message with ErrCode 0xB0.
A syntax error in the Modbus telegram also results in an error message with ErrCode 0xA1.

"Number of records" determines the number of data sets required in the response telegram.

## Example of request telegram

Here, an example telegram is provided to show read-out of the "Day Profile Memory" of the device with the "Data Identifier" 0x6D, OID "0x00002CE2", and number of data sets "0x02".

Table 6- 20    Example of request telegram

| 1 byte | 1 byte | 5 bytes |
|---|---|---|
| Data log identifier (day profile memory) | Data identifier (all channels energy) | Advanced data identifier (4 byte OID and 1 byte number of records.) |
| 0x04 | 0x6D | 0x00002CE2 0x02 |

Table 6- 21    Example of response telegram

| 04 | Data log identifier -> day profile memory | | |
|---|---|---|---|
| 6D | Data identifier -> channels 1 + 2 (active energy) and readings of energy counters T1+T2 | | |
| 00 00 2C E2 | Set the read pointer to OID 0x00002CE2 of the day profile memory | | |
| 02 | Number of records inserted in this telegram (may be smaller than requested) | | |
| 2D | Length of first record in bytes (including this byte) | | |
| 5E 84 CF 98<br>00 00 0E 10<br>00 00 2C E2<br>41 90 D1 A4<br>00 00 00 00<br>41 41 B4 EB 44 67 2E 00<br>00 00 00 00 00 00 00 00<br>00 00 07 7E<br>00 01 00 40 | 0x2D data bytes of 1st record with OID 0x00002CE2<br>timestamp act. period<br>Timezone offset in s<br>OID act. period (unique period entry identification index)<br>Active energy import act. period in Wh<br>Active energy export act. period in Wh<br>Active energy counter reading import T1+T2 act. period in Wh<br>Active energy counter reading export T1+T2 act. period in Wh<br>Real load profile period length act. period in ms<br>Information flag bytes act. period | unix time UTC<br>signed long<br>unsigned long<br>float<br>float<br>double<br>double<br>unsigned long<br>bit array | 4 bytes<br>4 bytes<br>4 bytes<br>4 bytes<br>4 bytes<br>4 bytes<br>4 bytes<br>4 bytes<br>4 bytes |

## 6.3.14    I&M device identification

### Addressing the I&M0 data set

This data set contains the I&M0 data for the unique identification of a SENTRON device.

| | |
|---|---|
| I&M data set for SPP2000 | Address slot: slot number 0 and subslot 1 |
| I&M data sets for the PAC devices | Address slot: slot number 1...8 and subslot 1. |

Table 6- 22    Structure of data set 0xaff0, IM0 data read access only

| Byte | Number of bits | Format | Standard | Description |
|---|---|---|---|---|
| 0 | 16 | Unsigned short | 0x0020 | Block type: IM0 |
| 2 | 16 | Unsigned short | 0x0038 | Block length |
| 4 | 8 | Unsigned char | 0x01 | Block version high |
| 5 | 8 | Unsigned char | 0x00 | Block version low |
| **I&M data block 0** | | | | |
| 0006 | 16 | Unsigned short | 42 | IM0 manufacturer ID[1] |
| 0008 | 160 | Char 20 | — | IM0 order number |
| 0028 | 128 | Char 16 | — | IM0 serial number |
| 0044 | 16 | Unsigned short | — | IM0 hardware version |
| 0046 | 32 | 1*char 3*unsigned short | — | IM0 firmware version |
| 0050 | 16 | Unsigned short | 0x0000 | IM0 counter for changes |
| 0052 | 16 | Unsigned short | F600 | IM0 profile ID |
| 0054 | 16 | Unsigned short | 0x00 | IM0 profile-specific ID |
| 0056 | 16 | Unsigned short | 0x0101 | IM0 version of the I&M data |
| 0058 | 16 | Unsigned short | 001E | IM0-supported I&M data |
| Total bytes: 60 | | | | |

1) Standard: 42. "42" stands for Siemens AG.

### Addressing the I&M1...4 data sets

Data sets I&M1...4 are stored (read and written) in the SENTRON device.

Table 6- 23    Structure of data set 0xaff1, IM1 data - read access and write access

| Byte | Number of bits | Format | Standard | Description |
|---|---|---|---|---|
| 0 | 16 | Unsigned short | 0x0021 | Block type: IM1 |
| 2 | 16 | Unsigned short | 0x0038 | Block length |
| 4 | 8 | Unsigned char | 0x01 | Block version high |
| 5 | 8 | Unsigned char | 0x00 | Block version low |
| **I&M data block 1** | | | | |
| 0006 | 256 | Char 32 | 20h | IM1 plant identifier |
| 0040 | 176 | Char 22 | 20h | IM1 location identifier |
| Total bytes: 60 | | | | |

Table 6- 24    Structure of data set 0xaff2, IM2 data – read access and write access

| Byte | Number of bits | Format | Standard | Description |
|---|---|---|---|---|
| 0 | 16 | Unsigned short | 0x0022 | Block type: IM2 |
| 2 | 16 | Unsigned short | 0x0038 | Block length |
| 4 | 8 | Unsigned char | 0x01 | Block version high |
| 5 | 8 | Unsigned char | 0x00 | Block version low |
| **I&M data block 2** | | | | |
| 0006 | 128 | Char 16 | "YYY-MM-DD" | IM2 installation date |
| 0022 | 304 | Char 38 | 20h | Reserved |
| Total bytes: 60 | | | | |

Table 6- 25    Structure of data set 0xaff3, IM3 data - read access and write access

| Byte | Number of bits | Format | Standard | Description |
|---|---|---|---|---|
| 0 | 16 | Unsigned short | 0x0023 | Block type: IM3 |
| 2 | 16 | Unsigned short | 0x0038 | Block length |
| 4 | 8 | Unsigned char | 0x01 | Block version high |
| 5 | 8 | Unsigned char | 0x00 | Block version low |
| **I&M data block 3** | | | | |
| 0006 | 432 | Char 54 | 20h | IM3 comment |
| Total bytes: 60 | | | | |

Table 6- 26    Structure of data set 0xaff4, IM4 data - read access and write access

| Byte | Number of bits | Format | Standard | Description |
|---|---|---|---|---|
| 0 | 16 | Unsigned short | 0x0024 | Block type: IM4 |
| 2 | 16 | Unsigned short | 0x0038 | Block length |
| 4 | 8 | Unsigned char | 0x01 | Block version high |
| 5 | 8 | Unsigned char | 0x00 | Block version low |
| **I&M data block 4** | | | | |
| 0006 | 432 | Char 54 | 00h | IM4 signature |
| Total bytes: 60 | | | | |

## 6.3.15 Error telegrams data set

If a data set is rejected by the SPP2000, the following happens:

- The request is negatively acknowledged with an NRS telegram.

- The request is signaled to the master with an error telegram that includes the negative acknowledgment and error code.

**Structure of the error telegram**

The error telegram has the following structure:

| Function_Num | Error_Decode | Error_Code_1 | Error_Code_2 |
|---|---|---|---|

- **Function_Num** (if no error: B#16#00 for an error)

  – Function identification from data set (DS) record: reading 0xDE, writing 0xDF

  – DS record protocol element not used: B#16#C0

- **Error_Decode**

  Location of error detection: SPP2000 0x80

- **Error_Code_1**

  Error detection

- **Error_Code_2**

  Reserved

## Error_Code_1 and its cause

---

**Note**

The structure of the error telegram used and the error codes were based on the SIMATIC error messages.

---

Table 6- 27    Causes for sending Error Code 1

| Error Code 1 | Error | Meaning |
|---|---|---|
| 0xA0 | Read error | Occurs on a read access to a "Write only" DSx or error in processing |
| 0xA1 | Write error | Occurs on a write access to a "Read only" DSx and general error on write access |
| 0xA7 | PE temporarily not possible | "Busy_PE", i.e. on a new "Write" Profi Energy task, the SPP2000 is busy with another task. On a "Read" Profi Energy task, the initialized data are not yet ready. |
| 0xA9 | The function is not supported | Occurs during write access to IM0 data |
| 0xB0 | Invalid index | Occurs on:<br>• Non-implemented DSx or device does not support this DS<br>• Device does not support this "Data log identifier number" |
| 0xB1 | "Write/Read" (IM data) length error | Occurs when length specification for "Write" DSx is incorrect |
| 0xB2 | Invalid slot | Occurs when invalid slot specified for "Read" and "Write" DSx |
| 0xB5 | Status conflict | Occurs on "Read" DSx or ProfiEnergy without previous indexing |
| 0xB6 | Access denied | For example, write-protected, or error in processing the Profi Energy tasks. |
| 0xC2 | Temporarily not possible | • "Busy", i.e. on a new "Write" DS, the SPP2000 is busy with another task. It can therefore not be re-initialized.<br>• In a "Read" DS that initialized data are not yet ready. The SPP2000 is busy with a task in progress. |
| 0xC4 | Internal error | Data point is not found |

# Alarm, error, and system messages

# 7

## 7.1          Description of the alarms on the SPP2000

The SPP2000 is designed as a diagnostics-capable IO device. It detects internal and external faults and reports them to the IO controller as diagnostics, maintenance, or hardware interrupts. These can be evaluated, for example, in TIA using the alarm OBs.

You can obtain detailed information on the error event when an alarm occurs, e.g. using the SFB54 (RALRM) in the corresponding alarm OB.

The failure or establishment of communication between SPP2000 and the lower-level PACs is signaled to the controller as an insert/remove module interrupt.

The alarms of the SPP2000 are implemented as diagnostics or hardware interrupts with channel information.

### Structure of the alarms

#### Structure of the insert/remove module interrupt

The basic structure of the insert/remove module interrupt with the individual data blocks is described below.

Table 7- 1      Insert/remove module interrupt

| Alarm | Length |
|---|---|
| BlockType | 2 bytes |
| BlockLength | 2 bytes |
| BlockVersion | 2 bytes |
| AlarmType | 2 bytes |
| API | 4 bytes |
| SlotNumber | 2 bytes |
| SubSlotNumber | 2 bytes |
| ModuleIdentNumber | 4 bytes |
| SubmoduleIdentNumber | 4 bytes |
| AlarmSpecifier | 2 bytes |

**Structure of the diagnostic interrupt**

The basic structure of the diagnostic interrupt message with the individual data blocks is described below.

Table 7- 2     Diagnostics/maintenance alarm

| Alarm | Length |
|---|---|
| BlockType | 2 bytes |
| BlockLength | 2 bytes |
| BlockVersion | 2 bytes |
| AlarmType | 2 bytes |
| API | 4 bytes |
| SlotNumber | 2 bytes |
| SubSlotNumber | 2 bytes |
| ModuleIdentNumber | 4 bytes |
| SubmoduleIdentNumber | 4 bytes |
| AlarmSpecifier | 2 bytes |
| UserStructureIdentifier | 2 bytes |
| ChannelNumber | 2 bytes |
| ChannelProperties | 2 bytes |
| ChannelErrorTypes | 2 bytes |
| UserData | x bytes |

**Structure of the hardware interrupt**

The basic structure of the hardware interrupt message with the individual data blocks is described below.

Table 7- 3     Hardware interrupt

| Alarm | Length |
|---|---|
| BlockType | 2 bytes |
| BlockLength | 2 bytes |
| BlockVersion | 2 bytes |
| AlarmType | 2 bytes |
| API | 4 bytes |
| SlotNumber | 2 bytes |
| SubSlotNumber | 2 bytes |
| ModuleIdentNumber | 4 bytes |
| SubmoduleIdentNumber | 4 bytes |
| AlarmSpecifier | 2 bytes |
| UserStructureIdentifier | 2 bytes |
| UserData | x bytes |

**"BlockType" data block**

0x0002: AlarmNotification "Low" for diagnostic interrupts

0x0001: AlarmNotification "High" for hardware interrupts

**"BlockLength" data block**

In the "BlockLength" data field, the number of subsequent bytes of the diagnostic data set is coded.
This corresponds to the length of the diagnostic data set without the number of bytes for the "BlockType" and "BlockLength" data fields, which each have a length of 2 bytes.

**"BlockVersion" data block**

W#16#0100: Block version of the diagnostic data set is 1.0.

**"AlarmType" data block**

W#16#0001: Diagnostic interrupt

W#16#0002: Hardware interrupt

W#16#0003: Remove module interrupt

W#16#0004: Insert module interrupt

**"API" data block**

API (application process identifier): The SPP2000 uses the standard API "0".

**"SlotNumber", "SubslotNumber" data blocks**

The SPP2000 is a modular PROFINET IO device with the following structure:

| Designation | SlotNumber | SubslotNumber |
|---|---|---|
| SPP200<br>• Interface<br>• Port1<br>• Port2 | 0 | 0x0001<br>0x8000<br>0x8001<br>0x8002 |
| Module /PACxxxx | 0x0001..x | 0x0001..8 |

**"ModuleIdentNumber", "SubmoduleIdentNumber" data blocks**

The ModuleIdentNumber and SubmoduleIdentNumber of the module causing the alarm.

**"AlarmSpecifier" data block, sequence**

| Bits | Meaning |
|---|---|
| 0 ... 10 | Sequence number |
| 11 | Channel diagnostics available. |
| 12 | Manufacturer-specific status information available. |
| 13 | At least one channel diagnosis available. |
| 14 | Reserved |
| 15 | At least one of the modules configured within this AR signals a diagnostic event. |

### "UserStructureIdentifier" data block

| Bits | Meaning |
|------|---------|
| 0x0000 ... 0x7FFF | User-specified |
| 0x8000 | ChannelDiagnosis |
| 0x8002 | Extended ChannelDiagnosis |

The SPP2000 signals all diagnostic interrupts as "ChannelDiagnostic Alarms". For that reason, the value of the "UserStructureIdentifier" field for the diagnostic interrupt is always "0x8000".

The hardware interrupts are signaled as "User specified" and have a value from 1 to XXX. The precise structure of the hardware interrupts is described below.

### "ChannelNumber" data block

For diagnostic interrupts only.

| ChannelNumber | Meaning |
|---------------|---------|
| 0x0000 ... 0x7FFF | Manufacturer-specific |
| 0x8000 | Submodule |

### "ChannelProperties" data block

| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| .Direction | | | .Specifier | | .Qualifier | | .Acc. | .Type | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

### "ChannelProperties.Type (bits 0 to 7)" data block

| Value | Meaning |
|-------|---------|
| 0 | If ChannelNumber has the value 0x8000. |
| 1 | 1 bit |
| 2 | 2 bits |
| 3 | 4 bits |
| 4 | 8 bits |
| 5 | 16 bits |
| 6 | 32 bits |
| 7 | 64 bits |

### "ChannelProperties.Accumulative (Bit 8)" data block

| Value | Meaning |
|-------|---------|
| 0 | No channel error group signal |
| 1 | Channel error group signal (more than one channel affected) |

**Combination of "ChannelProperties.Qualifier" (bits 9/10) and "ChannelProperties.Specifier" (bits 11/12)**

| Maintenance Required bit 9 | Maintenance Demanded bit 10 | Specifier bit 12/11 | Meaning | Diagnosis in the SIMATIC S7 300 and SIMATIC S7 400 user program |
|---|---|---|---|---|
| 0 | 0 | 00 | All lower-level diagnoses are no longer pending. | Evaluation of diagnostic interrupts with SFB54 in OB82 |
| | | 01 | Diagnosis is pending. | Evaluation of diagnostic interrupts with SFB54 in OB82, data set reading with SFB52 |
| | | 10 | Diagnosis is no longer pending. | Evaluation of diagnostic interrupts with SFB54 in OB82 |
| | | 11 | Status message. Only possible for manufacturer-specific errors. | |
| | 1 | 00 | Reserved | — |
| | | 01 | Maintenance required is pending. | Evaluation of diagnostic interrupts with SFB54 in OB82, data set reading with SFB52 |
| | | 10 | Maintenance required is no longer pending. | Evaluation of diagnostic interrupts with SFB54 in OB82 |
| | | 11 | Maintenance required is no longer pending; all others are still pending. | |
| 1 | 0 | 00 | Reserved | — |
| | | 01 | Maintenance required is pending. | Evaluation of diagnostic interrupts with SFB54 in OB82, data set reading with SFB52 |
| | | 10 | Maintenance required is no longer pending. | Evaluation of diagnostic interrupts with SFB54 in OB82 |
| | | 11 | Maintenance required is no longer pending; all others are still pending. | |
| | 1 | 00 | Reserved | — |
| | | 01 | Stepped diagnosis is pending. | Evaluation of diagnostic interrupts with SFB54 in OB82, data set reading with SFB52 |
| | | 10 | Stepped diagnosis is no longer pending. | Evaluation of diagnostic interrupts with SFB54 in OB82 |
| | | 11 | Stepped diagnosis is no longer pending; all others are still pending. | |

**"ChannelProperties.Direction (bits 13 to 15)" data block**

| Value | Meaning |
|---|---|
| 000 | Manufacturer-specific |
| 001 | Input |
| 010 | Output |
| 011 | Input/Output |
| 100 ... 111 | Reserved |

**"ChannelErrorType" data block**

The messages for the diagnostic and maintenance alarms are transferred in the "ChannelErrorType" field.

The more precise alarm information is defined in the "ChannelErrorType" and "ExtChannelErrorType" fields specifically for the SPP2000 and the PACs.

## Alarm messages

### Diagnostic/maintenance alarm messages

| ChannelErrorType (decimal) | Alarm type | Device |
|---|---|---|
| 19 | Error while writing the IM data | PACx |
| 21 | Firmware of the lower-level device incompatible | PACx |
| 26 | Output for remote control not enabled | PACx |
| 257 | Parameters write-protected | PACx |

### Hardware interrupt messages

The structure of the hardware interrupt differs from that of the diagnostic interrupt from field "UserStructIdentifier".

The hardware interrupt messages are defined as follows specifically for the SPP2000 and the PACs:

| UserStructureIdentifier (hex)/message | UserData |
|---|---|
| 0x7ffe<br>Voltage out of range, PACs only | 1: Active<br>0: inactive |
| 0x7ffd<br>Current out of range, PACs only | 1: Active<br>0: inactive |
| 0x7ffc<br>Maximum pulse rate exceeded, PACs only | 1: Active<br>0: inactive |
| 0x7ffb<br>Change of limit violation status, all devices | Current value of the limit violation status |
| 0x7ff9<br>Write-protection status change of the PAC | 1: Active<br>0: inactive |

# Maintenance, service, and disposal

<div style="text-align:right">

# 8

</div>

## 8.1 Firmware update

The PROFINET Proxy supports updates of the firmware (firmware updates).

Always use the latest version of the SENTRON powerconfig configuration software for a firmware update. You can find detailed instructions on how to perform firmware updates with SENTRON powerconfig in the related documentation and the online help.

All the device settings remain unchanged during a firmware update.

The firmware of the device is signed for security reasons, i.e. the device can only perform an update with original firmware from Siemens and it can never revert to an older version.

---

**Note**

**Performing a firmware update**

Before updating the firmware, consult Technical Support to confirm that an update is necessary. Update the firmware only when this is absolutely necessary.

---

| NOTICE |
|---|
| **A power failure during a firmware update makes the device unable to function.** |
| Connect the device to a fail-safe power supply during a firmware update. If the power fails despite this safety measure, try to restart the firmware update of the device in SENTRON powerconfig. |

## 8.2 Fault rectification

| Error | Measure |
|---|---|
| Device is not working. Diagnostics LED of the expansion module is Off. | • Check the connection to the SENTRON basic device and tighten the fastening screws if necessary.<br>• Check the supply voltage of the SENTRON basic device. |
| The module cannot be successfully configured using the SENTRON powerconfig configuring software. | • Check the communications settings (IP address, protocol, subnet, gateway).<br>• The firewall may be preventing access to the SENTRON basic device. |

# 8.3 Warranty

**Procedure**

---
**Note**

**Loss of warranty**

Opening the device invalidates the Siemens warranty. Return defective or damaged devices to Siemens.

---

If the device is defective or damaged, proceed as follows (only during the warranty period):

1. Uninstall the device.

2. Pack the device such that it cannot be damaged during transport.

3. Return the device to Siemens. You can obtain the address from:

   – Your Siemens sales partner

   – Technical Assistance (https://www.siemens.de/lowvoltage/support-request)

---
**Note**

The contents of this manual do not form part of an earlier or existing agreement, commitment or legal relationship, nor shall they modify same. All obligations on the part of Siemens derive from the respective purchase agreement, which also contains the complete and exclusively valid warranty regulation. These contractual warranty provisions are neither extended nor restricted by the implementation of this manual.

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# 8.4 Disposal of waste electronic equipment

**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.

# Technical specifications

<div align="right">

# 9

</div>

## 9.1 Standards

**Description**

Table 9- 1    The device meets the following standards

| Standard | Title |
|---|---|
| IEC 60603-7 | Connectors for electronic equipment - Part 7: Detail specification for 8-way, shielded, free and fixed connectors |
| IEC 61158-2 | "Digital data communications for measurement and control - Fieldbus for use in industrial control systems - Part 2: Physical layer specification and service definition" |
| IEC 61158-3 | "Digital data communications for measurement and control - Fieldbus for use in industrial control systems - Part 3: Data link service definition" |
| IEC 61158-4 | "Digital data communications for measurement and control - Fieldbus for use in industrial control systems - Part 4: Data link protocol specification" |
| IEC 61158-5 | "Digital data communications for measurement and control - Fieldbus for use in industrial control systems - Part 5: Application layer service definition" |
| IEC 61158-6 | "Digital data communications for measurement and control - Fieldbus for use in industrial control systems - Part 6: Application layer protocol specification" |
| IEC 61784-1 | Industrial communication networks – Profiles |
| EN 61000-6-2 | Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments |
| EN 61000-6-3 | Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments |
| SN 27095 | Testing of switching and control equipment for marine applications (Siemens standard) |

**Note**

**Other standards**

In addition to the above-mentioned standards, those listed in the manuals of the individual PAC devices also apply.

## Approvals

| Symbol | Approval |
|---|---|
| CE | **CE conformity** <br> The applied directives and standards can be found in the EU Declaration of Conformity. |
| UKCA | Approval for Great Britain |

You can download the relevant certificates from the Siemens Support website.

### See also

Siemens support (https://support.industry.siemens.com/cs/ww/en/ps/cert)

## 9.2 Technical data

### Dimensions and weights

Table 9- 2   Dimensions and weights

|  | Values |
|---|---|
| Type of fixing | Standard rail mounting TH35 acc. to EN 60715 |
| Construction type | 1MW |
| Housing dimensions W x H x D | 90 mm x 18 mm x 71 mm <br> 3.5 in x 0.7 in x 2.8 in |
| Weight: <br> Device without packaging | 51 g |

### Electrical data

Table 9- 3   Power supply

|  | Values |
|---|---|
| Design of the power supply | Direct voltage DC <br> (via pluggable screw terminals) |
| Working range | 24 V DC +/- 20%, SELV |
| Power consumption | 3.2 W |

**Ambient conditions**

> **Note**
>
> Operation of the device is only permissible in a control cabinet or fuse box inside an enclosed dry room.

Table 9- 4    Ambient conditions

| | | Values |
|---|---|---|
| Temperature range | Ambient temperature during operating phase | -25 °C ... +55 °C (K55) |
| | Ambient temperature during transport and storage | -40 °C ... +80 °C |
| Relative humidity (annual average value) | | < 75% RH |
| Installation altitude above sea level | | max. 2000 m |
| Degree of pollution | | 2 |
| Environmental tests acc. to | | EN 60068-2-27 |
| | | EN 60068-2-6 |
| | | EN 60068-3-3 |
| EMC tests | Interference emission:<br><br>Class B limit values complied with for emitted interference, suitable for domestic use | EN 61000-6-3 |
| | Interference immunity:<br><br>Standards considered for immunity | EN 61000-6-2 |
| | | EN61000-4-2 (Electrostatic discharge) |
| | | EN61000-4-3 (Electromagnetic RF fields) |
| | | EN61000-4-4 (Fast transients - burst) |
| | | EN61000-4-5 (Surge voltages - surge) |
| | | EN61000-4-6 (Conducted RFI) |
| | | EN61000-4-8 (Magnetic fields) |

**Relative humidity in relation to ambient temperature**

The maximum relative humidity is 80% at temperatures up to 31 °C, decreasing linearly down to 50% relative humidity at 40 °C.
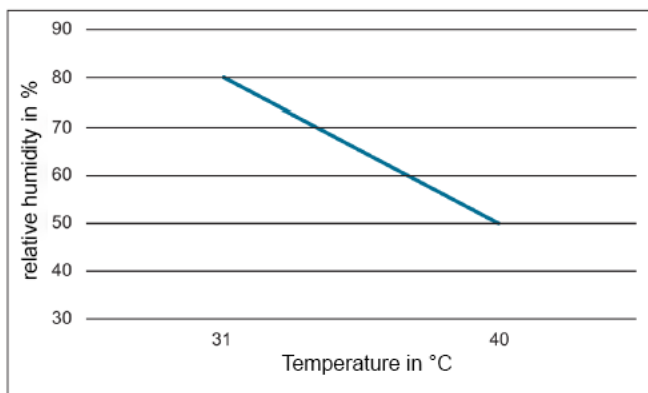


**Connection elements**

The specified conductor cross-sections describe the capacity of the connection terminals.

**Note**

When selecting the conductor cross-sections, pay attention to the possible current load and ensure adequate cable protection.

Table 9- 5    Conductor cross-section for copper cable (Cu)

| Nm [lb-in] | mm [in] | mm² [AWG] | mm² [AWG] | mm² [AWG] | mm² [AWG] |
|---|---|---|---|---|---|
| 23 [2] | 10 [0.4] | 1x 0.5 … 1.5 1x [20 … 16] 2x 0.5 … 0.75 2x [20 … 19] | | 1x 0.5 … 0.75 1x [20 … 19] 2x 0.5 … 0.34 2x [20 … 22] | |

# 9.3 Communication interface

**Technical specifications**

Table 9- 6     Technical specifications for the communication interface

|  | Values |
|---|---|
| Industrial Ethernet:     IRT-enabled switch | • Auto crossover<br>• Auto negotiation |
| Connector | 2 unshielded 8-pin RJ45 sockets [1] |
| PROFINET IO data transfer:<br>Supported data transfer rate in Mbps | 100 |
| Supported communication protocols | PROFINET infrastructure protocols, such as<br><br>• LLDP<br>• SNMP<br>• S2 system redundancy<br>• MRP<br>• MRPD<br>• DR |
| Measured variables to be transferred | Definable via GSDML file or acyclically via the PROFIenergy profile |

[1] The connector must meet the requirements of the PROFINET guideline. - Internet (https://www.profibus.com/)

# 9.4 Labeling

The following graphic shows the lettering of the device.
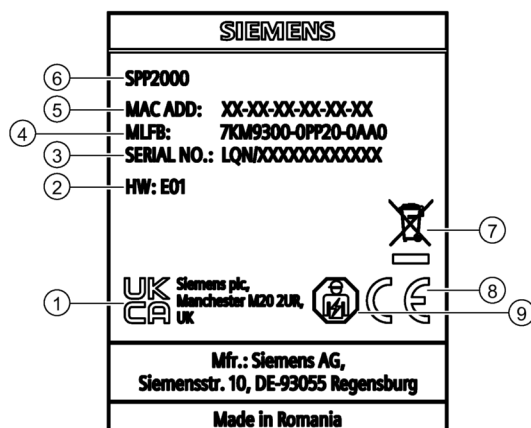


| ① | UKCA marking (United Kingdom) |
|---|---|
| ② | Marking of the hardware version |
| ③ | Serial number |
| ④ | Article number |
| ⑤ | MAC address |
| ⑥ | Device designation |
| ⑦ | The device must not be disposed of with general domestic waste. |
| ⑧ | CE marking (European Union) |
| ⑨ | Electrical installation and maintenance by qualified personnel only |

# Dimensional drawings

# 10



18 mm [0.7 in]   71 mm [2.8 in]   90 mm [3.5 in]
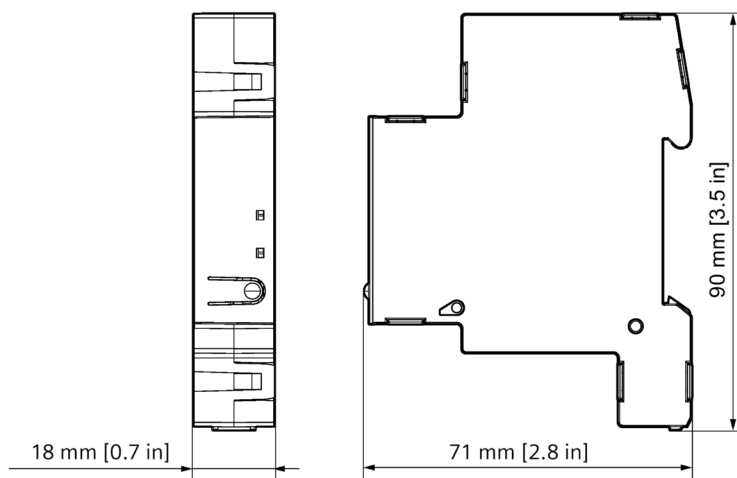
# Appendix

<div align="right">

# A

</div>

## A.1    Comprehensive support from A to Z

For more information, please see the following links:

**Useful links**

Table A- 1    Product information

| Website | The website provides rapid and targeted information on our pioneering products and systems. | Link (http://www.siemens.com/lowvoltage) |
|---|---|---|
| Newsletter | Constantly updated information on the subject of low-voltage power distribution. | Link (http://www.siemens.com/lowvoltage/newsletter) |

Table A- 2    Product information / product and system selection

| Information and Download Center | • Current catalogs<br>• Customer magazines<br>• Brochures<br>• Demonstration software<br>• Promotion packages | Link (http://www.siemens.com/lowvoltage/infomaterial) |
|---|---|---|

Table A- 3    Product and system selection

| Industry Mall | Platform for e-business and product information. 24/7 access to a comprehensive information and ordering platform for our complete low-voltage controls and distribution portfolio, etc.:<br>• Selection tools<br>• Product and system configurators<br>• Availability check<br>• Order tracking | Link (http://www.siemens.com/lowvoltage/mall) |
|---|---|---|

Table A- 4    Product documentation

| Service & Support Portal | Comprehensive technical information from the planning phase through configuration to operation. Around the clock. 365 days a year.<br><br>• Product data sheets<br>• Manuals / operating instructions<br>• Certificates<br>• Characteristic curves<br>• Downloads<br>• FAQs | Link (http://www.siemens.com/lowvoltage/support) |
|---|---|---|
| CAx DVD | Configuration-relevant CAx data on SENTRON is available on DVD:<br><br>• Commercial and technical product master data<br>• 2D dimension drawings<br>• Isometric illustrations<br>• 3D models<br>• Product data sheets<br>• Tender specifications | Link (http://www.siemens.com/lowvoltage/mall)<br>Article number:<br>E86060-D1000-A207-A6-6300 |
| Image Database | Free downloads in several different versions are available from the image database:<br><br>• All current product photos<br>• 2D dimension drawings<br>• Isometric illustrations<br>• 3D models<br>• Device circuit diagrams<br>• Symbols | Link (http://www.siemens.com/lowvoltage/picturedb) |

Table A- 5    Product training

| SITRAIN Portal | Comprehensive training program to expand your knowledge about our products, systems, and engineering tools | Link (http://www.siemens.com/lowvoltage/training) |
|---|---|---|

# List of abbreviations

<div style="text-align: right; font-size: 2em;">B</div>

## B.1 Abbreviations

**Overview**

Table B- 1     Meaning of abbreviations

| Abbreviation | Meaning |
| --- | --- |
| ANSI | American National Standards Institute |
| CAN | Controller Area Network |
| CE | Communautés Européennes |
| CEI | Commission Electrotechnique Internationale |
| CISPR | Comité international spécial des perturbations radioélectriques |
| CRC | Cyclic Redundancy Check |
| CSA | Canadian Standards Association |
| DIN | Deutsches Institut für Normierung e. V. |
| DP | Distributed I/Os |
| DR | Data record |
| ESD | Electrostatic sensitive devices |
| EIA | Electronic Industries Alliance |
| EMC | Electromagnetic compatibility |
| EN | European Standard |
| EU | European Union |
| FCC | Federal Communications Commission |
| GSDML | General Station Description Markup Language |
| HT | High Tariff |
| HW Config | "Hardware configuration" module in the SIMATIC Manager |
| I&M | Information and Maintenance |
| ID | Identification number |
| IEC | International Electrotechnical Commission |
| IEEE | Institute of Electrical and Electronics Engineers |
| IP | International Protection |
| IRT | Isochronous real time |
| ISM | Industrial, Scientific and Medical |
| ISO | International Organization for Standardization |
| LED | Light Emitting Diode |
| LSB | Least Significant Bit |
| LT | Low Tariff |
| MSB | Most Significant Bit |
| MS0 | Cyclic Master Slave Communication (master class 1) |
| MS1 | Acyclic Master Slave Communication (master class 1) |
| MS2 | Acyclic Master Slave Communication (master class 2) |

| Abbreviation | Meaning |
|---|---|
| NAFTA | North American Free Trade Agreement |
| NEMA | National Electrical Manufacturers Association |
| PAC | Power Analysis & Control |
| PMD | Power Monitoring Device |
| PI | PROFIBUS user organization |
| PTCP | Precision Transparent Clock Protocol |
| RALRM | Read alarm |
| RDREC | Read record |
| RET_VAL | Return value: "Return value" |
| RMS | Root Mean Square RMS |
| RJ | Registered Jack |
| RS | Formerly: Radio Selector; now usually: Recommended Standard |
| RT | Real Time |
| SELV | Safety Extra Low Voltage |
| SFB | System function block |
| SFC | System function |
| TIA | Totally Integrated Automation |
| THD | Total Harmonic Distortion Total Harmonic Distortion |
| THD-R | Relative THD |
| UL | Underwriters Laboratories Inc. |
| VDE | Association of Electrical Engineering, Electronics and Information Technology (Germany) |
| RLO | Result of logic operation |
| WRREC | Write record |

# Glossary

**Bus system**

All nodes physically connected to a bus cable form a bus system.

**Cycle time**

The cycle time of a PROFIBUS segment is made up of the number of nodes. It is set, for example, in TIA in the HW Config.

**Cyclic execution**

The DP master accesses the DP slaves regularly. In doing so, the DP master reads the input data of the slaves and forwards output data to the slaves.

**Diagnostics**

The detection, localization, visualization and further evaluation of errors, disturbances and messages.

Diagnostics offers monitoring functions that automatically run while the system is in operation. This reduces startup times and standstill times. Plant availability increases.

**Equipotential bonding**

Electrical connection (equipotential bonding conductor) that keeps the conductive parts of electronic equipment and extraneous conductive parts at an equal or approximately equal potential. This prevents disruptive or dangerous voltages between these parts.

**Master**

When a master is in possession of the token, it can send data to other nodes and request data from other nodes.

**Nodes**

Device which can send, receive or amplify data on the bus, e.g., PROFIBUS DP master, PROFIBUS DP slave.

**PROFINET IO controller**

A PROFINET IO controller is the station in an automation system in which the control programs runs. It handles process data traffic with the PROFINET IO devices.

## PROFINET IO device

Distributed field device that is assigned to the PROFINET IO controller.

## PROFINET IO supervisor

The PROFINET IO supervisor is a PG/PC or HMI device for commissioning or diagnostics.

## Slave

A slave can only exchange data after being requested to by the master.

# Further Information

Always at your disposal: our extensive support
**www.siemens.com/online-support**

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