

SITOP power supplies

SITOP UPS1600 / BAT1600 / UPS1100

Equipment Manual

SITOP UPS1600 10 A
6EP4134-3AB00-0AY0
6EP4134-3AB00-1AY0
6EP4134-3AB00-2AY0

SITOP UPS1600 20 A
6EP4136-3AB00-0AY0
6EP4136-3AB00-1AY0
6EP4136-3AB00-2AY0

SITOP UPS1600 40 A
6EP4137-3AB00-0AY0
6EP4137-3AB00-1AY0
6EP4137-3AB00-2AY0

SITOP BAT1600
Battery module 2.5 Ah (6EP4132-0JA00-0AY0)
Battery module 3.2 Ah (6EP4133-0GA00-0AY0)
Battery module 7.5 Ah (6EP4134-0JA00-0AY0)
Battery module 12 Ah (6EP4135-0GE00-0AY0)
Battery module 38 Ah (6EP4137-0GE00-0AX0)

SITOP UPS1100
Battery module 1.2 Ah (6EP4131-0GB00-0AY0)
Battery module 2.5 Ah (6EP4132-0GB00-0AY0)
Battery module 3.2 Ah (6EP4133-0GB00-0AY0)

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Warning notice system

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

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.


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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

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

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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.

Overview



The DC UPS modules supplement 24 V SITOP power supply units for interruption-free rated currents of up to 40 A from SITOP BAT1600 and SITOP UPS1100 battery modules, which are based on maintenance-free lead-gel or LiFePO₄ batteries. With its integrated electronics, SITOP UPS1600 automatically detects the battery type and charges it with the optimum temperature-controlled charging characteristic curve. The intelligent battery management monitors all relevant data, also for parallel-connected battery modules. The battery status and various actual values, for example voltage and current, are output via the Ethernet/PROFINET and USB interfaces. Thanks to the integrated web server, remote diagnosis is also possible.

The low profile SITOP UPS1600 DC-UPS module provides a dynamic overload behavior, e.g. to switch on industrial PCs. The high charge current quickly restores the buffer readiness after a supply system failure. And for the deployment in stand-alone operation, the UPS can be activated from the battery for missing supply system voltage, e.g. to start the generators.

The key benefits of the product include:

- Compact SITOP UPS1600 24 V/10 A, 20 A and 40 A DC-UPS modules with digital inputs/outputs, optional with USB or two port Ethernet/PROFINET interfaces
- Battery modules SITOP BAT1600 24 V/3.2 Ah, 12 Ah, 38 Ah with lead-gel batteries and SITOP BAT1600 24 V/2.5 Ah, 7.5 Ah with LiFePO₄ batteries as well as SITOP BAT1600 Battery Monitor are part of the 38 Ah battery module
- 24 V/1.2 Ah, 2.5 Ah, 3.2 Ah, 7 Ah and 12 Ah SITOP UPS1100 battery modules with maintenance-free lead-gel batteries or 5 Ah with LiFePO₄ batteries and integrated electronics
- Intelligent battery management with automatic detection of the battery modules, and selection of the optimum temperature-controlled charging characteristic; monitoring operational readiness, battery feeder cable, aging and charge status
- All diagnostic data and alarm messages are available via USB and Ethernet/PROFINET
- Supports high dynamic overload capability: 3-fold rated current for 30 ms and 1.5-fold rated current for 5 seconds per minute
- High charge currents

- Start from battery modules for missing supply system voltage
- OPC UA server with encrypted interface
- Remote monitoring via the integrated web server
- SITOP Manager (free software download) supports the configuration and monitoring for PC-based systems (<https://support.industry.siemens.com/cs/ww/de/view/109760673>)
- User-friendly engineering as fully integrated in SIMATIC PCS 7, in SIMATIC STEP 7 and SIMATIC STEP 7 in the TIA Portal, S7 function blocks for integration in the user programs and WinCC faceplates

Ordering data

The following device options are available:

SITOP UPS1600 uninterruptible power supply	
Type	Order number
Input 24 V DC, Output 24 V DC / 10 A	6EP4134-3AB00-0AY0
Input 24 V DC, Output 24 V DC / 10 A With USB interface	6EP4134-3AB00-1AY0
Input 24 V DC, Output 24 V DC / 10 A With PROFINET (PN) interface	6EP4134-3AB00-2AY0
Input 24 V DC, Output 24 V DC / 20 A	6EP4136-3AB00-0AY0
Input 24 V DC, Output 24 V DC / 20 A With USB interface	6EP4136-3AB00-1AY0
Input 24 V DC, Output 24 V DC / 20 A With PROFINET (PN) interface	6EP4136-3AB00-2AY0
Input 24 V DC, Output 24 V DC / 40 A	6EP4137-3AB00-0AY0
Input 24 V DC, Output 24 V DC / 40 A With USB interface	6EP4137-3AB00-1AY0
Input 24 V DC, Output 24 V DC / 40 A With PROFINET (PN) interface	6EP4137-3AB00-2AY0

SITOP BAT1600 battery module	
Type	Order number
SITOP BAT1600 2.5 Ah (LiFePO4)	6EP4132-0JA00-0AY0
SITOP BAT1600 3.2 Ah (lead-gel)	6EP4133-0GA00-0AY0
SITOP BAT1600 7.5 Ah (LiFePO4)	6EP4134-0JA00-0AY0
SITOP BAT1600 12 Ah (lead-gel)	6EP4135-0GE00-0AY0
SITOP BAT1600 38 Ah (lead-gel)	6EP4137-0GE00-0AY0

SITOP UPS1100 battery module	
Type	Order number
Battery module 1.2 Ah (lead-gel)	6EP4131-0GB00-0AY0
Battery module 2.5 Ah (pure lead)	6EP4132-0GB00-0AY0
Battery module 3.2 Ah (lead-gel)	6EP4133-0GB00-0AY0
Battery module 5 Ah (LiFePO4)	6EP4133-0JB00-0AY0
Battery module 7 Ah (lead-gel)	6EP4134-0GB00-0AY0
Battery module 12 Ah (lead-gel)	6EP4135-0GB00-0AY0

Accessories for SITOP UPS1600 and SITOP BAT1600	
Type	Order number
Device identification labels 20 mm × 7 mm, pastel turquoise	3RT1900-1SB20
SITOP BAT1600 Wall Mounting Plate	6EP4990-0MK00-0XU0
SITOP BAT1600 Battery Monitor	6EP4130-0GJ00-0AY0

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Safety and security

1.1 General safety instructions

 WARNING
Correct handling of the devices
When operating electrical devices, it is inevitable that certain components will carry dangerous voltages.
Therefore, failure to handle the units properly can result in death or serious physical injury as well as extensive property damage.
Only appropriately qualified personnel may work on or in the vicinity of this equipment.
Perfect, safe, and reliable operation of this equipment is dependent on proper transportation, storage, installation and mounting.
Before installation or maintenance work can begin, the system's main switch must be switched off and measures taken to prevent it being switched on again.
If this instruction is not observed, touching live parts can result in death or serious injury.

1.1.1 SITOP BAT1600 and UPS1100

NOTICE

The maintenance, installation and commissioning may only be performed or monitored by personnel who are familiar with batteries and the necessary precautionary measures. Ensure that non-authorized personnel do not get involved with these batteries.

When storing, installing and operating the battery modules, the regulations of VDE 0510 Part 2 / EN 50272-2 or the applicable national regulations must be complied with.

For lead-gel batteries, it must be carefully ensured that the battery module location is adequately ventilated.

Battery module location: In the lower part of the control cabinet or at the coolest location in the control cabinet to optimize the battery service life.

Dimension the power cables corresponding to the fuse in the battery module.

The fuse should only be inserted in the fuse holder when commissioning the device.

The "+" and "-" power connections of the battery module may **only** be connected to the UPS1600 UPS module, or when BAT1600 or UPS1100 battery modules of the same type are connected in parallel. **Do not connect the power connections with "0 V" or "Ground" of the power supply system!**

Only connect battery modules in parallel if they have the same charge state.

When replacing the batteries, always use batteries with the same batch number and approximately the same charge state. Only the types listed in Section "Battery replacement" should be used. The approval becomes null and void if other batteries are used.

The batteries must always be disposed of in the discharged condition according to the applicable regulations.

1.2 Safety instructions

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 stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under

<https://www.siemens.com/industrialsecurity>.

1.3 Safety instructions for hazardous zones

Only UPS1600 and UPS1100 1.2 Ah, 3.2 Ah, 7 Ah, 12 Ah devices may be used in explosive environments (hazardous zones).

The devices comply with ATEX directive 2014/34/EU; EN 60079-0; EN 60079-15.

Suitable for Ex applications in CLASS I, DIVISION 2, GROUPS A, B, C and D - or in non-hazardous zones only.

1.3.1 UPS1600

 WARNING
--

ACTUATE SWITCHES IN NON-HAZARDOUS AREAS ONLY!

 WARNING
--

EXPLOSION HAZARD – DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS

 WARNING
--

EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2
--

1.3.2 UPS1100 **CAUTION**

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

 **WARNING**

EXPLOSION HAZARD – DO NOT OPEN ANY CONNECTIONS UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS!
ONLY REMOVE / INSERT THE FUSE OR REPLACE BATTERIES IN NON-EXPLOSIVE ENVIRONMENTS!

 **WARNING**

In hazardous zones, it is not permissible that UPS1100 battery modules are connected in parallel!

Description, device design, dimension drawing

2.1 Device description

2.1.1 SITOP UPS1600

The SITOP UPS1600 10 A, 20 A and 40 A are built-in devices of the SITOP series for mounting on TH35-15/7.5 DIN rails (EN 60715). When installing SITOP UPS1600 devices, SITOP BAT1600 and SITOP UPS1100 battery modules, the relevant DIN/VDE regulations or country-specific regulations (e.g. VDE 0510 Part 2 / EN 50272-2) must be carefully complied with.

See Section Installation (Page 211)

In combination with SITOP BAT1600 and SITOP UPS1100 battery modules, they are used to buffer the load current from the 24 V load power supplies of the SITOP series.

With their high dynamic overload capability up to the 300 % rated current for 30 ms or up to the 150 % rated current for 5 s per minute, they are suitable for applications with programmable logic controllers (PLCs) and industrial PCs, as they permit high switch-on currents even in buffer mode.

The input of the SITOP UPS1600 DC-UPS module must be connected with the output of the supplying 24 V DC power supply unit. The SITOP BAT1600 and SITOP UPS1100 battery modules are connected to the BAT terminals. The loads to be buffered are supplied via the output of the SITOP UPS1600 DC-UPS module with the voltage connected at the input.

The Energy Storage Link is an additional two-wire connection between the SITOP UPS1600 basic unit and the coded SITOP BAT1600 and SITOP UPS1100 battery modules. Furthermore, the basic unit detects and manages as many as six battery modules and selects the optimum, temperature-controlled charging characteristic curve. The latter provides the basis for the long service life of the battery modules. Energy Storage Link also monitors the operational readiness as well as the supply cables (wire breakage) and the charge state (voltage, current, residual capacity) of the batteries.

Battery modules from other series and manufacturers can also be used; however, with restricted diagnostic functions such as SoH (state-of-health) and without the temperature-controlled charging function. To ensure optimum utilization, battery parameters must be adapted in the HW configuration.

In the event of failure of the 24 V DC supply voltage or voltage dip below the set switch-in threshold, the loads are supplied by switching over to the battery module. Buffering is realized until the line supply returns or until the buffer time, set using the rotary coding switch, has expired. If the buffer time has been set to MAX, then shutdown is realized when the exhaustive discharge threshold is reached.

Using the output voltage interrupt function you can select whether the output voltage is interrupted once the set buffer time expires if, in the meantime, the input voltage returns. For devices without interface, the interruption lasts 5 s. For devices with interface, the interruption duration can be adjusted.

2.1 Device description

For devices with software release up to V2.0.1, this function is only available for devices with interface, as the output voltage is only interrupted after a shutdown signal is received.

For software version > V2.0.1, the interruption of the output voltage is independent of receiving a shutdown signal.

Rotary coding switches can be used to set the battery module switch-in threshold and the buffer time. The charge current for the battery modules is set automatically, and can be changed using the interface (only for types -1AY0 and -2AY0), as well as via the signal connector.

Eight LEDs, two potential-free changeover contacts and one floating NO contact indicate the SITOP UPS1600 status.

The USB interface (only -1AY0) or PROFINET/Ethernet interface (only -2AY0) handles the communication to the PC/controllers.

For details, see Sections Connections and terminal designation (Page 27) and Operator controls (Page 34).

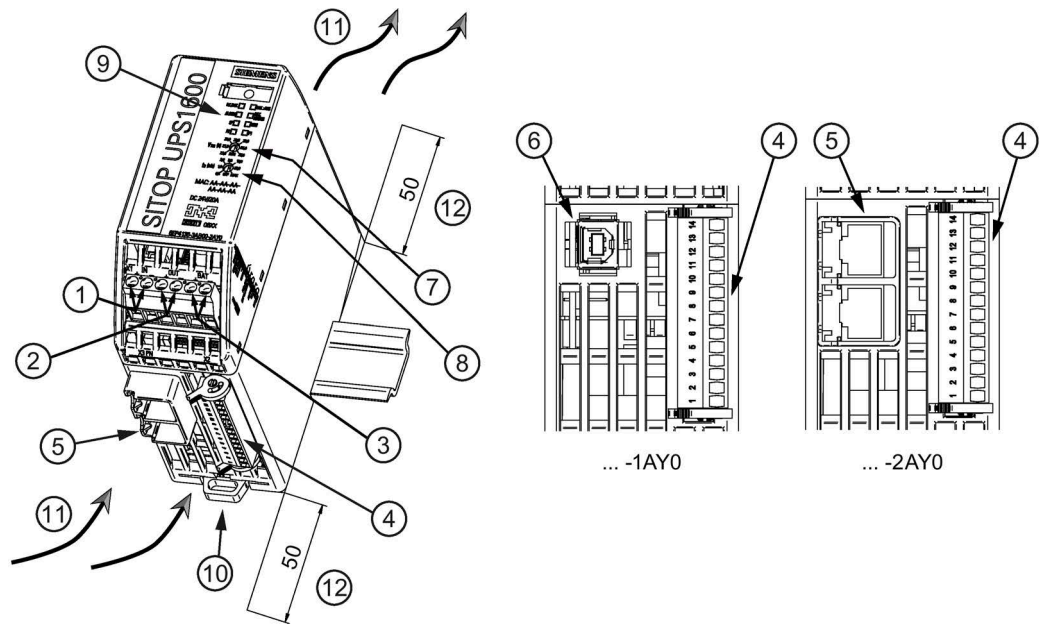
Operating data and diagnostic data can be transferred using two integrated Industrial Ethernet/PROFINET ports and visualized or further processed externally as an alternative to the proven USB connection. An integrated web server allows authorized users to export relevant data remotely via a web browser without requiring any additional software to be installed on the remote system. When delivered, the web server is not active (applies from version V2.1 and higher). Using the two rotary coding switches, the web server can be activated, and a temporary Internet address assigned, see Accessing the web server (Page 131).

The free-of-charge SITOP Manager UPS Manager software tool, which runs on Windows XP and Windows 7 and Windows 10 systems (32 and 64 bit), allows full access. This allows the overall DC-UPS installation to be configured and monitored easily using a PC. The software tool provides many possibilities for visualizing operating and diagnostic information, such as in the form of alarm lists.

The SITOP UPS1600 is fully integrated in Totally Integrated Automation (TIA), the Siemens open system architecture for integrated automation solutions. The engineering is performed in the TIA Portal and reduces to just a few clicks for the user. The UPS modules can be selected directly in the hardware catalog and transferred into the graphic network representation.

For applications without network connection, the SITOP UPS1600 is available in the versions with USB interface or digital inputs/outputs.

For stand-alone operation, the DC-UPS can be activated without input voltage from the battery, for example, to start a generator via a directly supplied controller. (see Chapter Jumper variants (Page 35))



- ① DC input X1
- ② DC output X1
- ③ DC power terminal to connect a battery module X1
- ④ Signal connector X2
- ⑤ PROFINET (Ethernet) interface X3 (only for ... - 2AY0)
- ⑥ USB interface X3 (only for ... - 1AY0)
- ⑦ Rotary coding switch, switch-in threshold
- ⑧ Rotary coding switch, buffer time
- ⑨ Signaling (LEDs)
- ⑩ DIN rail slider
- ⑪ Convection
- ⑫ Clearance above/below

Figure 2-1 SITOP UPS1600 design (example 6EP4136-3AB00-2AY0)

2.1 Device description

2.1.2 SITOP BAT1600

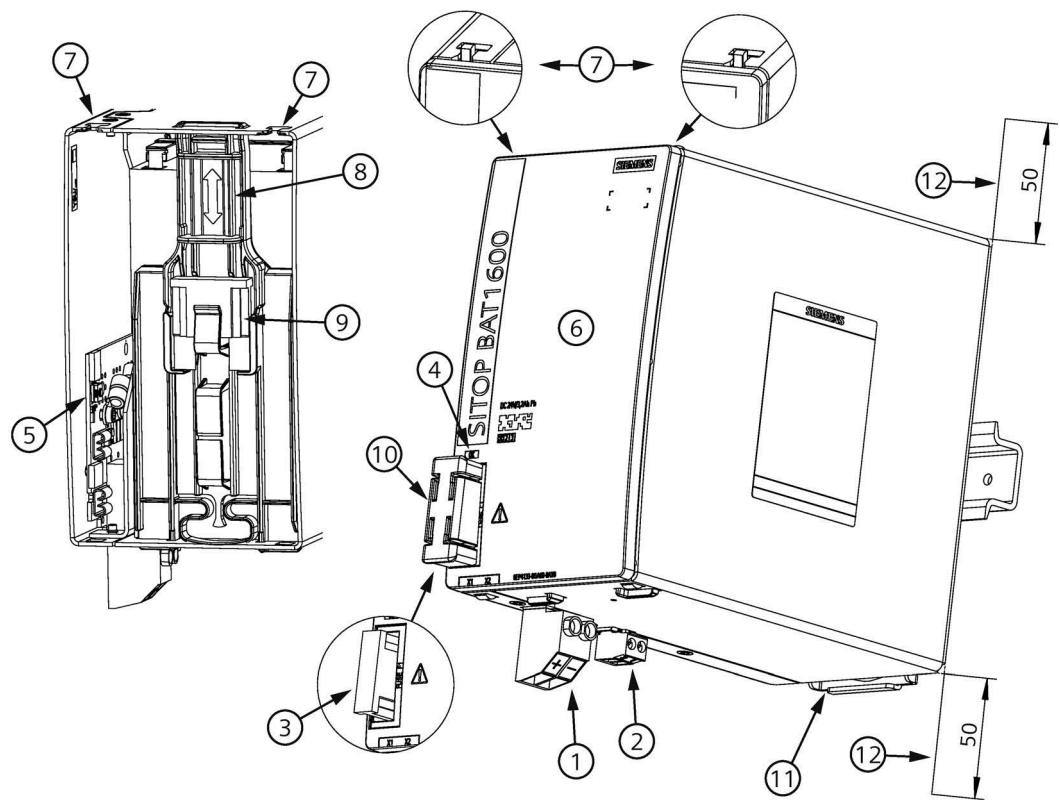
The SITOP BAT1600 battery modules consist of a battery holder with two maintenance-free, sealed lead-gel or one to three LiFePO₄ batteries with terminals for the connecting cables to the SITOP UPS1600 uninterruptible power supply. The SITOP BAT1600 includes a printed-circuit board for monitoring the battery functions and the communication with the SITOP UPS1600. A three-color LED indicates the operating status as well as the status of the communication connection to the SITOP UPS1600. The LED flashes when the batteries are being replaced or for faults and alarms.

See SITOP BAT1600 (Page 45)

Note

SITOP BAT1600 battery modules can only be used together with SITOP UPS1600 from SW Version V2.4 and higher.

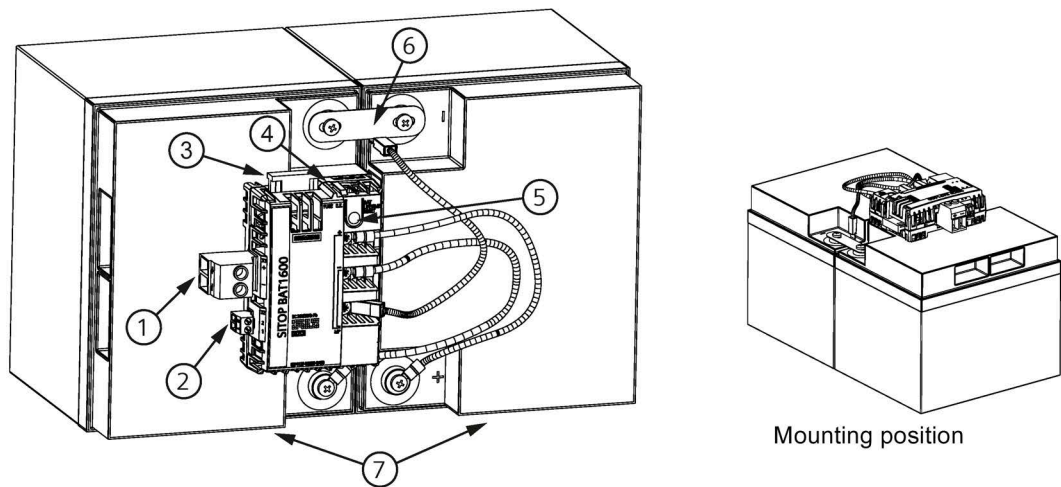
Up to 6 SITOP BAT1600 of the same type can be connected in parallel with a SITOP UPS1600. See Chapter Connecting SITOP BAT1600 battery modules to the UPS module (Page 213) Connecting battery modules in parallel. To replace batteries, see Chapter Battery replacement SITOP BAT1600 (Page 225). Batteries cannot be replaced for battery modules with LiFePO₄ batteries.



- ① DC power terminal
- ② Communication terminal
- ③ Fuse
- ④ LED display (O.K.)
- ⑤ Reset button (below the enclosure cover)
- ⑥ Enclosure cover
- ⑦ Enclosure cover release
- ⑧ Battery holder
- ⑨ Reserve fuse
- ⑩ Fuse cover
- ⑪ DIN rail slider
- ⑫ Clearance above/below

Figure 2-2 Design SITOP BAT1600 (example 6EP4133-0GA00-0AY0 (3.5 Ah))

2.1 Device description



- ① DC power terminal
- ② Communication terminal
- ③ Fuse
- ④ LED display (O.K.)
- ⑤ Reset button
- ⑥ Mid-point connector
- ⑦ Battery

Figure 2-3 Design SITOP BAT1600 38 Ah

Buffer times

NOTICE

Before the first buffer mode in the application, new battery modules must be fully charged for 24 hours continuously without any interruption (for batteries with a capacity of 24 Ah and above, for 48 hours).

NOTICE

Battery modules, which have been fully discharged in buffer mode, must be fully charged again within 14 days to avoid the batteries being damaged as a result of being deeply discharged. An unnecessary deep discharge of the battery module when buffering can be avoided by limiting the buffer time.

Note

For the SITOP BAT1600, clearance is required above the battery module to open and close the cover and for thermal reasons. The clearance below is required for the cable plug connector.

Additional information about the battery modules is also provided in Chapter "Correct storage and transport (Page 232)".

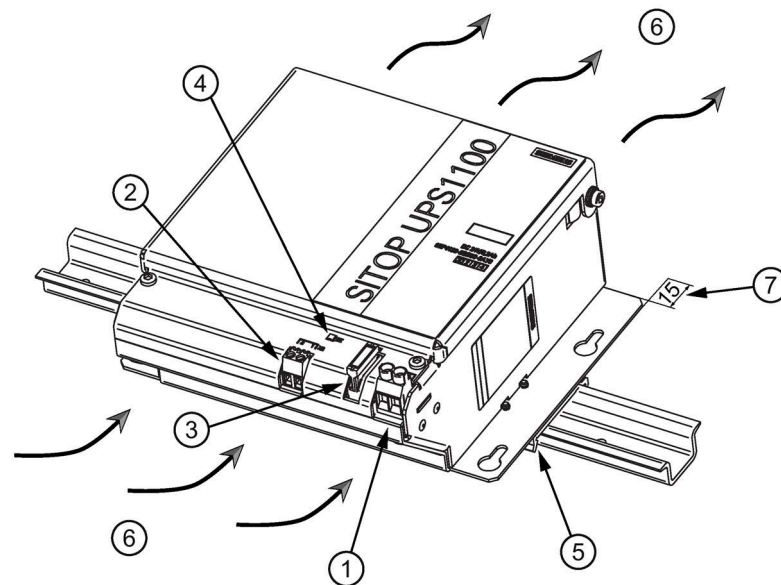
2.1.3 SITOP UPS1100

The SITOP UPS1100 battery modules consist of a battery holder with two maintenance-free, sealed lead-gel or LiFePO₄ batteries with terminals for the connecting cables to the SITOP UPS1600 uninterruptible power supply. The SITOP UPS1100 includes a printed-circuit board for monitoring the battery functions and the communication with the SITOP UPS1600. A green LED indicates that there is a communication connection to the SITOP UPS1600. The LED flashes when the batteries are being replaced or for faults and alarms.

Note

The 5 Ah SITOP UPS1100 battery module with LiFePO₄ batteries can only be used in conjunction with SITOP UPS1600 from software version V2.1 and higher.

Up to 6 SITOP UPS1100 of the same type can be connected in parallel with a SITOP UPS1600. When replacing a battery, see Chapter Battery replacement SITOP UPS1100 (Page 226).



- ① DC power terminal X1
- ② Signal terminal X2
- ③ Fuses F1/F2 (F2 only for 7 Ah and 12 Ah)
- ④ Signaling (LED)
- ⑤ Mounting rail holder (not for the 7 Ah and 12 Ah versions)
- ⑥ Natural convection
- ⑦ Clearance above

Figure 2-4 SITOP UPS1100 design (example 6EP4133-0GB00-0AY0)

2.1 Device description

Note

For the SITOP UPS1100, clearance is required above it in order to open the cover. Clearance below is not required for thermal reasons - however, space is required to feed in the cable.

2.2 Connections and terminal designation

2.2.1 SITOP UPS1600

2.2.1.1 Terminals

The input terminals ① can be used to establish the connection to the supply voltage. The output terminals ② are used to connect to the supplied loads.

The cables used must be suitable for temperatures of at least 90 °C.

UPS1100 battery modules are connected via DC power terminals BAT ③.

(see also Chapter Installation (Page 211))

Connections and terminal designations (see Figure 2-1 SITOP UPS1600 design (example 6EP4136-3AB00-2AY0) (Page 21))	
① DC input IN+, IN-	One screw terminal each
② DC output OUT+, OUT-	One screw terminal each
③ DC power terminals to connect a battery module BAT+, BAT-	One screw terminal each
④ Signal connector	Connector with 14 screw terminals
⑤ PROFINET (Ethernet) connection	RJ45 plug-in contact (only for ...-2AY0)
⑥ USB connection	USB-B plug-in contact (only for ...-1AY0)






	① + ② + ③	④	⑦ + ⑧
	0,8 x 4,0 / PZ1	0,4 x 2,5	0,4 x 2,5
	1 x 0,2 - 6 mm ²	1 x 0,2 - 1,5 mm ²	-
	1 x 0,2 - 4 mm ²	1 x 0,2 - 1,5 mm ²	-
	1 x 0,25 - 4 mm ²	1 x 0,2 - 1,5 mm ²	-
AWG	24 - 10	28 - 14	-
Nm	0,5 - 0,6 Nm	0,2 - 0,25 Nm	-
	8 mm	6 mm	-

Figure 2-5 Terminal data SITOP UPS1600 10 A, 20 A

2.2 Connections and terminal designation






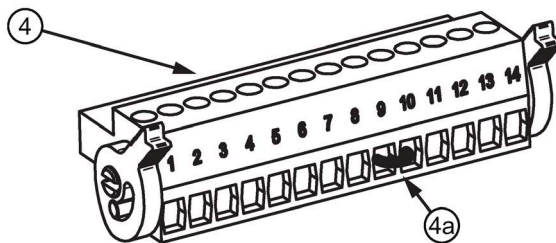
	① + ② + ③	④	⑦ + ⑧
	0,8 x 4,5 / PZ1	0,4 x 2,5	0,4 x 2,5
	1 x 0,5 - 16 mm ²	1 x 0,2 - 1,5 mm ²	-
	1 x 0,5 - 10 mm ²	1 x 0,2 - 1,5 mm ²	-
	1 x 0,5 - 10 mm ²	1 x 0,2 - 1,5 mm ²	-
AWG	20 - 6	28 - 14	-
Nm	1,2 - 1,5 Nm	0,2 - 0,25 Nm	-
	11 mm	6 mm	-

Figure 2-6 Terminal data SITOP UPS1600 40 A

2.2.1.2 Signal terminal



- ④ Signal connector
- ④a Wire jumper

Figure 2-7 Signal connector

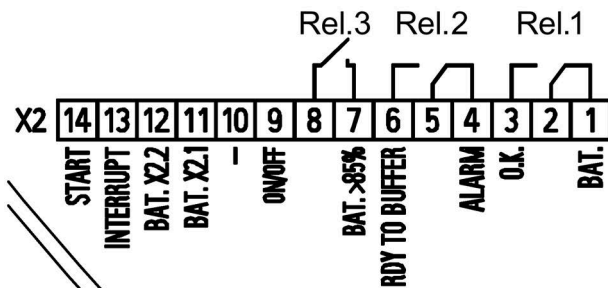


Figure 2-8 Signal connector connection schematic

Pin	Terminal designation	Function
1	BAT.	24 V DC OK / BAT REL1 (changeover contact): Energized state: Normal operation Quiescent state: Buffer mode or off
2	-	
3	O.K.	
4	ALARM	Ready for buffer mode / alarm REL2 (changeover contact): Energized state: Buffer mode is possible Quiescent state: Not ready for buffering Cycle 0.25 Hz: Battery defect or replacement recommended.
5	-	
6	RDY TO BUFFER	
7	BAT. > 85 %	Battery > 85 % REL3 (NO contact): Energized state: Buffering of the selected buffer time is possible, or charge state > 85 %
8	-	
9	ON/OFF	On/Off (buffer mode permitted/prevented)
10	-	-
11	BAT. X2.1	Battery communication or charge current setting
12	BAT. X2.2	Battery supply or charge current setting
13	INTERRUPT	Interrupt (interruption of the output voltage)
14	START	Start from the battery

Relay contact: Contact rating, max. AC 30 V/0.5 A; DC 60 V/0.3 A; DC 30 V/1 A

The jumper (4a) (see Figure 2-7 Signal connector (Page 28)) between pins 9 and 10 is necessary to operate the device in the buffer mode.

Delivery state: Jumper between pins 9 and 10

2.2.1.3 USB port

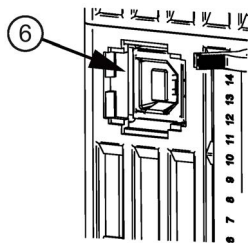


Figure 2-9 USB port

The USB interface (type B) ⑥ corresponds to the USB 2.0 standard (Full Speed). Strain relief (see Section USB connector (Page 189)) is implemented using a defined cable/connector (Y-Con USB - Yamaichi). Maximum USB cable length is 5 m.

2.2.1.4 PROFINET/Ethernet connection

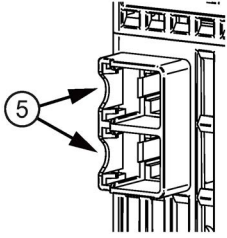


Figure 2-10 PROFINET/Ethernet connection

The Ethernet interface ⑤ corresponds to the standard full duplex up to 100 Mbit/s electrical (100BASE-TX) according to IEEE 802.3.

Properties of the Ethernet interface:

- Transfer rate 10/100 Mbit/s
- Two RJ45 sockets, i.e. integrated switch, for RJ45 connector
- Cable type 100Base-TX (CAT5)
- Autonegotiation
- Auto-crossover communication via TCP/IP and PROFINET

The strain relief (see Section PROFINET/Ethernet connector (Page 189)) is implemented using a Siemens IE FastConnect RJ45.

The physics of the Ethernet interface is implemented so that PROFINET IO according to standards IEC 61158 and IEC 61784-2 is possible. For PROFINET, conformance class B must be maintained as a minimum.

The Ethernet/PROFINET interface permits:

- Configuration and monitoring using the SITOP Manager
- Monitoring via the Web server
- Integration and communication of the DC-UPS with other automation components from Siemens and the open environment, e.g. IPC, PLC, HMI, OPC UA
- Firmware update of the device via SITOP Manager, web server or STEP 7

2.2.2 SITOP BAT1600

The power cables to the UPS module and to additional battery modules are connected at power terminals ①. Refer to the diagram in Section "SITOP BAT1600 (Page 22)". The data cables to the UPS module and to additional battery modules are connected at communication terminals ②. See also Chapter Installation (Page 211).

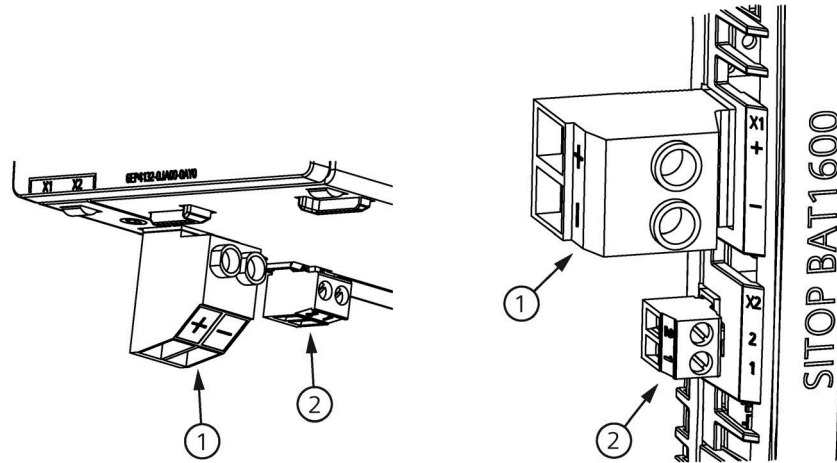


Figure 2-11 Power terminals ① / communication terminals ②

NOTICE
Material damage
It is not permissible that the "+" and "-" power terminals are connected to the "0V", the 0V busbar or "GROUND".

Note

Use cables with the same length and the same cross-section.

Dimension the power cables corresponding to the fuse in the battery module.

The fuse should only be inserted in the fuse holder when commissioning the device.

See Connecting SITOP BAT1600 battery modules to the UPS module (Page 213)

Connections and terminal designations	
① Power terminals "-" and "+"	Plug-in terminal each with a screw connection
② Communication terminals "COM2", "COM1"	Plug-in terminal each with a screw connection

2.2 Connections and terminal designation

As an alternative to the plug-in terminals with screw connection provided, push-in terminals are also approved.

	Manufacturer	Part numbers
Push-in data connector all devices:	Phoenix Contact FKCN 2.5/ 2-ST-5.08	1707358
Push-in power connector 2.5Ah, 3.2Ah:	Weidmüller BVF 7.62HP/180	1060390000
Push-in power connector 7.5Ah, 12Ah, 38Ah:	Weidmüller BUF 10.16 IT/02/180	2493170000





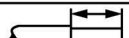
	①	②
	0,8 x 4,5 / PH1	0,6 x 3,5
	1 x 0,2 - 10 mm ²	1 x 0,2 - 2,5 mm ²
	1 x 0,5 - 10 mm ²	1 x 0,2 - 2,5 mm ²
	1 x 0,25 - 6 mm ²	1 x 0,25 - 2,5 mm ²
AWG	24 - 8	24 - 12
Nm	0,6 Nm	0,6 Nm
	12 mm	7 mm

Figure 2-12 Terminal data 2.5 Ah / 3.2 Ah


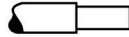


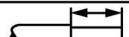
	①	②
	1,0 x 5,5 / PZ1 / PH1	0,6 x 3,5
	1 x 0,2 - 16 mm ²	1 x 0,2 - 2,5 mm ²
	1 x 0,5 - 16 mm ²	1 x 0,2 - 2,5 mm ²
	1 x 0,25 - 16 mm ²	1 x 0,25 - 2,5 mm ²
AWG	22 - 6	24 - 12
Nm	1,5 Nm	0,6 Nm
	12 mm	7 mm

Figure 2-13 Terminal data 7.5 Ah / 12 Ah / 38 Ah

2.2.3 SITOP UPS1100

Power terminal ① and signal terminal ② can be used to establish the connection to SITOP UPS1600 (also see Chapter Installation (Page 211)).

Connections and terminal designations (see Figure 2-4 SITOP UPS1100 design (example 6EP4133-0GB00-0AY0) (Page 25))	
① DC power terminal +, -	One screw terminal each
② Signal terminal 1, 2	One screw terminal each





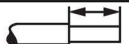
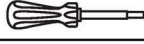




	①	②
	0,6 x 3,5	0,6 x 3,5
	1 x 0,2 - 6 mm ²	1 x 0,14 - 4 mm ²
	1 x 0,2 - 4 mm ²	1 x 0,14 - 2,5 mm ²
	1 x 0,25 - 4 mm ²	1 x 0,5 - 2,5 mm ²
AWG	24 - 10	22 - 12
Nm	0,5 Nm	0,5 - 0,7 Nm
	8 mm	6,5 mm

Figure 2-14 Terminal data for 6EP4131-0GB00-0AY0, 6EP4132-0GB00-0AY0 and 6EP4133-0GB00-0AY0

	①	②
	1,0 x 5,5	0,6 x 3,5
	1 x 0,5 - 16 mm ²	1 x 0,14 - 4 mm ²
	1 x 0,5 - 16 mm ²	1 x 0,14 - 2,5 mm ²
	1 x 0,25 - 16 mm ² *)	1 x 0,5 - 2,5 mm ²
AWG	26 - 6	22 - 12
Nm	1,2 - 1,5 Nm	0,5 - 0,7 Nm
	12 mm	6,5 mm

*) 16 mm² for square crimping, otherwise 10 mm²

Figure 2-15 Terminal data for 6EP4133-0JB00-0AY0, 6EP4134-0GB00-0AY0 and 6EP4135-0GB00-0AY0

2.3 Operator controls

2.3.1 SITOP UPS1600

2.3.1.1 Rotary coding switch, switch-in threshold

The switch-in threshold can be set using the rotary coding switch ⑦ on the device front between 21.0 V and 25.0 V (21 - 21.5 - 22 - 22.5 - 23 - 24 - 25 volt). The delivery state is 21.5 V

For devices with an interface (...-1AY0, ...-2AY0), the coding switch has an additional position REN. If this is selected, the software settings (for the switch-in threshold and the backup time) apply rather than the hardware settings. In the switch position REN, connection X2.13 (INTERRUPT - reset after buffer mode) of the signal terminal (see Chapter Signal terminal (Page 28)) has no effect.

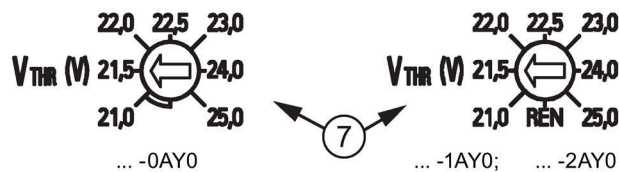


Figure 2-16 Rotary coding switch, switch-in threshold

Note

It is only permissible to operate the rotary coding switch using an insulated screwdriver.

The stop buffering voltage is a voltage to be set, which must not be fallen below in the case of a buffering event. This ensures that the undervoltage monitoring of the device supplied from the UPS does not trip as a result of the decreasing output voltage during the buffering event. Customers can set the voltage.

For notes on actuating the rotary coding switch (screwdriver, torque), see Figure 2-5 Terminal data SITOP UPS1600 10 A, 20 A (Page 27).

2.3.1.2 Rotary coding switch, backup time

The buffer time is set using the rotary coding switch ⑧ on the device front between 30 seconds and MAX in steps of 0.5 minute (30 s), 1 minute, 2 minutes, 5 minutes, 10 minutes, 20 minutes and MAX. The MAX setting means that buffering is realized for as long as possible. The device only shuts down when the battery has discharged down to the stop buffering voltage. Condition when delivered is 5 minutes.

The rotary coding switch has an additional setting OFF (see following diagram). If this is selected and the additional threshold rotary coding switch is not set to REN, then buffering is deactivated.

If the buffer time is to be set using the software (only for devices with an interface (...-1AY0, ...-2AY0)) (possible setting range, see Section Parameterizing SITOP UPS1600 (Page 92)), the rotary coding switch for the connection threshold must be set to REN (see Section Rotary coding switch, switch-in threshold (Page 34)).

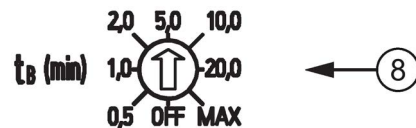


Figure 2-17 Rotary coding switch, buffer time

Note

It is only permissible to operate the rotary coding switch using an insulated screwdriver.

2.3.1.3 Jumper variants

On/Off (pin 9)

The wire jumper on the signal connector ④ between pin 9 and pin 10 is used to enable/disable the buffer mode (see Figure 2-7 Signal connector (Page 28)).

Buffer mode is only possible if the ON/OFF wire jumper is closed. The ON/OFF wire jumper has priority over the position of the switch-in threshold rotary coding switch. Delivery state: Wire jumper is closed between pin 9 and pin 10.

As a consequence, buffer mode can be enabled or prevented using a floating contact (e.g. a contact in the plant or system). The contact is switched instead of the ON/OFF wire jumper.

Note

The contact in the switched-on state must have a resistance of < 10 Ohm, contact load must be a minimum of 15 V / 5 mA.

Note

The external circuit must meet the requirements relating to SELV (ES1) circuits according to EN62386-1.

2.3 Operator controls

Changes are also effective in the buffer mode.

Table 2-1 With interface (up to firmware release less than V1.20)

Rotary coding switch buffer time	Rotary coding switch connection threshold	Wire jumper ON/OFF (pin 9) to (pin 10)	Result
OFF	21 - 25	Yes	Buffering not permitted
0.5 - MAX	21 - 25	Yes	Buffer mode permitted (buffer time corresponding to the settings or maximum buffer time)
OFF, 0.5 - MAX	21 - 25	No	Buffering not permitted
OFF, 0.5 - MAX	REN	Not relevant	The software settings apply

Table 2-2 With interface (from firmware release V1.20 up to V2.0.x)

Rotary coding switch buffer time	Rotary coding switch connection threshold	Wire jumper ON/OFF (pin 9) to (pin 10)	Result
OFF	21 - 25	Yes	Buffering not permitted
0.5 - MAX	21 - 25	Yes	Buffer mode permitted (buffer time corresponding to the settings or maximum buffer time)
OFF, 0.5 - MAX	21 - 25, REN	No	Buffering not permitted
OFF, 0.5 - MAX	REN	Yes	The software settings apply

Table 2-3 With interface (from firmware release V2.1)

Rotary coding switch buffer time	Rotary coding switch connection threshold	Wire jumper ON/OFF (pin 9) to (pin 10)	Result
OFF	21 - 25	Yes	Buffering not permitted
0.5 - MAX	21 - 25	No	Buffering not permitted
0.5 - MAX	21 - 25	Yes	Buffer mode permitted (buffer time corresponding to the settings or maximum buffer time)
OFF, 0.5 - MAX	21 - 25, REN	No	Buffering not permitted

Rotary coding switch buffer time	Rotary coding switch connection threshold	Wire jumper ON/OFF (pin 9) to (pin 10)	Result
0.5 - MAX	REN	Yes	The software settings apply
OFF	REN	Not relevant	The web server can be activated, and a temporary IP address assigned, see Chapter Accessing the web server (Page 131).

Table 2- 4 Without interface

Rotary coding switch buffer time	Rotary coding switch connection threshold	Wire jumper ON/OFF (pin 9) to (pin 10)	Result
OFF	21 - 25	Yes	Buffering not permitted
OFF	21 - 25	No	Buffering not permitted
0.5 - MAX	21 - 25	Yes	Buffer mode permitted (buffer time corresponding to the settings or maximum buffer time)
0.5 - MAX	21 - 25	No	Buffering not permitted

Interruption of the output voltage (pin 13)

A wire jumper on the signal connector ④ between pin 13 and pin 10 is used to enable/disable the interruption of the output voltage, after the set buffer time expires, for the parameterized time (default value 5 seconds) when the line supply returns during the buffer time. The default value can only be changed for devices with USB or Ethernet/PROFINET interface.

To prevent data losses, PCs must be shut down in time before the buffer time ends. If the input voltage returns after the shutdown has already started, the SITOP UPS1600 terminates the buffer mode and transitions into normal operation. PC shutdown is completed to the end and the internal power supply is brought into the standby state. PCs, which do not have an on/off switch, can only be rebooted by switching off the power and switching on again. When the "Interrupt output voltage" jumper is inserted, the UPS generates this pulse.

Start from the battery (pin 14)

The start from the battery is initiated by connecting pin 14 to pin 10. This jumper must not provide a permanent connection, but must be controlled using a button. The input is designed so that a single lamp with a permissible supply voltage of between 12 and 30 V and 8 to 15 mA can be switched in series to the switching contact. If the button is actuated when the input voltage is not available, and if buffering is permitted, then the UPS goes into the buffer mode. The SITOP UPS1600 shuts down if, at the end of the selected buffer time, an input voltage is still not available.

The SITOP UPS1600 starts in normal operation if the input voltage is available.

This can occur if the UPS was remotely shut down via the interface.

Note

From SITOP Manager V1.1 and SITOP UPS1600 Version V2.2.2, when starting from the battery, buffer mode is identified when powering-up. After the set time "Shut down PC on power failure" elapses, the PC is correctly powered down and switched off.

Setting the charge current (pins 10 / 11 / 12)

For third party batteries, the magnitude of the charge current can be changed by inserting jumpers between terminals X2.10 (-) and X2.11 or X2.12. These settings are only effective if the rotary coding switch REN is not set to ($V_{THR} \neq REN$).

Table 2- 5 Charge current for SITOP UPS1600 without communication or SITOP UPS1600 USB/PN in the manual mode ($V_{THR} \neq REN$)

SITOP UPS1600 10 A	SITOP UPS1600 20 A and 40 A	Terminal X2.11	Terminal X2.12	Charge volt- age
0.3 A ^{*1)}	0.8 A ^{*1)}	open	open	26.4 V ^{*1)}
0.8 A	1.75 A	open	connected with X2.10	26.4 V
Max.	Max.	connected with X2.10	open	26.4 V

*1) Factory setting

Table 2- 6 Charge current for SITOP UPS1600 USB/PN in the remote mode ($V_{THR} = REN$)

SITOP UPS1600 10 A	SITOP UPS1600 20 A	SITOP UPS1600 40 A	Charge voltage
0.3 A ^{*1)}	0.8 A ^{*1)}	0.8 A ^{*1)}	26.4 V ^{*1)}
0.1-3 A	0.1-4 A	0.1-5 A	24-30 V

*1) Factory setting

Comment

The charge current is automatically reduced if the input voltage of the UPS1600 falls below 24 V DC, or the ambient temperature exceeds 40 °C. In this case, the maximum charge current is reduced as follows:

10 A: 3 A → 2 A

20 A: 4 A → 3 A

40 A: 5 A → 3 A

2.3.2 SITOP BAT1600

Buttons for battery replacement

A button ⑤ is located under the housing cover of the battery module to change the battery, see Replacing batteries in a battery module (Page 231).

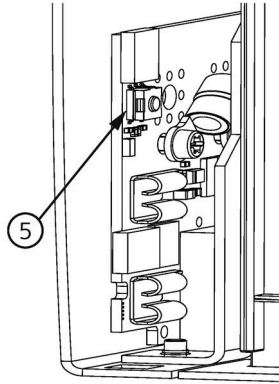


Figure 2-18 Buttons for battery replacement

2.3.3 SITOP UPS1100

Buttons for battery replacement

For the SITOP UPS1100, below the cover there is a button ⑧ for battery replacement, see Battery replacement SITOP UPS1100 (Page 226)

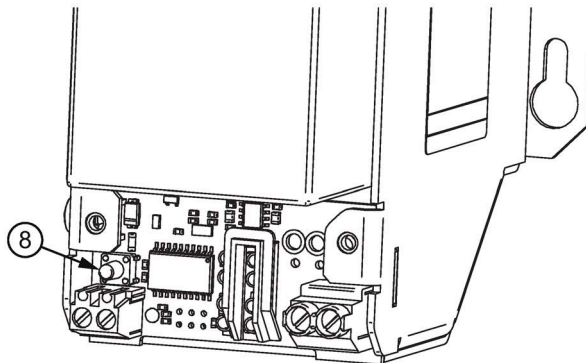


Figure 2-19 Buttons for battery replacement

2.4 Operating displays and signaling

Multi-color LEDs at the front of the device indicate the operating state of the device and the operating state of the outputs.

Meaning of the LEDs

The LED is shown using symbols:

○	LED off		
●	LED is lit		
*	LED flashes in the interval:	0.1 seconds on/ 0.1 seconds off 0.25 seconds on/ 0.25 seconds off 0.5 seconds on/ 0.5 seconds off 1 second on / 1 second off	5 Hz 2 Hz 1 Hz 0.5 Hz

2.4.1 SITOP UPS1600

2.4.1.1 LEDs

LEDs	Labeling, just the same as at the housing	Description
LED 1	O.K./BAT.	Mode DC-USV
LED 2	BAT.> 85 %	Charge state
LED 3	ALARM	Not ready for buffering!
LED 4	BAT.STATUS	Battery status
LED 5 * ¹⁾	SF	PROFINET-specific diagnostic displays
LED 6 * ¹⁾	RUN	PROFINET-specific diagnostic displays
LED 7 * ¹⁾	P2	Connection status Ethernet port 1
LED 8 * ¹⁾	P1	Connection status Ethernet port 2

*¹⁾ Only active for ... -2AY0

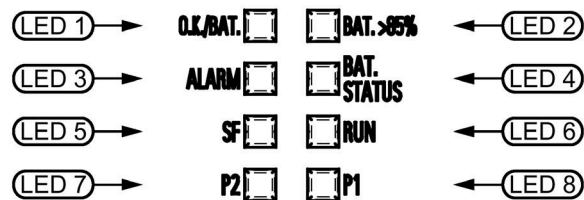


Figure 2-20 Operating displays

States of the LEDs

LED 1 (O.K./BAT.)

Signaling	6EP4134-3AB00-... 6EP4136-3AB00-... 6EP4137-3AB00-...
○ Off	DC-UPS off
● Red	DC-UPS defect (severe hardware fault)
* Flashing red (0.25/0.25)	Firmware update
* Flashing red (1/1)	Software corrupted
* Flashing yellow (0.25/0.25)	Critical temperature identified, overtemperature or overvoltage at the input
* Flashing yellow (1/1)	Buffer mode, output off
● Yellow	Buffer mode, output on
* Flashing green (1/1)	DC-UPS OK, output off
● Green	DC-UPS OK, output on

LED 2 (BAT.> 85%)

Signaling	6EP4134-3AB00-... 6EP4136-3AB00-... 6EP4137-3AB00-...
○ Off	Battery module charge state < 10 %
* Flashing green (0.25/0.25)	10 % < battery module charge state < 85 % or firmware update
* Flashing green (1/1)	85 % < battery module charge state < 100 %
● Green	Battery module charge state = 100 %

The LED and the relay contact (see Chapter Relay outputs (Page 44)) have two meanings:

1. If no additional settings have been made, then the previous LED signaling applies.
2. If an expected buffer current and a buffer time are set under the hardware configuration, then the LEDs and the relay contact serve as an indicator when buffering is possible with the two parameters – or is no longer possible.

Note

From the instant in time when the SITOP UPS1600 is switched over into the buffer mode, for the evaluation, instead of the expected buffer current, the actually measured buffer current is used. As a consequence, the status of the LEDs and the relay can also change.

LED 3 (ALARM)

Signaling	6EP4134-3AB00-... 6EP4136-3AB00-... 6EP4137-3AB00-...
● Red	Output off for 45 seconds because of overcurrent, overtemperature or buffer mode not possible
○ Off	Buffer mode possible

LED 4 (BAT.STATUS)

For several battery modules connected in parallel, the LED only shows the LED status with the highest priority.

If a SITOP BAT1600 is connected:

Signaling	6EP4134-3AB00-... 6EP4136-3AB00-... 6EP4137-3AB00-...
○ Off	Module runs up, DC-UPS defective (critical hardware fault)
✱ Flashing green (0.25/0.25)	Battery is being replaced (button pressed, reset service life)
✱ Flashing green (1/1)	Battery successfully replaced (LED flashes for 5 s)
✱ Flashing green (1/1)	Battery replacement recommended (SoH ≤ 20 %)
● Green	Battery module OK
✱ Flashing yellow (0.25/0.25)	End of the battery service life reached (SoH = 0 %) or battery test negative → battery must be replaced, buffer mode possible
✱ Flashing yellow (1/1)	Temperature outside the valid range, communication cable interrupted or different battery types being used → restricted charge operation
● Yellow	Selected buffer time cannot be attained
✱ Flashing red (1/1)	Battery replacement canceled (LED flashes for 5 s)
● Red	Fuse ruptured/not inserted, power cable interrupted, 1 battery in the module is not connected, battery pack voltage is not symmetrical or reset button is pressed > 2 s

If only SITOP UPS1100 are connected:

As soon as a SITOP BAT1600 is connected, the status of SITOP BAT1600 is displayed, and married up with the information of SITOP UPS1100.

Signaling		6EP4134-3AB00-... 6EP4136-3AB00-... 6EP4137-3AB00-...
○ Off		Module runs up, DC-UPS defective (critical hardware fault)
● Green		Battery module OK
✱ Flashing yellow (1/1)		Battery outside the permitted temperature range
● Yellow		Selected buffer time cannot be attained
● Red		Battery module fault, maintenance required (incorrect polarity, battery module not connected, high ohmic battery module connection, battery deep discharged, fuse defective/ruptured, asymmetrical cell voltage, battery R test unsuccessful)

LED 5 and LED 6 (PROFINET LEDs)

Signaling		6EP4134-3AB00-2AY0 6EP4136-3AB00-2AY0 6EP4137-3AB00-2AY0
LED 5 (SF)	LED 6 (RUN)	
○ Off	○ Off	No connection to a PROFINET IO controller
○ Off	✱ Flashing green (0.5/0.5)	Configuration by the PROFINET IO controller
○ Off	● Green	Application started successfully, module O.K.
● Red	● Green	Application started successfully, module not O.K.
✱ Flashing red (0.1/0.1)	● Green	Application in progress, diagnosis can be called
✱ Flashing red (0.5/0.5)	✱ Flashing green (0.5/0.5)	Self-test running (flashing alternately every 3 s)
✱ Flashing red (0.5/0.5)	○ Off	DCP device identification (LED flashes for 3 seconds)
✱ Flashing red (0.5/0.5)	✱ Flashing green (0.5/0.5)	Firmware update

LEDs 5 and 6 are active only for ... -2AY0.

LED 7 (Ethernet LED /P2)

Signaling		6EP4134-3AB00-2AY0 6EP4136-3AB00-2AY0 6EP4137-3AB00-2AY0
○ Off		Device not connected with controller
● Green		Device connected with controller, no activity
● Green/yellow, alternating		Device connected with controller, send/receive data (RX/TX)
● Yellow		Device connected with controller, active communication (RX/TX)

LED 7 is active only for ... -2AY0

LED 8 (Ethernet LED /P1)

Signaling	6EP4134-3AB00-2AY0 6EP4136-3AB00-2AY0 6EP4137-3AB00-2AY0
○ Off	Device not connected with controller
● Green	Device connected with controller, no activity
● Green/yellow, alternating	Device connected with controller, send/receive data (RX/TX)
● Yellow	Device connected with controller, active communication (RX/TX)

LED 8 is active only for ... -2AY0.

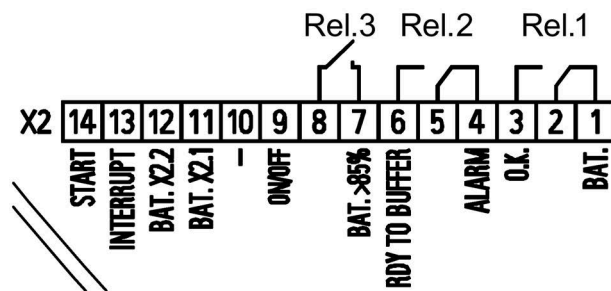
2.4.1.2 Relay outputs

Figure 2-21 Signal connector connection schematic

Rel.1 (changeover contact):

Energized state: Normal operation (X2.2 - X2.3)

Deenergized state: Buffer mode or off

Rel.2 (changeover contact):

Energized state: Buffer mode is possible (X2.5 - X2.6)

Deenergized state: Not ready for buffering

Cycle 0.25 Hz: Battery defective or different – or more than 6 battery modules connected.

If the buffer time is not reached, only **Rel.3** (< 85 %) is in the quiescent state.

In buffer mode, signal "alarm" signifies that the battery voltage has dropped to < 20.5 V and a forced shutdown is immediately pending to protect the battery. After the battery has been shut down as a result of overload, short-circuit, deep discharge protection or expired buffer time, the red LED (alarm) goes dark, relay contact X2.4 - X2.5 remains closed.

Rel.3 (NO contact):

Energized state: Buffering of the selected buffer time is possible, or charge state > 85 %.

Contact rating:

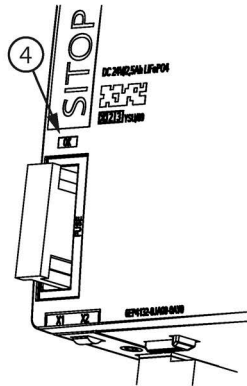
30 V AC/0.5 A 60 V DC/0.3 A 30 V DC/1 A

Note

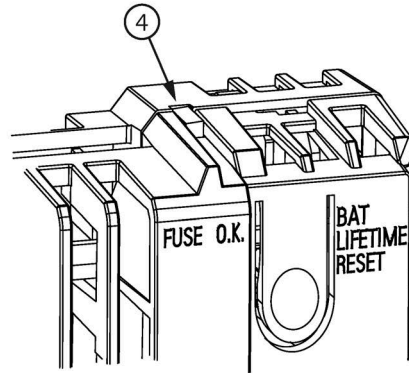
From the instant in time when the SITOP UPS1600 is switched over into the buffer mode, for the evaluation, instead of the expected buffer current, the actually measured buffer current is used. As a consequence, the status of the LEDs and the relay can also change.

Note

The value assumed for the buffer time is based on the battery being in a new state.

2.4.2 SITOP BAT1600

6EP4132-OJA00-0AY0 (2.5 Ah)



6EP4137-0GE00-0AX0 (38 Ah)

No.	Labeling	Signal type	Signaling
④	O.K.	LED	Device status

Meaning of the LED colors for buffering:

- Green ≙ buffer readiness
- Yellow ≙ buffer mode endangered
- Red ≙ buffer mode not possible

States of the LEDs

Signaling	6EP4132-0JA00-0AY0 (2.5 Ah) 6EP4133-0GA00-0AY0 (3.2 Ah) 6EP4134-0JA00-0AY0 (7.5 Ah)	6EP4135-0GE00-0AY0 (12 Ah) 6EP4137-0GE00-0AX0 (38 Ah)
○ Off	Module runs up, DC-UPS defective (critical hardware fault)	
✱ Flashing green (0.25/0.25)	Battery is being replaced (button pressed, reset service life)	
✱ Flashing green (1/1)	Battery successfully replaced (LED flashes for 5 s)	
✱ Flashing green (1/1)	Battery replacement recommended (SoH ≤ 20 %)	
● Green	Battery module OK	
✱ Flashing yellow (0.25/0.25)	End of the battery service life reached (SoH = 0 %) or battery test negative → battery must be replaced, buffer mode possible	
✱ Flashing yellow (1/1)	Temperature outside the valid range, communication cable interrupted or different battery types being used → restricted charge operation	
● Yellow	Selected buffer time cannot be attained	
✱ Flashing red (1/1)	Battery replacement canceled (LED flashes for 5 s)	
● Red	Fuse ruptured/not inserted, power cable interrupted, 1 battery in the module is not connected, battery pack voltage is not symmetrical or reset button is pressed > 2 s	

2.4.3

SITOP UPS1100

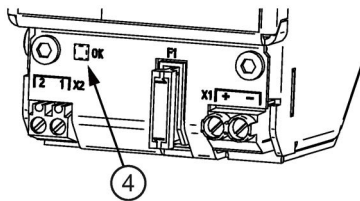


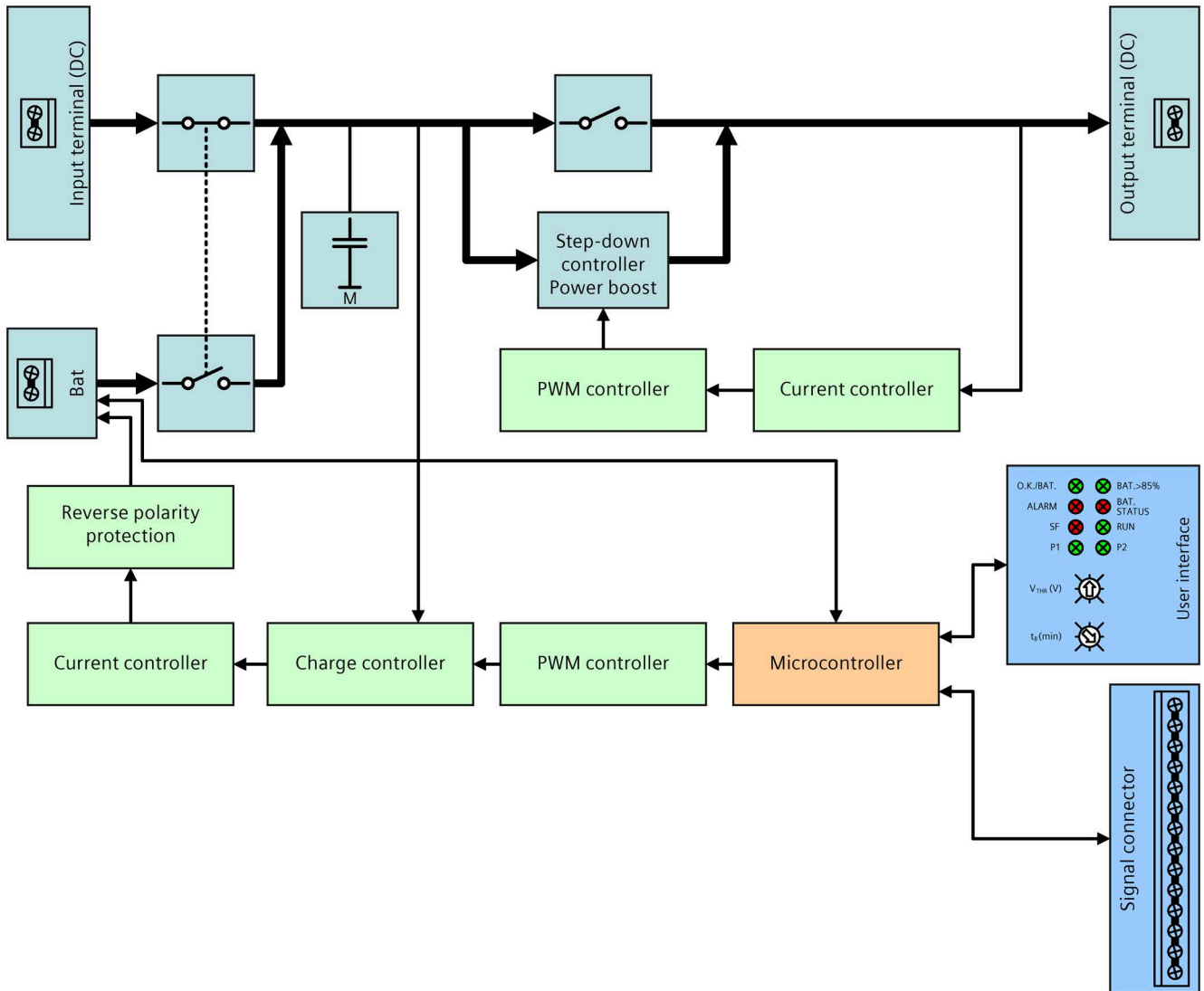
Figure 2-22 Example 6EP4131-0GB00-0AY0

States of the LEDs

Signaling	6EP4131-0GB00-0AY0 (1.2 Ah) 6EP4132-0GB00-0AY0 (2.5 Ah) 6EP4133-0GB00-0AY0 (3.2 Ah)	6EP4133-0JB00-0AY0 (5 Ah) 6EP4134-0GB00-0AY0 (7 Ah) 6EP4135-0GB00-0AY0 (12 Ah)
○ Off	Module runs up, DC-UPS defective (critical hardware fault)	
● Green	Battery module OK	
✱ Flashing yellow (1/1)	Battery outside the permitted temperature range	
● Yellow	Selected buffer time cannot be attained	
● Red	Battery module fault, maintenance required (incorrect polarity, battery module not connected, high ohmic battery module connection, battery deep discharged, fuse defective/ruptured, asymmetrical cell voltage, battery R test unsuccessful)	

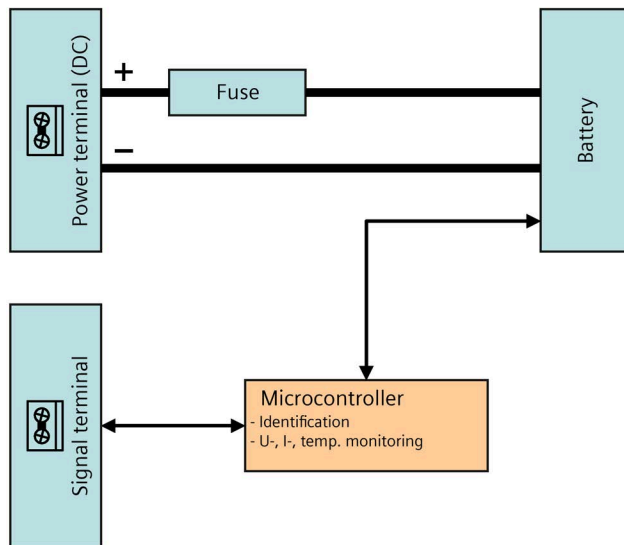
2.5 Block diagram

2.5.1 SITOP UPS1600

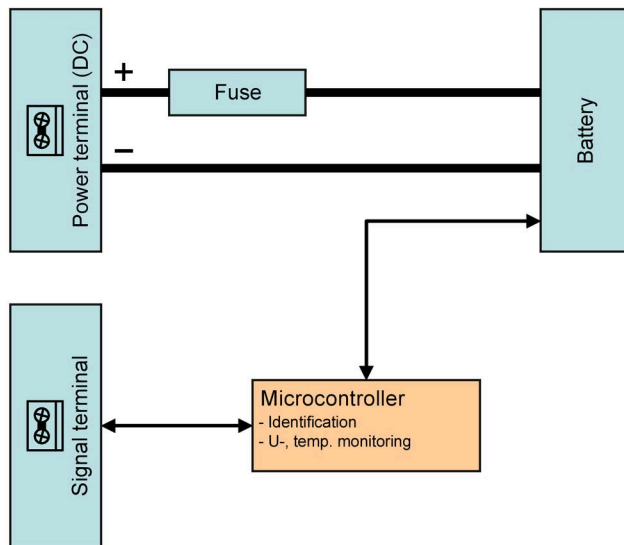


2.5 Block diagram

2.5.2 SITOP BAT1600



2.5.3 SITOP UPS1100



2.6 Dimensions and weight

2.6.1 SITOP UPS1600

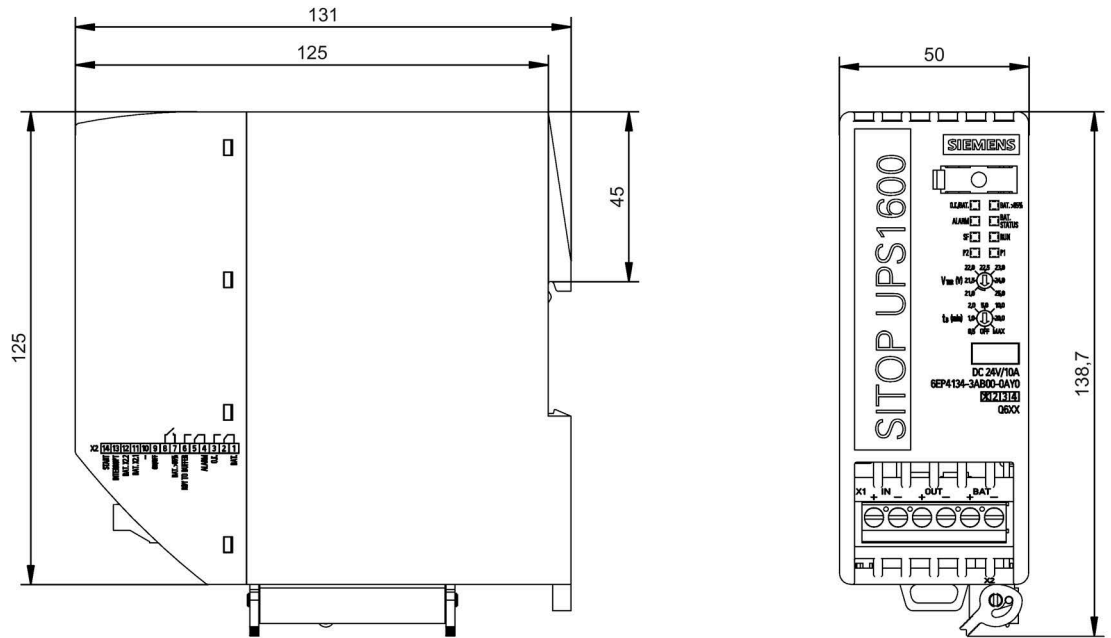


Figure 2-23 Dimension drawing 6EP4134-3AB00-0AY0, 6EP4134-3AB00-1AY0, 6EP4136-3AB00-0AY0, 6EP4136-3AB00-1AY0

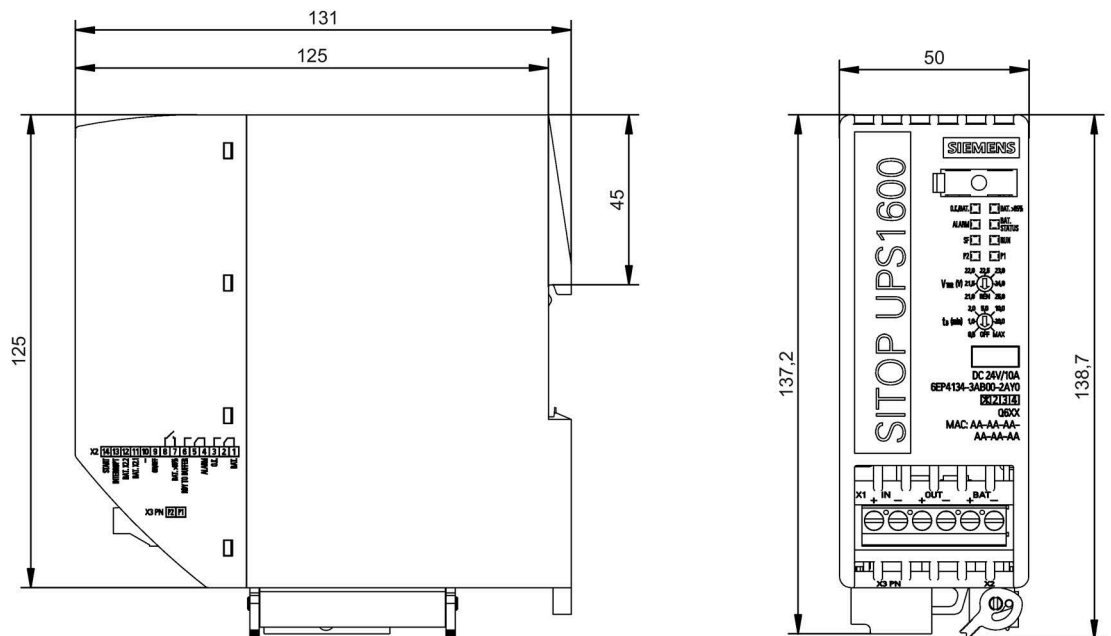


Figure 2-24 Dimension drawing 6EP4134-3AB00-2AY0, 6EP4136-3AB00-2AY0

2.6 Dimensions and weight

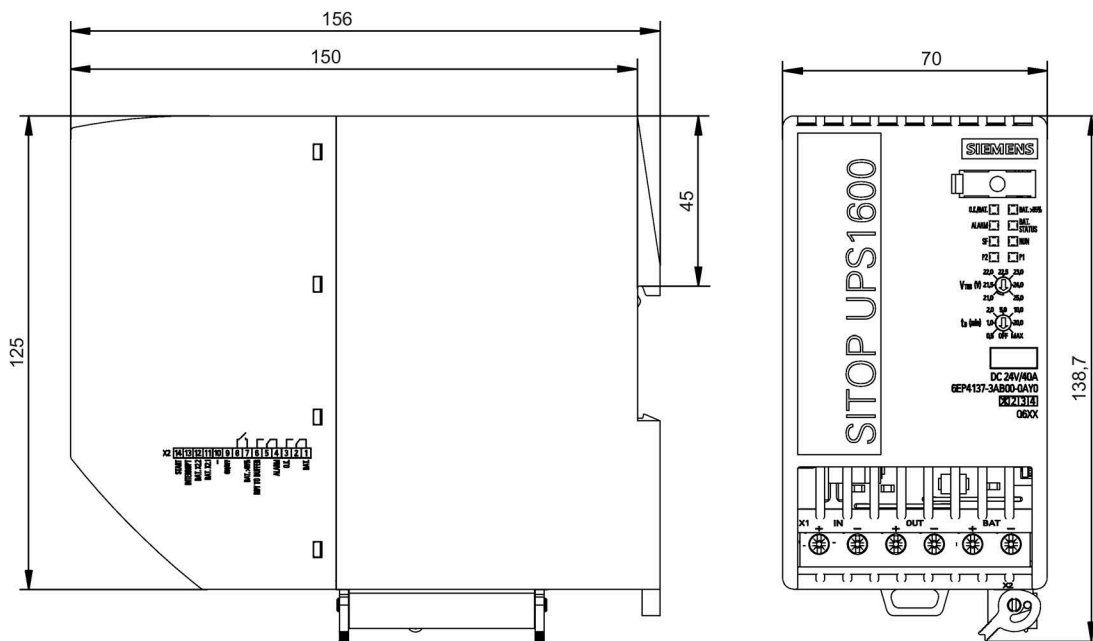


Figure 2-25 Dimension drawing 6EP4137-3AB00-0AY0, 6EP4137-3AB00-1AY0

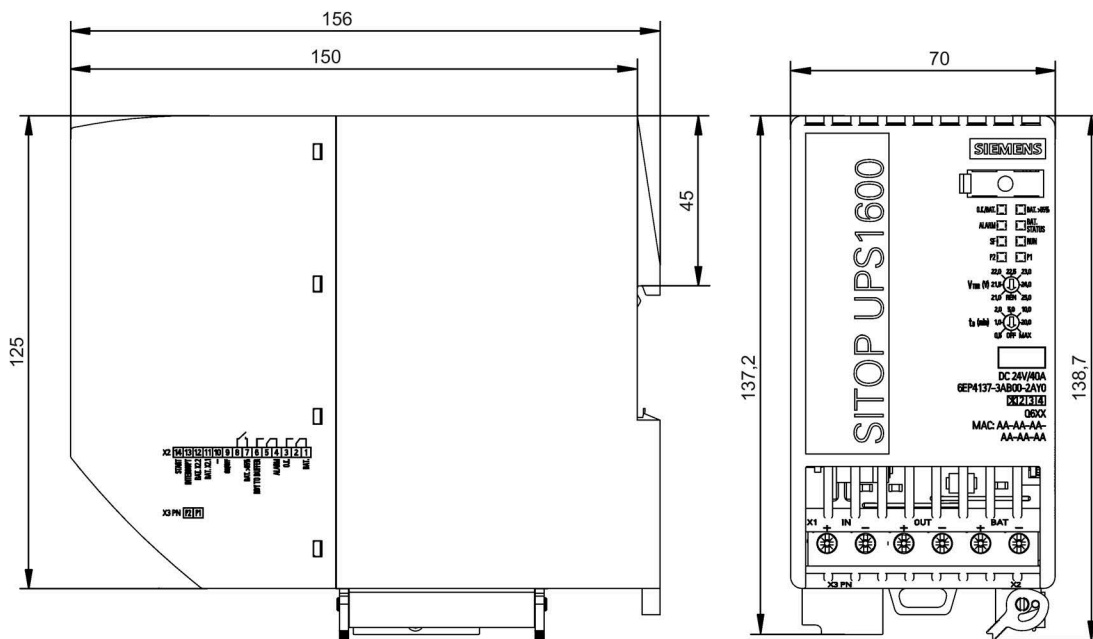


Figure 2-26 Dimension drawing 6EP4137-3AB00-2AY0

	6EP4134-3AB00-0AY0	6EP4134-3AB00-1AY0	6EP4134-3AB00-2AY0
Dimensions (W × H × D) in mm	50 × 138.7 × 125	50 × 138.7 × 125	50 × 138.7 × 125
Weight	Approx. 0.38 kg	Approx. 0.4 kg	Approx. 0.45 kg

	6EP4136-3AB00-0AY0	6EP4136-3AB00-1AY0	6EP4136-3AB00-2AY0
Dimensions (W × H × D) in mm	50 × 138.7 × 125	50 × 138.7 × 125	50 × 138.7 × 125
Weight	Approx. 0.39 kg	Approx. 0.41 kg	Approx. 0.45 kg

	6EP4137-3AB00-0AY0	6EP4137-3AB00-1AY0	6EP4137-3AB00-2AY0
Dimensions (W × H × D) in mm	70 × 138.7 × 150	70 × 138.7 × 150	70 × 138.7 × 150
Weight	Approx. 0.65 kg	Approx. 0.65 kg	Approx. 0.7 kg

2.6.2 SITOP BAT1600

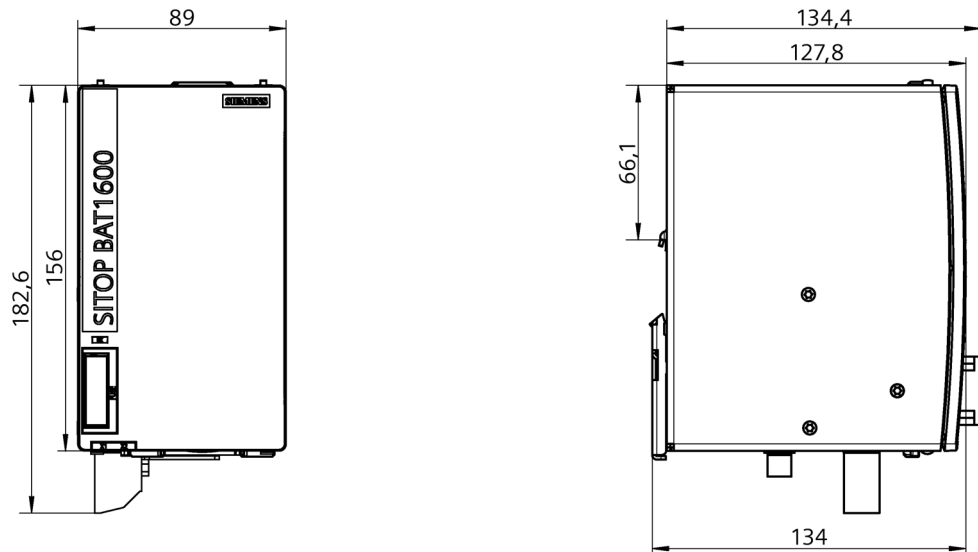


Figure 2-27 Dimension drawing 6EP4132-0JA00-0AY0 (2.5 Ah)

2.6 Dimensions and weight

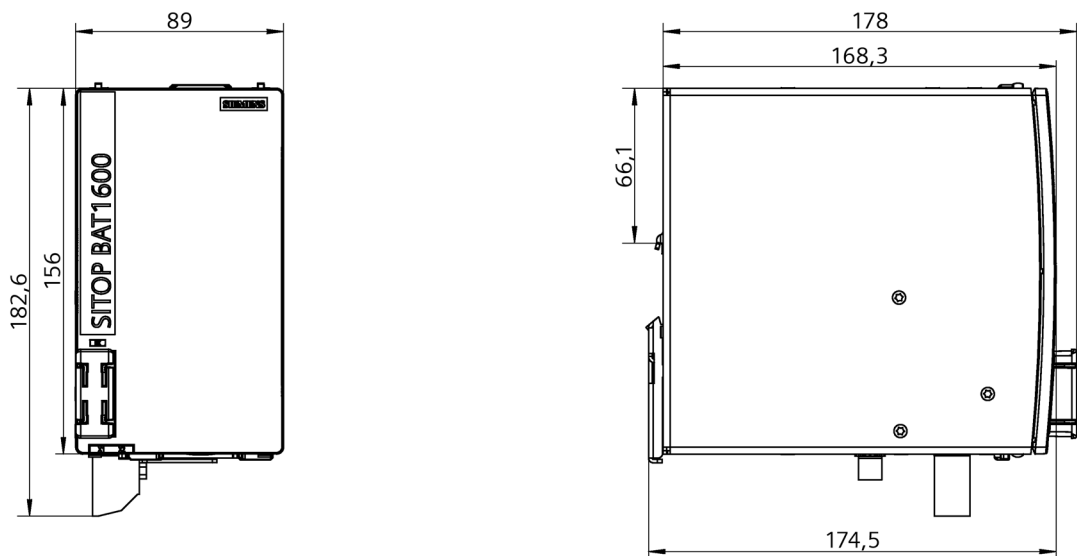


Figure 2-28 Dimension drawing 6EP4133-0GA00-0AY0 (3.2 Ah)

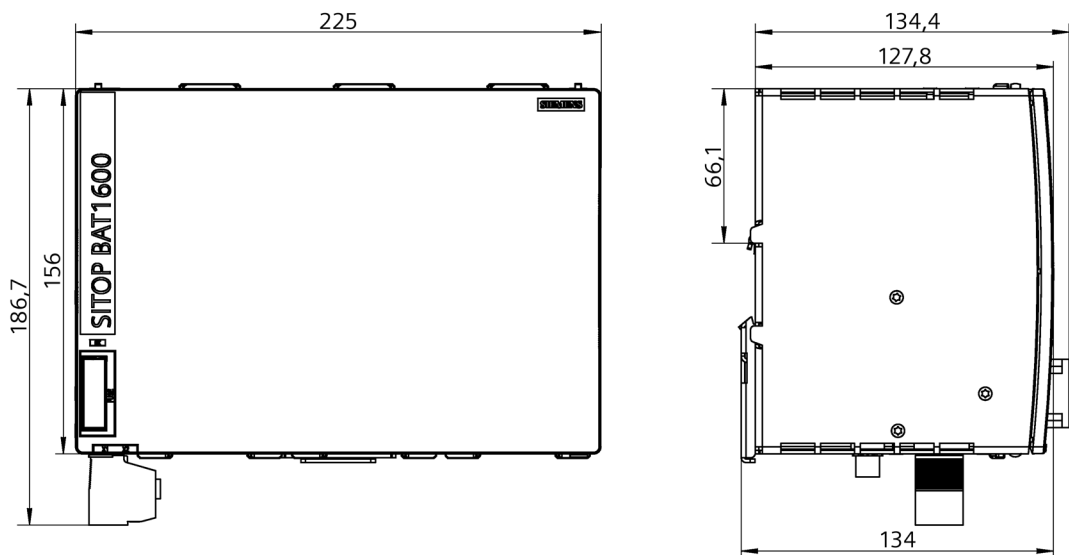


Figure 2-29 Dimension drawing 6EP4134-0JA00-0AY0 (7.5 Ah)

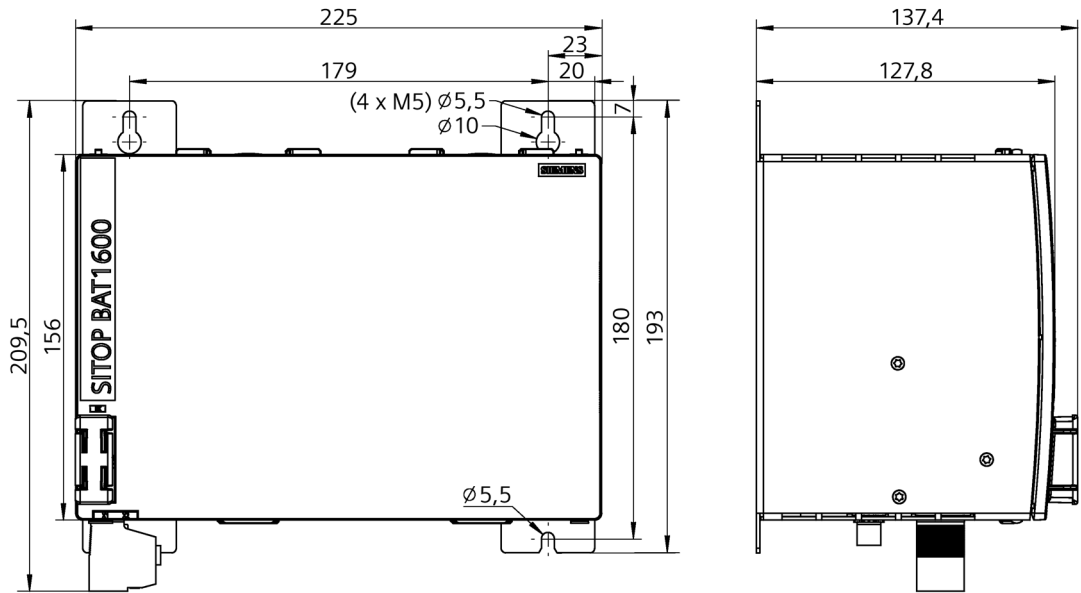


Figure 2-30 Dimension drawing 6EP4135-0GE00-0AY0 (12 Ah)

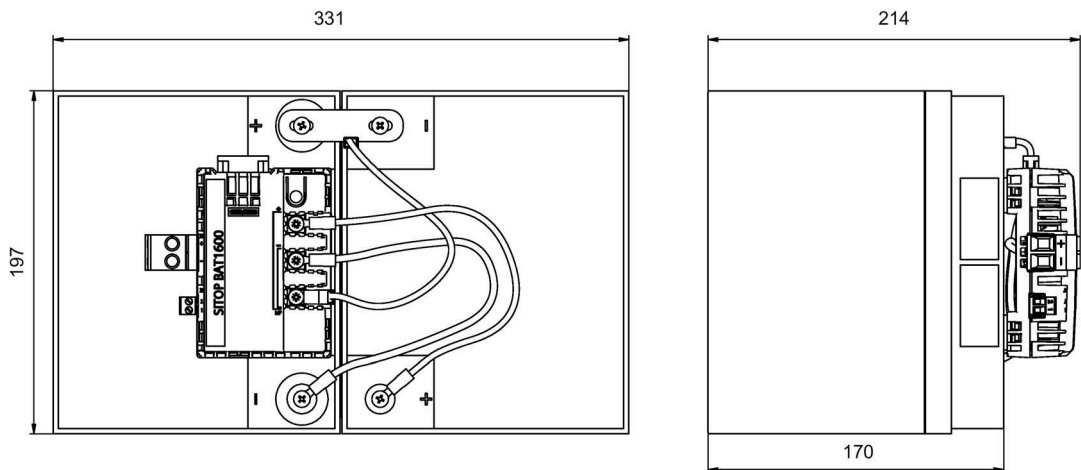


Figure 2-31 Dimension drawing 6EP4137-0GE00-0AY0 (38 Ah)

	6EP4132-0JA00-0AY0 (2.5 Ah)	6EP4133-0GA00-0AY0 (3.2 Ah)
Dimensions (W × H × D) in mm	89 × 156 × 135	89 × 156 × 178
Weight	2.1 kg	4.0 kg

	6EP4134-0JA00-0AY0 (7.5 Ah)	6EP4135-0GE00-0AY0 (12 Ah)	6EP4137-0GE00-0AY0 (38 Ah)
Dimensions (W × H × D) in mm	225 × 156 × 135	225 × 156 × 138	Battery monitor: 105 × 76 × 30 Batteries per unit: 165 × 170 × 197
Weight	4.7 kg	10.2 kg	Battery monitor: 0.5 kg Batteries per unit: 13.7 kg

2.6 Dimensions and weight

2.6.3 SITOP UPS1100

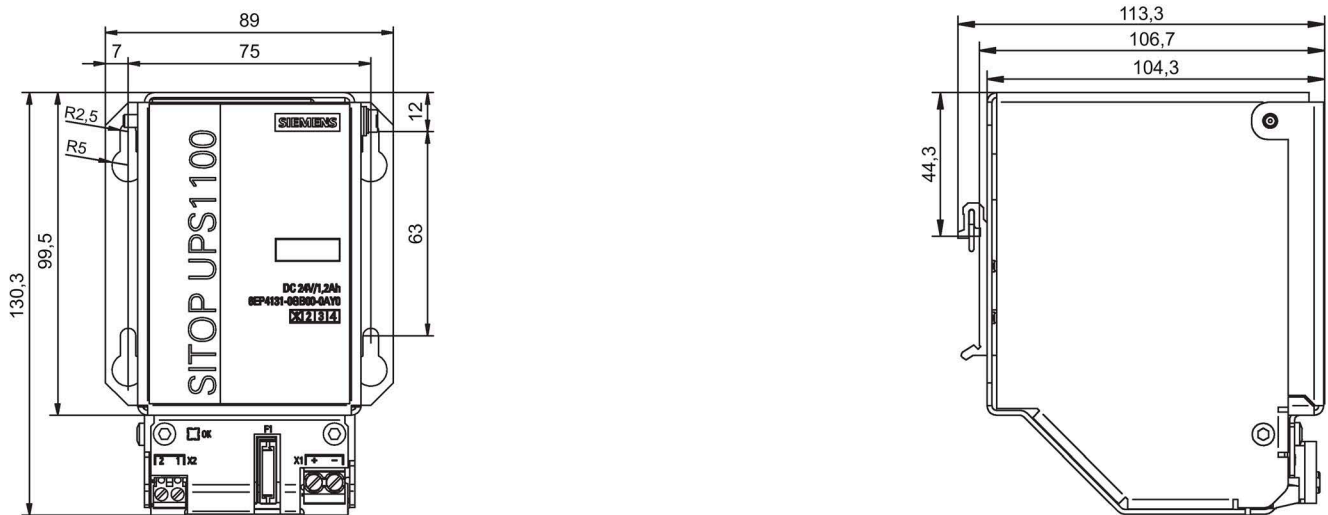


Figure 2-32 Dimension drawing 6EP4131-0GB00-0AY0

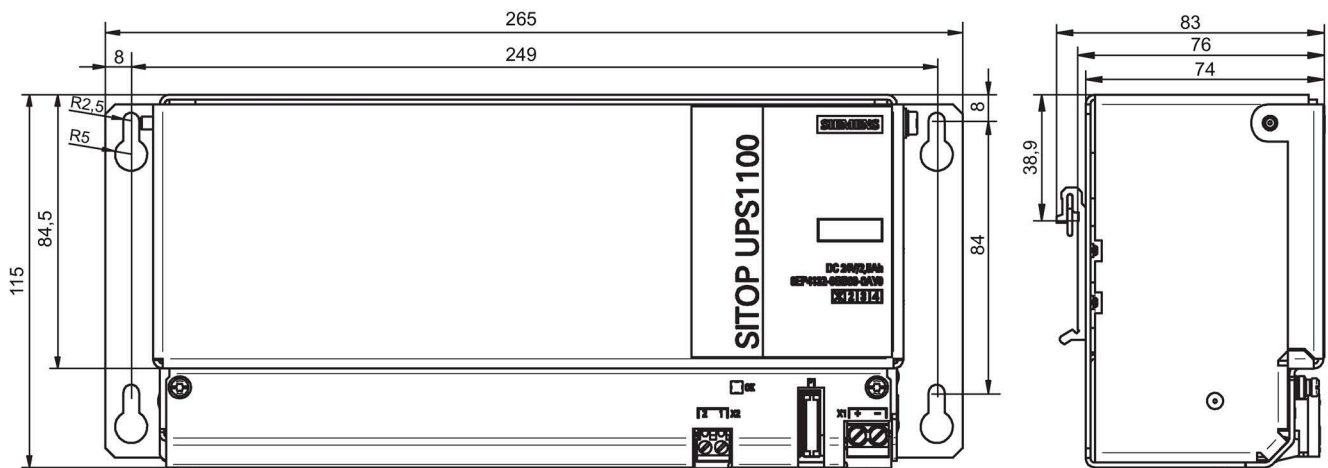


Figure 2-33 Dimension drawing 6EP4132-0GB00-0AY0

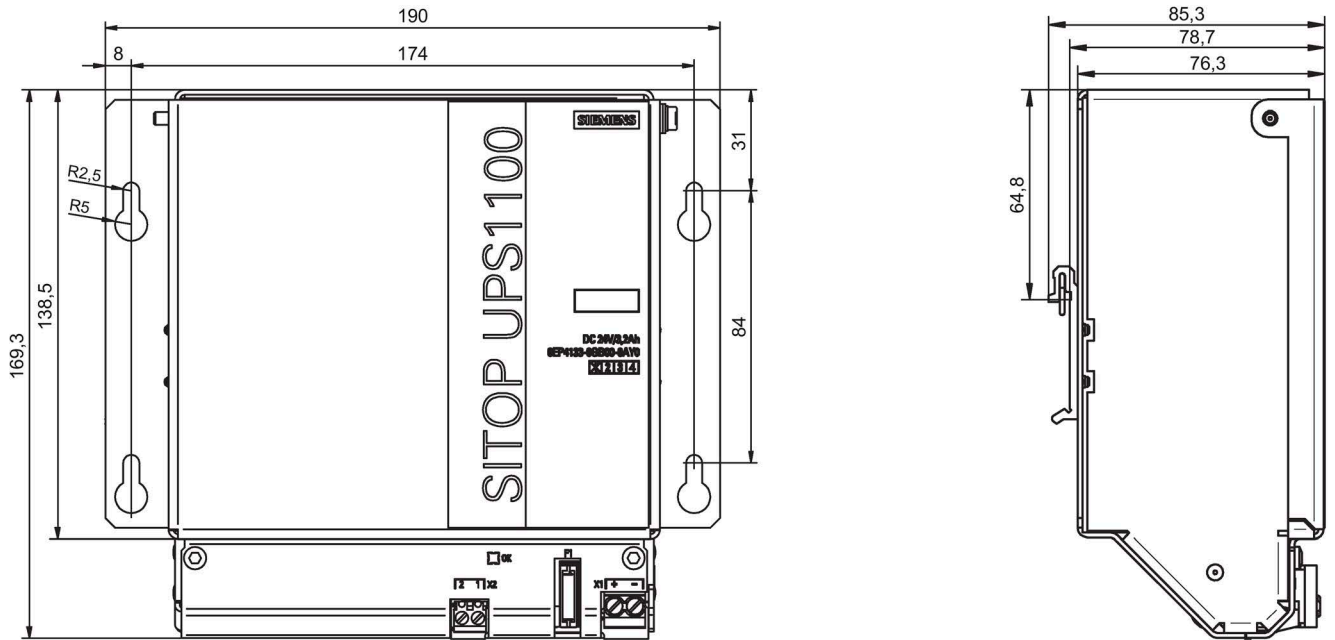


Figure 2-34 Dimension drawing 6EP4133-0GB00-0AY0

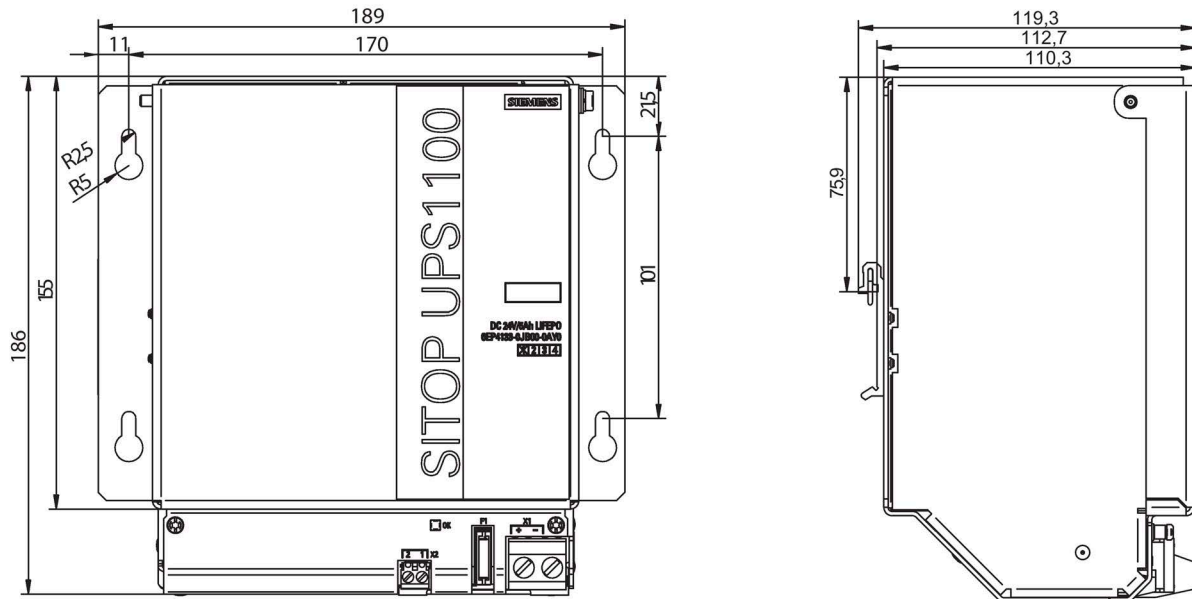


Figure 2-35 Dimension drawing 6EP4133-0JB00-0AY0

2.6 Dimensions and weight

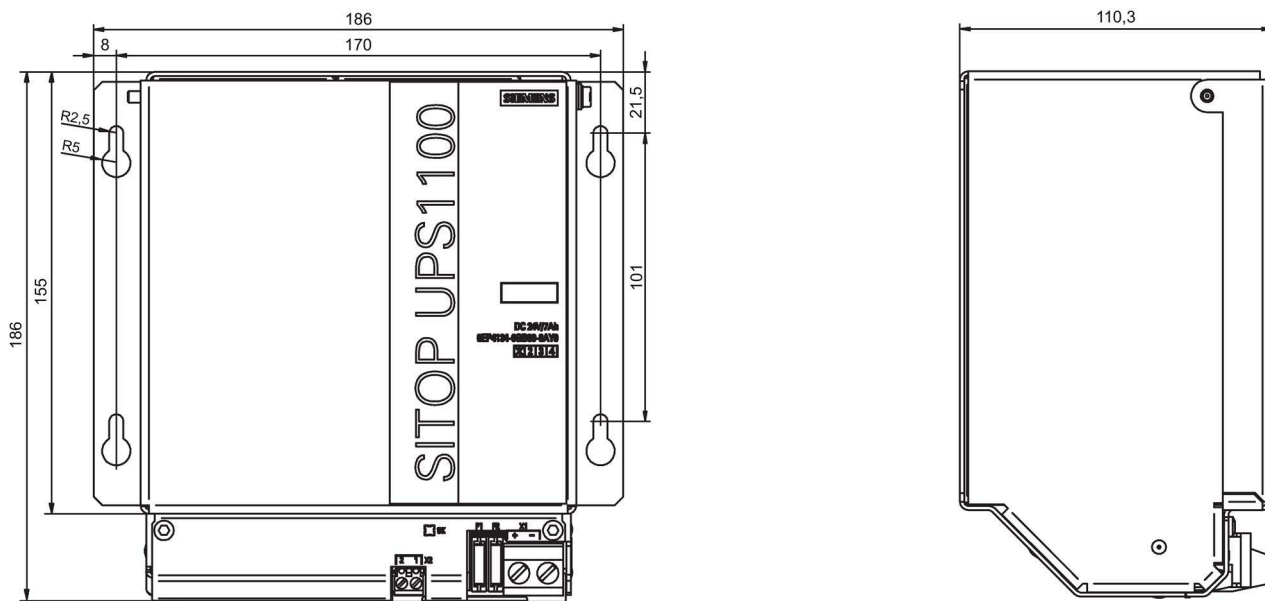


Figure 2-36 Dimension drawing 6EP4134-0GB00-0AY0

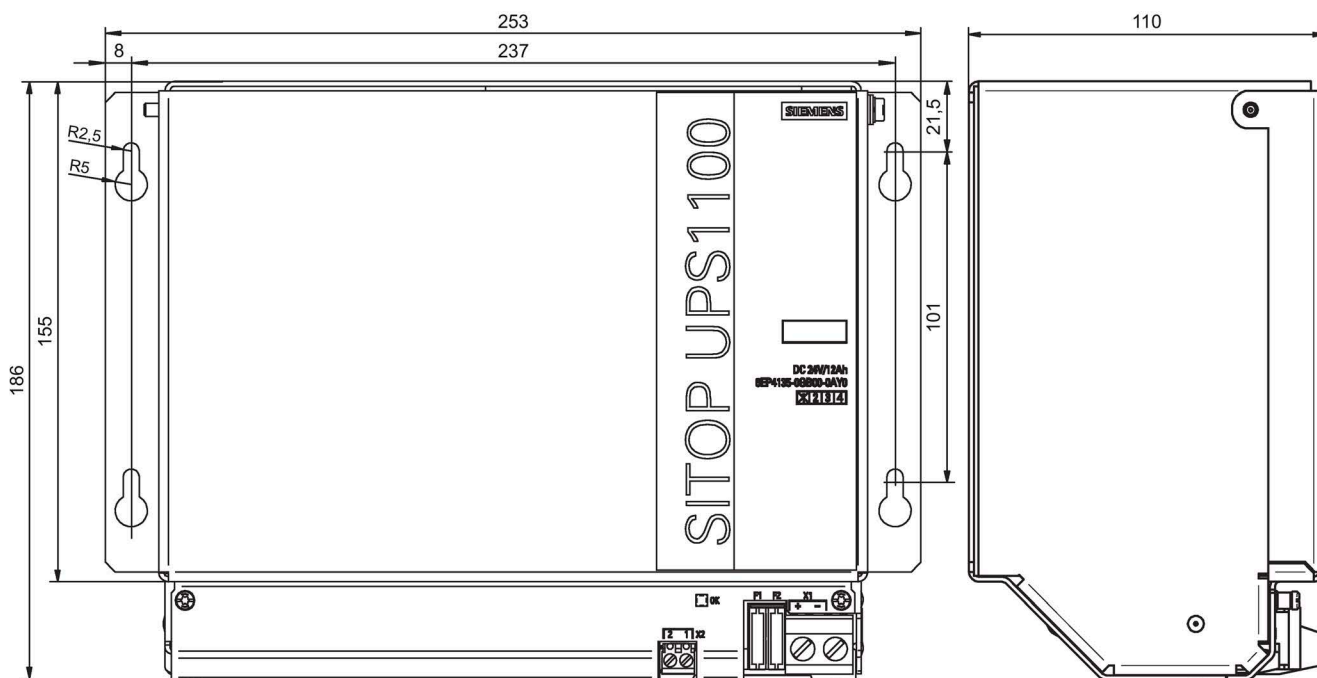


Figure 2-37 Dimension drawing 6EP4135-0GB00-0AY0

	6EP4131-0GB00-0AY0 (1.2 Ah)	6EP4132-0GB00-0AY0 (2.5 Ah)	6EP4133-0GB00-0AY0 (3.2 Ah)
Dimensions (W × H × D) in mm	89 × 130.3 × 106.7	265 × 115 × 76	190 × 169.3 × 78.7
Weight	Approx. 1.9 kg	Approx. 3.7 kg	Approx. 3.8 kg

	6EP4133-0JB00-0AY0 (5 Ah)	6EP4134-0GB00-0AY0 (7 Ah)	6EP4135-0GB00-0AY0 (12 Ah)
Dimensions (W × H × D) in mm	189 × 185.5 × 112.7	186 × 186 × 110.3	253 × 186 × 110
Weight	Approx. 3.4 kg	Approx. 6.1 kg	Approx. 9.8 kg

2.6 Dimensions and weight

Engineering and remote access

3.1 General

This section describes the software tools offered by Siemens that are compatible with SITOP UPS1600. The software tools are introduced with their functions, the associated requirements and the operation. The software products are:

- SIMATIC STEP 7 in the TIA Portal
- SIMATIC STEP 7
- SIMATIC PCS 7
- SITOP Manager
- Web server
- OPC UA

Functions of the individual software products

- **SIMATIC STEP 7 in the TIA Portal**
To use the SITOP UPS1600 in SIMATIC STEP 7 in the TIA Portal, it must have first been saved to the hardware catalog. This can be realized by installing the relevant Hardware Support Package (HSP) or the GSDML file.
- **SIMATIC STEP 7**
SITOP UPS1600 can be used with SIMATIC STEP 7 from Version 5.5 and higher. After SITOP UPS1600 has been saved to the hardware catalog of STEP 7, it can be integrated into projects, parameterized and diagnosed.
- **SIMATIC PCS 7**
SITOP UPS1600 can be used with SIMATIC PCS 7 from Version 8.2 SP1. After SITOP UPS1600 has been saved in the hardware catalog and APL has been installed, it can be integrated in the project, parameterized and diagnostics performed.
- **SITOP Manager**
The SITOP Manager is the new tool for commissioning, engineering and monitoring at SITOP power supplies that are communication-capable. It is independent of engineering frameworks such as the SIMATIC TIA Portal or the SIMATIC PCS 7. The SITOP Manager replaces the UPS Manager tool.
- **Web server**
The web server is used to monitor the SITOP UPS1600. It operates independently of SITOP Manager and PROFINET access.
- **OPC UA**
The OPC UA server is used for monitoring and controlling the SITOP UPS1600. It operates independently of PROFINET and web server access.

Note

SIMATIC STEP 7 and the SITOP Manager cannot simultaneously access the SITOP UPS1600.

Note regarding the European regulation "General Data Protection Regulation" (GDPR)

The SITOP UPS1600 does not save and does not use any personal data.

Please carefully ensure that only personal data absolutely required for the correct functioning of your application are saved to the device. Carefully ensure that data is not saved to the device, which would permit unnecessary or undesirable conclusions or inferences to be made to people - such as for example logins with real names - or contact data that is no longer anonymous (telephone numbers, email addresses, location data, etc.).

3.2 Addressing (MAC address)

In a network, the SITOP UPS1600 is addressed using its physical MAC device address. This is printed on the front side of the basic device.

Further, the basic devices are equipped with a 2 port switch, which can also be identified using the following MAC addresses in the network:

- **Ethernet port 1:** MAC address of the basic device + "1"
- **Ethernet port 2:** MAC address of the basic device + "2"

3.3 Overview of application examples

At our support web site you can find the following application example to parameterize the SITOP UPS1600 uninterruptible power supply:

- "SITOP UPS1600: Graphic blocks and STEP 7 communication blocks" to integrate SITOP UPS1600 into an automation system :
(<https://support.industry.siemens.com/cs/ww/en/view/78817848>)

3.4 SIMATIC STEP 7 in the TIA Portal

3.4.1 Introduction

In SIMATIC STEP 7 in the TIA Portal, the basic unit SITOP UPS1600 and its battery modules SITOP BAT1600 or SITOP UPS1100 can be integrated in projects, parameterized and diagnosed.

Note

If you use SIMATIC STEP 7 in the TIA Portal, and the SITOP UPS1600 version to be configured is not supported, then you must install the appropriate Hardware Support Package (HSP) or the appropriate generic station description file (GSD) in order to be able to use the SITOP UPS1600 and the supplementary modules.

You can find more information at Installing the Hardware Support Package (HSP) (Page 63) or Installing the generic station description file (GSD) (Page 64).

3.4.2 Installing the Hardware Support Package (HSP)

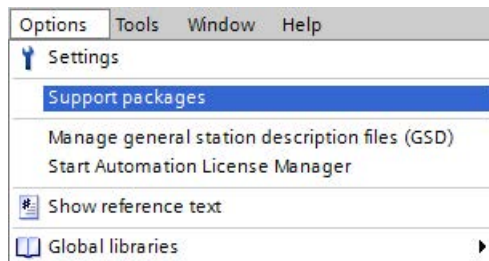
Note

The HSP is available at our SITOP-homepage (<http://www.siemens.com/sitop-ups1600>) or directly at (<https://support.industry.siemens.com/cs/ww/de/view/72341852/en?dl=en>).

Procedure

To install the Hardware Support Package, proceed as follows:

1. Start STEP 7 in the TIA Portal.
2. In the "Options" menu, click on "Support Packages".



Dialog "Detailed information" opens.

All Support Packages from the directory that you specified as storage location for Support Packages in the settings are listed in a table.

3. You have the following possibilities to install the Hardware Support Package:
 - If the support package is already available on your computer or on a connected data storage medium, you can add it to the list using "Add from file system".
 - If you want to add a Support Package from the "Service & Support" page in the Internet, download it with "Load from the Internet".
You can then add it to the file system.
4. Select the support package that you want to install.
5. Click on "Install", and follow the instructions of the installation program. During the installation you will be prompted to close all TIA Portal instances.
6. Close all TIA Portal instances and click on "Continue".
7. After the Support Package has been installed, the TIA Portal is reinitialized by clicking on "Restart".

The installed devices are imported into the module catalog and can then be integrated in the project.

You can find SITOP UPS1600 in the hardware catalog under "Power supply and distribution\Power supplies\SITOP UPS\UPS1600".

Note

You can find more information on installing hardware support packages in the manual of your STEP 7 software.

3.4.3 Installing the generic station description file (GSD)

Note

The GSD is available at our SITOP-homepage (<http://www.siemens.com/sitop-ups1600>) or directly at (<https://support.industry.siemens.com/cs/ww/en/view/75854605>).

Preconditions

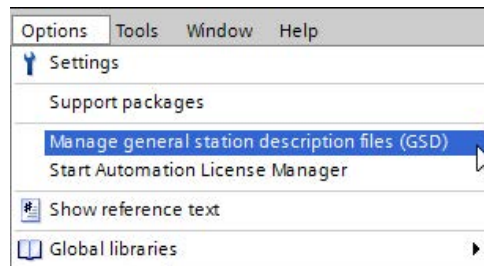
- You know where the GSD file is saved.

Procedure

To install the generic station description file, proceed as follows:

1. Download the GSD file from the Internet.
2. Start SIMATIC STEP 7 in the TIA Portal.

3. In the project view, click in the menu "Options" on "Install general station description file (GSD)" or "Manage general station description file (GSD)".



The "Manage general station description file (GSD)" dialog is opened.

4. Select the source path under which you locally saved the GSD file that you downloaded.
5. Select the GSD file.
6. Click on "Install", and follow the instructions of the installation program.

The installed devices are imported into the module catalog and can then be integrated in the project. You can find the UPS1600 in the hardware catalog at "Other field devices\PROFINET IO\I\O\Siemens AG\UPS1600".

3.4.4 Inserting SITOP UPS1600 into a project

To be able to use SITOP UPS1600, you must assign it as IO device to an IO controller (SIMATIC S7 control). Further, SITOP UPS1600 can be equipped in the project with one or several SITOP BAT1600 or SITOP UPS1100 battery modules.

The main views used to configure the SITOP UPS1600 are the Network view and the Device view.



Note

More information on the Network view and Device view, as well as the Topology view is available in the manual for your STEP 7 software.

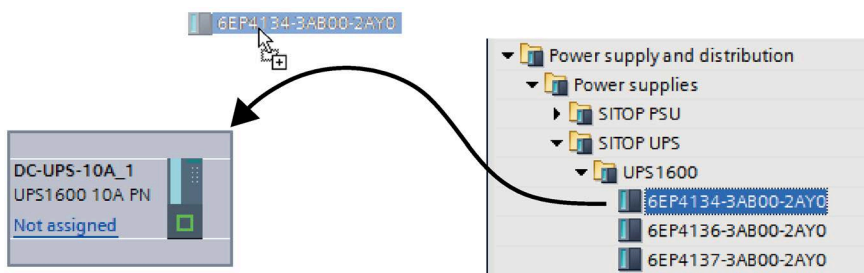
Preconditions

- The hardware support package or the general station description file of the SITOP UPS1600 has been installed.
- STEP 7 in the TIA Portal has been opened, and a project with an IO controller (SIMATIC S7 control) has been created.

Inserting SITOP UPS1600 from the hardware catalog

1. Open the network view.
2. Open the "Hardware catalog" task card.

3. **If you use the SITOP UPS1600 with the hardware support package:**
In the "Catalog" palette, navigate to SITOP UPS1600 under "Power supply and distribution\Power supplies\SITOP UPS\UPS1600".
4. **If you use the SITOP UPS1600 with the generic station description file:**
In the "Catalog" palette, navigate to the SITOP UPS1600 under "Other field devices\PROFINET IO\O/SIEMENS AG\UPS1600".
5. Select the required SITOP UPS1600 with a mouse click.
In the "Information" area you can see information about the selected SITOP UPS1600, and if necessary change the preselected version.
6. Drag the SITOP UPS1600 and drop it into the Network view.



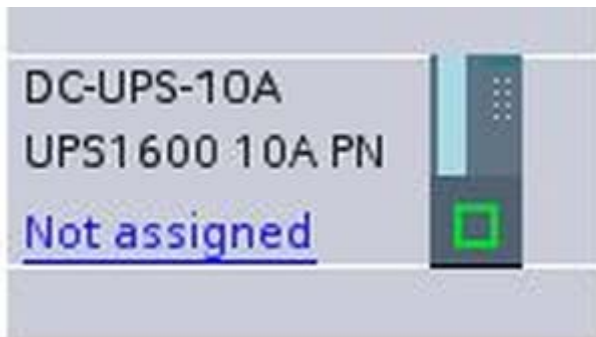
Alternatively, you can add the module to the Network view by double-clicking on the entry in the hardware catalog.

You have now inserted the SITOP UPS1600 into the project. The rectangle displayed in the network view symbolizes the SITOP UPS1600.

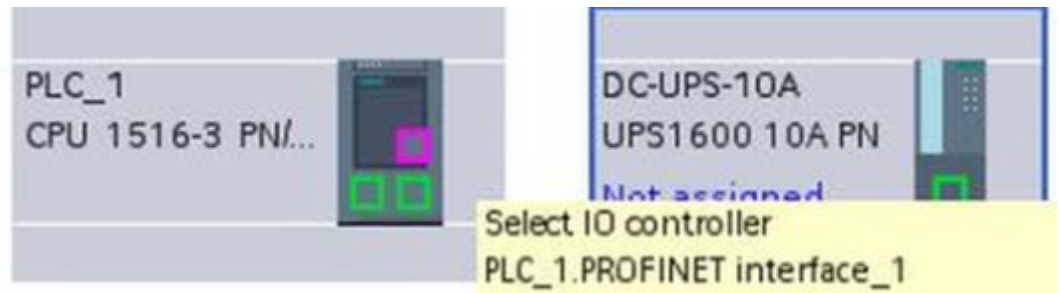
3.4.5 Assigning the SITOP UPS1600 to a controller

To be able to use the SITOP UPS1600 you must assign an IO controller as IO device.

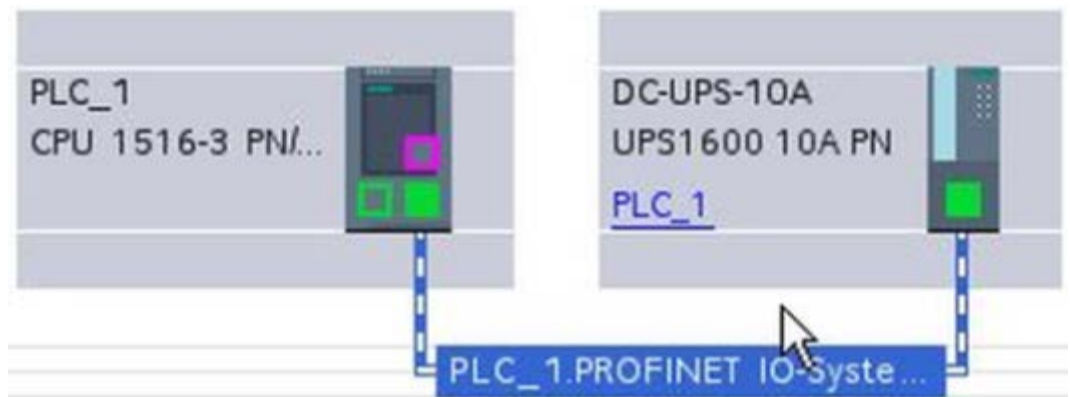
1. Click in the network view on the blue lettering "Not assigned" at the left next to the symbol of the SITOP UPS1600.



A menu opens with the available controllers.



2. Select a controller in the menu.
3. Select the connection between the controller and SITOP UPS1600.



4. Make the required settings in the "Network data".
5. Double-click on SITOP UPS1600 to display it in the device view.
6. Select the PROFINET interface.



7. Under "Ethernet addresses" in the inspector window enter the IP address of the SITOP UPS1600, which was already assigned in the TIA Portal.

You have assigned a controller to the SITOP UPS1600.

3.4.6 Assigning SITOP BAT1600 / UPS1100 battery modules to the basic unit SITOP UPS1600

The basic functions of the uninterruptible power supply are available with all of the battery modules that are compatible with the SITOP UPS1600. The SITOP UPS1100 5 Ah LiFePO4 battery is only supported by SITOP UPS1600 from software version V2.1; all SITOP BAT1600 battery modules first from software version V2.4.

Additional functions are available with battery module SITOP BAT1600 or SITOP UPS1100:

- Automatic detection of the battery module rated values
- Automatic management of up to six battery modules
- Temperature-controlled charging
- Charge status display
- Battery status (battery health) status display for SITOP BAT1600
- Diagnostics using the SITOP Manager and the web server

Using an example, in the following steps you are shown how the SITOP UPS1600 is assigned a battery module.

Note

Only SITOP BAT1600 or SITOP UPS1100 battery modules of the same type can be added to the slots of a SITOP UPS1600.

The number of battery modules that can be configured is limited to six. The description is only applicable to devices that were linked to via the HSP.

Preconditions

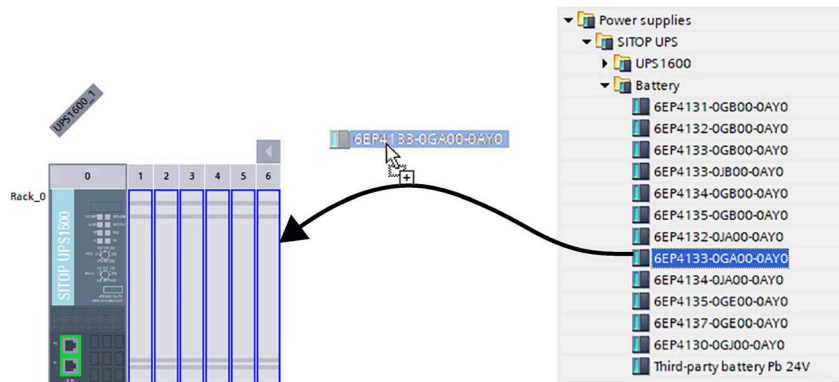
- STEP 7 in the TIA Portal has been opened and a project has been created.
- A SITOP UPS1600 has been integrated in the project.

Procedure

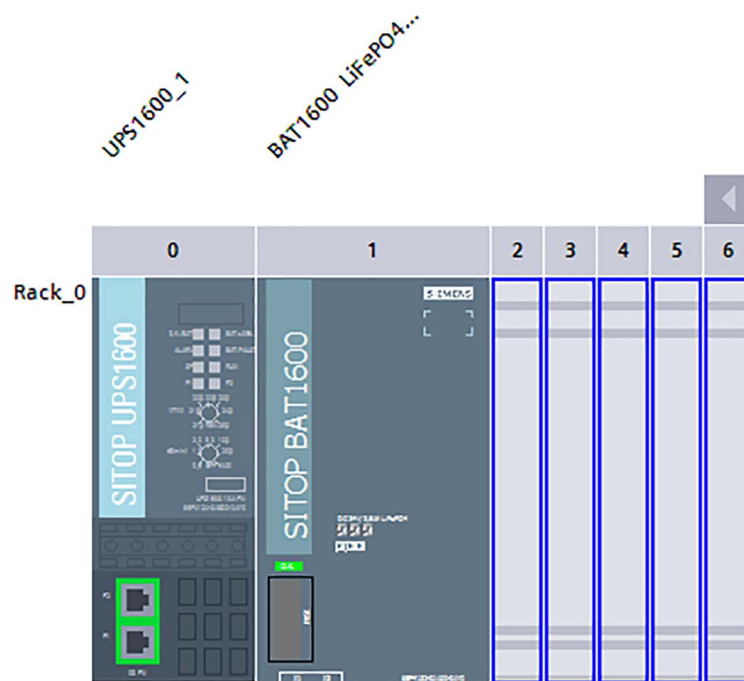
The procedure is only applicable for devices integrated using HSP.

1. In the device view, select the SITOP UPS1600 basic unit.
2. In the Hardware catalog, navigate to the SITOP BAT1600/UPS1100 battery modules under "Power supply and distribution\Power supplies\SITOP UPS\UPS1100".
3. Select the required battery module in the hardware catalog.
In the "Information" area you can see information about the expansion module, and when necessary you can change the preselected (default) version.

4. Drag the battery module and drop it into the Device view.
Alternatively, the battery module can be added by double-clicking on the entry in the hardware catalog.



5. Drag the battery module and drop at the first free slot to the right next to the SITOP UPS1600.
The battery module is inserted at the selected slot.



6. Save the hardware configuration.

You have assigned a battery module to the basic unit SITOP UPS1600.

How you change the number and type of SITOP BAT1600 or SITOP UPS110 battery modules used is described under Parameterizing UPS1600 with STEP 7 in the TIA Portal (Page 70).

The operating parameters for third-party batteries can be adapted under properties in Section "Device configuration/energy storage".

3.4.7 Parameterizing the UPS1600

The adjustable parameters of the SITOP UPS1600 can be found in STEP 7 in the TIA Portal in the inspector window under Properties when the appropriate device was selected.

For parameterization, in the area navigation, the settings under "Device configuration" ("Base Unit", "Energy storage") and "Web server" are relevant.

Navigation area			Description
Device configuration	Base Unit	Buffering	All parameters, which involve the behavior of SITOP UPS1600 when buffering
		Signaling	Setting of the alarm signaling and the wait time for stable input voltage.
		Charging	Charging the battery
	Energy storage	-	Parameters for the battery modules used

Navigation area		Description
Web server	General	Defines whether it is permissible to access SITOP UPS1600 via the web server (yes / no) Activate the web server on this module Activate automatic logoff Access only via HTTPS
	Automatic update	Activate automatic update Activation interval

Navigation area			Description
OPC UA server	General	OPC UA Server activated	Here, activate the OPC UA server.
		OPC UA server port	Specify which port should be used.
	Security Policies	Activation of anonymous access	
		No security	If the option is activated, then unencrypted access via the OPC UA client is possible. Activating the option is not recommended.
		Basic128 - Sign & Encrypt	Allow Basic128 security profile for OPC UA communication.
		Basic256 - Sign & Encrypt	Allow Basic256 security profile for OPC UA communication.
		Basic256Sha256 - Sign & Encrypt	Allow Basic256Sha256 security profile for OPC UA communication.

Navigation area		Description
NTP client	NTP client activated	Here, activate the NTP client.
	NTP server Address 1 ... 4	Enter up to 4 addresses for an NTP server.

Navigation area		Description
PROFINET security	DCP write protection activated	Activate or deactivate write protection for configuration changes via the DCP protocol

A detailed description of the individual parameters of the subgroups is contained in the associated section under Parameterizing the UPS in STEP 7 in the TIA Portal (Page 70).

The procedure is the same for all parameters. This section describes the general procedure to reach the configuration dialog, using as example the parameters for buffering. The individual parameters and their possible values are described in the following subsections.

Each parameter has a start value. A click on "Reset to initial values" resets all parameters of a subgroup to the associated start value.

Preconditions

- The SITOP UPS1600 was integrated in the opened project.

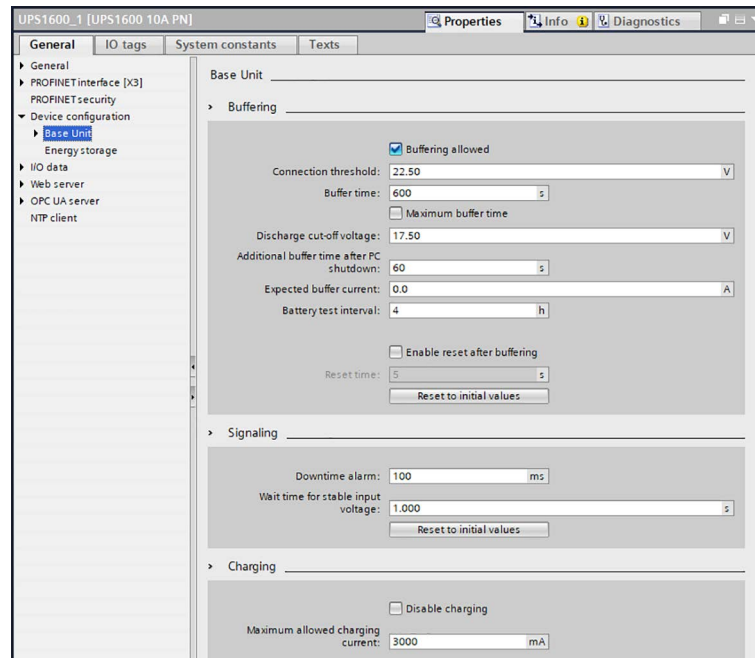
Procedure

1. Select the SITOP UPS1600 in the Device view.
2. In the inspector window select "Properties > General > Device configuration".

Entries for parameterization are provided in the navigation area.

3.4.7.1 Device configuration

Base Unit



Buffering

Parameter	Value range	Default setting
Buffering allowed	Yes / No	Yes
Connection threshold	21 - 25 V	22.5 V
Buffer time	1 - 32767 s	600 s
Maximum buffer time ¹⁾	Yes / No	No
Discharge cut-off voltage	18 - 23 V	18.5 V (for LiFePO4 battery 20.5 V)
Additional buffer time after the PC was powered down. ³⁾	1 - 300 s	60 s
Expected buffer current ¹⁾	0 - 40 A	0 A
Battery test interval ²⁾	1 - 65535 h	4 h
Enable reset after buffering	Yes / No	No
Reset time	1 - 120 s	5 s
Reset to initial values	-	-

¹⁾ Parameter only available from SW version V2.0 and higher

²⁾ Parameter only available from SW version V2.1 and higher

³⁾ Valid from V2.0.4 or V2.1

- **Buffering permitted**

When the connection threshold is fallen below, selects whether the system is buffered or the output is shut down.

- **Switch-in threshold**

Setting the switch-in threshold.

- **Buffer time**

Length of time during which the system should be buffered by the SITOP UPS1600.

- **Maximum buffer time**

The setting means that buffering is realized for as long as possible. The device only shuts down when the battery has discharged down to the defined stop buffering voltage. The value entered for the "Buffer time" parameter is not relevant in this case.

- **Discharge cut-off voltage**

Voltage at which battery discharge is exited. For a system battery (SITOP BAT1600 or SITOP UPS1100) the discharge cut-off voltage defined for this type is always used.

- **Additional buffer time after PC shutdown**

Time during which the system should be buffered by the SITOP UPS1600 after the PC was shut down.

- **Expected buffer current**
Load current, which is expected at the device output during buffer mode. Please adjust the correct application load current required. For current settings between 0 A and rated current, the display in the diagram "Remaining buffer time" is adapted. If a value of 0 A is entered, then for this parameter, the average value of the actual load current measured at the output over the last 10 min is assumed. The value of this parameter is used when calculating the remaining buffer time. The entered value may not exceed the rated device current.

Note

From the instant in time when the SITOP UPS1600 is switched over into the buffer mode, the buffer current actually measured is used to determine the expected buffer time instead of the expected buffer current.

- **Battery test interval**
Interval between performing battery tests.
- **Activate reset after buffering**
If this option is activated, the output voltage is interrupted after the selected buffer time expires if, in the meantime, the input voltage returns. This option is useful, when, for example, computer networks are protected by the UPS that can be activated by a reset when the power supply is restored. For buffer time "MAX", the output voltage is not interrupted.
- **Reset time**
Duration of the output voltage interruption.
- **Reset to initial values**
Reset all parameters of this area to default setting values.

Signaling

Parameter	Value range	Default setting
Downtime alarm	0 - 20,000 ms	100 ms
Wait time for stable input voltage	0.2 - 65 s	1.0 s
Reset to initial values	-	-

- **Downtime alarm**
The time in which no alarm is issued to the system although it is buffered.
- **Wait time for a stable input voltage**
Time where the input voltage must continually lie above the connection threshold so that buffering is exited and a transition is made into normal operation.
- **Reset to initial values**
Reset all parameters of this area to default setting values.

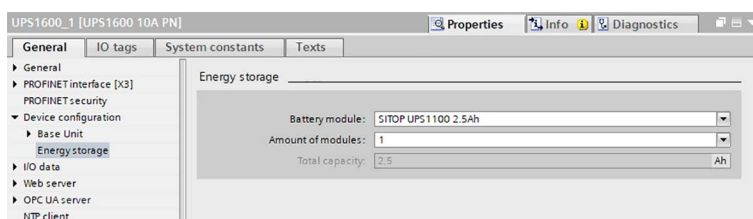
Charging

Parameter	Value range	Default setting
Deactivate charging	Yes / No	No
Maximum permissible charge current	3,000 mA / 4,000 mA / 5,000 mA	3,000 mA / 4,000 mA / 5,000 mA

- **Deactivate charging**
Shut down battery charging
- **Maximum permissible charge current**
Max. permissible current to charge the battery

Energy storage

The parameters in Section "Energy storage" are dependent on the battery type used. Configure the type of the battery module you are using SITOP BAT1600, SITOP UPS1100 or third-party battery.



Parameters when using a SITOP BAT1600 or SITOP UPS1100 battery module

Parameter	Value range	Default setting
Battery module	Drop-down menu with the SITOP BAT1600, SITOP UPS1100 battery modules or third-party battery saved by the HSP.	-
Number of modules	1 - 6	1
Total capacity	0 - 228 Ah	-

- **Battery module**
Type of SITOP BAT1600, SITOP UPS1100 battery modules or third-party battery
- **Number of modules**
Number of installed modules.
- **Total capacity**
Total capacity of the installed battery modules.

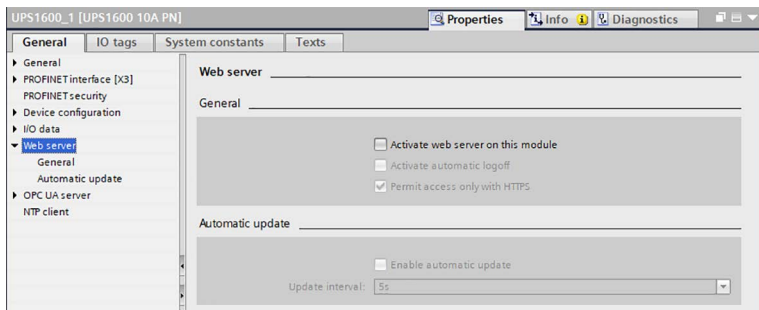
Parameters when using third-party batteries

Parameter	Value range	Default setting
Battery module	Drop-down menu with the SITOP BAT1600, SITOP UPS1100 battery modules or third-party battery saved by the HSP.	-
Battery type	Pb / pPb	Pb
Typical ambient temperature	-70 ... 100 °C	40 °C
Total capacity	0 - 3,200 Ah	10.0 Ah
End-of-charge voltage at 20 °C	24.0 - 30.0 V	27.3 V
Temperature coefficient	0 - 200 mV/K	36 mV/K
Battery constant voltage duration	0 - 720 h	12 h
Charge current	0.001 - 3 or 4 or 5 A	0.3 A
Start preserve charge voltage	23.0 - 30.0 V	25.2 V
Stop buffering voltage	18.0 - 23.0 V	18.5 V
Faulty battery voltage	1.0 - 18.0 V	6.0 V
Reset to initial values	-	-

- **Battery module**
Type of SITOP BAT1600, SITOP UPS1100 battery modules or third-party battery
- **Battery type**
Make/type of battery: Pb ... lead-gel battery, pPb ... pure lead battery
- **Typical ambient temperature**
Typical ambient temperature of the battery in operation
- **Total capacity**
Total capacity of the installed batteries.
- **End-of-charge voltage at 20 °C**
The end-of-charge voltage defines the maximum battery voltage during the charging phase. When reaching this end-of-charge voltage, the charging status changes from "constant current" into the "constant voltage" phase. The adjustable end-of-charge voltage is applicable for a battery ambient temperature of 20 °C. SITOP UPS1600 adapts the end-of-charge voltage corresponding to the connected SITOP BAT1600 or SITOP UPS1100 depending on the battery ambient temperature and the battery technology. For third-party batteries, the adaptation is based on configuration parameters battery type, typical ambient temperature and temperature coefficient.
- **Temperature coefficient**
Relative dependency of the end-of-charge voltage on the ambient temperature
- **Duration of the constant floating voltage charging phase**
Duration of the constant voltage charging phase

- **Charge current**
 The battery is only charged with maximum selected charge current during the "constant current" charging phase. When using system batteries, the charge current is automatically set, and is controlled by the temperature. When using third-party batteries, the permissible charge current specified by the battery manufacturer must be taken into consideration.
 Further, the following device-dependent values apply:
 - SITOP UPS1600 10 A: Maximum permissible charge current 3,000 mA
 Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 2,000 mA
 - SITOP UPS1600 20 A: Maximum permissible charge current 4,000 mA
 Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 3,000 mA
 - SITOP UPS1600 40 A: Maximum permissible charge current 5,000 mA
 Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 3,000 mA
- **Start preserve charge voltage**
Voltage value for the start of the preserve charge voltage
- **Stop buffering voltage**
 Buffering is interrupted when this threshold value is fallen below.
- **Faulty battery voltage**
 Batteries are considered to be defective when this threshold value is fallen below.
- **Reset to initial values**
 Reset all parameters of this area to default setting values.

3.4.7.2 Web server



Parameter	Value range	Default setting
Activate web server on this module	Yes/no	No
Activate automatic logoff	Yes/no	No
Permit access only with HTTPS	Yes/no	Yes
Enable automatic update	Yes/no	No
Update interval	0 / 5 s / 10 s / 20 s / 30 s / 60 s	0 = no automatic update

Set here whether access to the UPS via web server is permitted.

- **Activate web server on this module**
Define whether it is permissible that this device is accessed via the web server.
- **Activate automatic logoff**
When automatic logoff is activated, the logged on user (administrator or guest) is logged off.
- **Permit access only with HTTPS**
Define whether access is only permissible via HTTPS.
- **Activate automatic update**
When automatic update is activated, the web interface is populated with new data corresponding to the update interval.
- **Update interval**
Define the intervals in which the actual values are sent to the web server.

3.4.8 Loading the configuration (commissioning)

In the delivered state, the SITOP UPS1600 has not yet been assigned an IP address and the DHCP protocol is deactivated.

If the SITOP UPS1600 is connected with a controller for the first time (SIMATIC S7 controller) then the controller must assign a device name and an IP address to it. A new configuration can be loaded to the device using STEP 7 in the TIA Portal.

Identifying a SITOP UPS1600 in the network

From STEP 7 in the TIA Portal, you can get LED "SF" to flash at the SITOP UPS1600. This means that you can clearly identify a module in the network, e.g. if several SITOP UPS1600 are installed in the network.

Preconditions

- The SITOP UPS1600 has been correctly connected and linked with the network.
- PG/PC with STEP 7 in the TIA Portal is connected with the network.

Procedure

1. Open the "Online > Accessible nodes" menu.
2. As type of PG/PC interface, select "PN/IE".
3. Select the PG/PC interface connected with the system.
4. Select the connection with the Subnet, in which the SITOP UPS1600 is located.
All the available SITOP UPS1600 devices in the selected subnet are displayed.
5. Select the required SITOP UPS1600.

6. Activate checkbox "Flash LED" in menu "Online & diagnostics > Functions > Assign PROFINET device name".



7. Check at which SITOP UPS1600 in the network the "SF" LED flashes.

By checking the flashing LEDs, you can uniquely identify all SITOP UPS1600 in a network. Note the device name and the IP address of the required SITOP UPS1600 in order to load a configuration.

Changing the device name of the SITOP UPS1600

1. In STEP 7, in the tabular area of the Network view, select the "Network overview" table.
2. Overwrite the name in the "Device" column in the row of the PROFINET device involved.

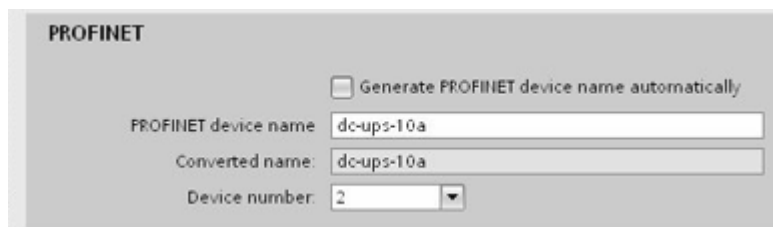
You have changed the name of the SITOP UPS1600 device.

The name is adapted in the graphical area of the network view.

Changing the PROFINET device name of the SITOP UPS1600 via the properties of the PROFINET interface

You can change the PROFINET device name using the properties of the PROFINET interface.

1. In the Network or Device view of the Hardware and Network editor of STEP 7, select the PROFINET interface of a PROFINET device.
2. In the Inspector window navigate to "Ethernet addresses" in the "PROFINET" area.
3. Deactivate the "Generate automatically the PROFINET device name" checkbox.
4. Enter the new PROFINET device name in the appropriate field.



Changing the IP address of the SITOP UPS1600

1. In the Network or Device view of the hardware and network editor from STEP 7 in the TIA Portal, select the PROFINET interface of a PROFINET device.
2. In the Inspector window, navigate to "Ethernet addresses" in the "IP protocol" area.
3. Check whether the "Set IP address in the project" option is activated.
4. Enter the new IP address in the appropriate field.

Loading the configuration to the SITOP UPS1600

To commission the UPS, you must load the project data that you created offline into the connected SITOP UPS1600. This project data results from the configuration of the hardware, networks and connections in STEP 7.

Initially, the complete project data is loaded. Only the changes are loaded for subsequent load actions.

Preconditions

- The project data is consistent.
- The device name must be identical offline and online.
- The SITOP UPS1600 is accessible online.
- The SITOP UPS1600 is located in the PROFINET IO system of an IO controller.
- The PG/PC is connected to the same network to which the SITOP UPS1600 and the controller are connected. The interface of the PG/PC must be set to TCP/IP.

Note

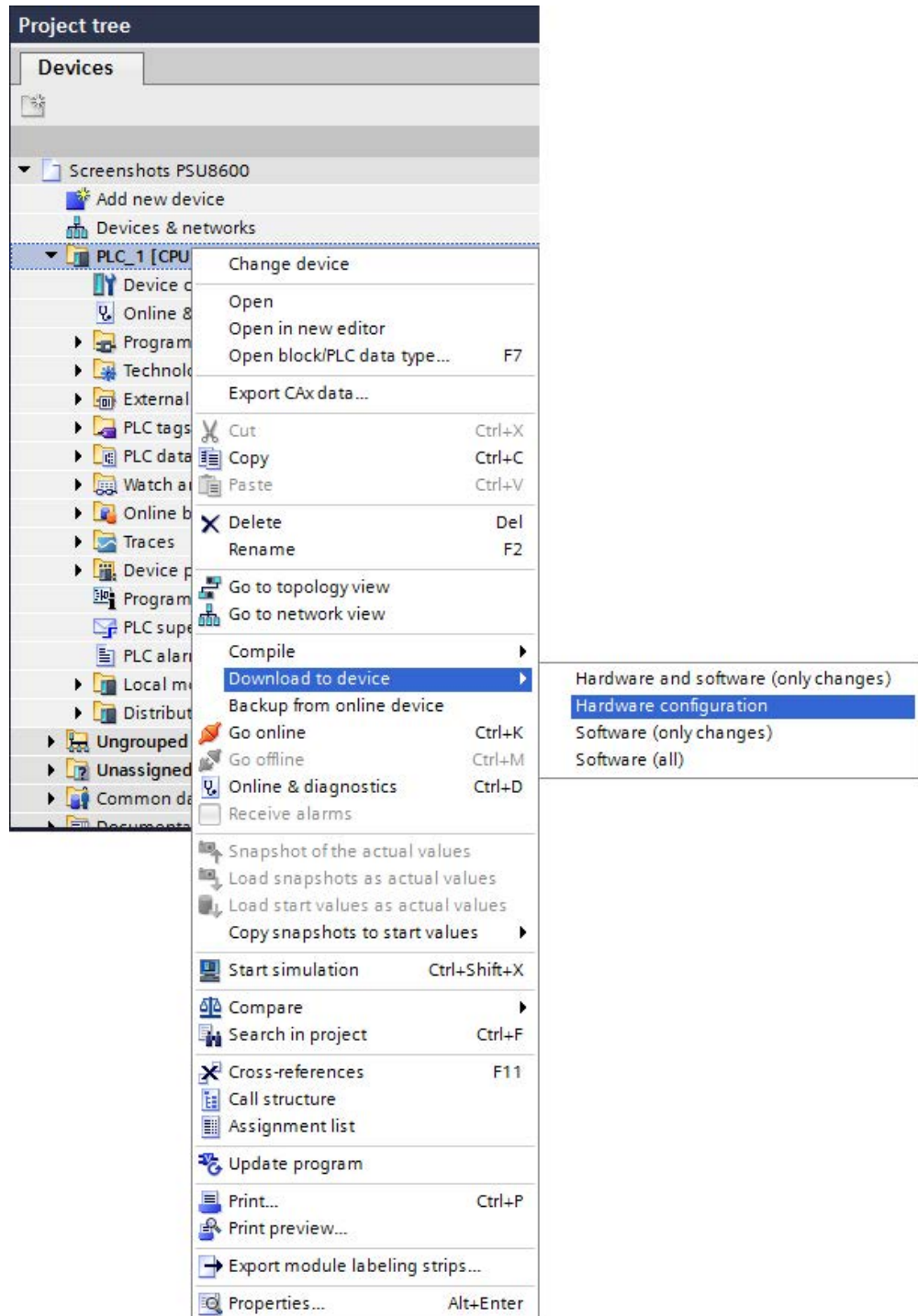
Ensure that the article number of the SITOP UPS1600 configured offline matches the article number of the device connected online. The following response is obtained after loading the configuration into the device:

Offline configured device Online connected device	UPS1600 10 A	UPS1600 20 A	UPS1600 40 A
UPS1600 10 A	Device status: OK Diagnostics status: OK	Device status: Fault Diagnostics status: Differences were identified (not accepted)	Device status: Fault Diagnostics status: Differences were identified (not accepted)
UPS1600 20 A	Device status: OK Diagnostics status: Differences were identified (accepted)	Device status: OK Diagnostics status: OK	Device status: Fault Diagnostics status: Differences were identified (not accepted)
UPS1600 40 A	Device status: OK Diagnostics status: Differences were identified (accepted)	Device status: OK Diagnostics status: Differences were identified (accepted)	Device status: OK Diagnostics status: OK

Figure 3-1 Online / offline

Procedure

1. In the "Project tree", right-click on the SITOP UPS1600 controller. The shortcut menu opens.



2. In the shortcut menu, in submenu "Download to device", select option "Hardware configuration".

The project data are compiled. The "Load" button is activated as soon as loading is possible.

3. Click on "Load".

Data is loaded. The "Result of the load operation" dialog window is then opened. In this dialog, you can check whether the load task was successful and select any further actions.

4. Click on the "Finish" button.

Result

The set parameters have been loaded to the SITOP UPS1600 via the controller.

3.4.9 Diagnostics

The following data can be retrieved using the online and diagnostics function:

Navigation area		Value
General	Module	Short designation
		Article number
		Hardware
		Firmware
	Module information	Device name
		Module name
		Plant designation
		Location ID
	Manufacturer information	Description of manufacturer
		Serial number
		Copyright entry
		Profile
		Profile details
PROFINET interface	Ethernet address / network connection	MAC address
	Ethernet address / IP parameter	IP address
		Subnet mask
		Default router
		IP settings
		IP setting time
	Ports	List of ports
Functions	Assign an IP address	MAC address
		IP address
		Subnet mask
		Router address
	Firmware update / UPS1600	Article number
		Firmware
		Name
		Rack
		Slot
		Firmware file

Navigation area		Value
		Firmware version
		Suitable for modules with
		Status
		Activate firmware after update
	Assign name	PROFINET device name
		Type
	Reset to factory settings	MAC address
	IP address	
	PROFINET device name	

Retrieve the online and diagnostics data of SITOP UPS1600

Proceed as follows to start the online and diagnostics view of the particular module:

Project tree:

1. Open the device folder of the SITOP UPS1600 in the Project tree. This is located (after the assignment to the control system) in the folder of the control system under "Distributed I/O " > [name of the PROFINET connection].
2. Double-click on "Online & diagnostics".

Alternatively:

3. Select the device folder of the SITOP UPS1600 in the Project tree.
4. In the shortcut menu or in the "Online" main menu, select the "Online & diagnostics" .

Device view:

1. Open the device view of the device configuration.
2. Select the SITOP UPS1600.
3. In the shortcut menu or in the "Online" main menu, select the "Online & diagnostics" .

Network view:

1. Open the network view of the device configuration.
2. Select the SITOP UPS1600.
3. In the shortcut menu or in the "Online" main menu, select the "Online & diagnostics" .
4. Click on "Connect online".

The information is displayed under "Diagnostics / General".

3.4.10 Firmware update

 **WARNING**

The SITOP UPS1600 is reset while updating the firmware. For safety reasons, the output is switched off.

Ensure that no damage is caused to the plant or system.

Ensure that the PG/PC and/or all switches, routers and gateways that are used have an independent power supply during the firmware update.

 **WARNING**

Firmware update to V2.3.0 with UPS Manager

If the UPS Manager was used to update the firmware to V2.3.0 for devices with PROFINET interface, then the update cannot be successfully completed. In a case such as this, the device signals a software error using LED 1 (O.K./BAT.). Such a device can be made operational again by performing an update using the web server, see Firmware update with web server (Page 135).

Note

Install the current version of the SITOP Managers, before you start the firmware update. The installation file for the SITOP Manager is available at no charge on the SITOP home page (<http://www.siemens.com/sitop>) or directly (<https://support.industry.siemens.com/cs/ww/en/view/109760607>).

Note

Do not switch-off the devices during the firmware update.

The files for updating the firmware (firmware updates) are available online under (<http://support.automation.siemens.com/WW/view/en/79207181>). Different firmware updates are offered depending on the amp rating of the SITOP UPS1600.

Note

Observe the compatibility of the firmware!

Other firmware updates are not compatible.

Determine the amp rating of your SITOP UPS1600 and download the appropriate firmware update.

Note

From device firmware 2.3, a downgrade can be made to version 2.2.3. A downgrade is not supported for older versions. Information on how to read out the firmware release from the device is provided in Section Diagnostics (Page 82).

Note

"Reset to Factory" function:

All configuration parameters are reset to the default setting; 0.0.0.0 is used for the IP address. A new IP address must then be assigned, as otherwise a connection will not be able to be established to the SITOP Manager or the TIA Portal.

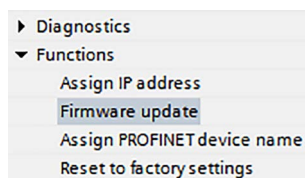
Preconditions

- The SITOP UPS1600 has been correctly connected and linked with the system.
- PG/PC with STEP 7 in the TIA Portal is connected with the system.
- Online connection is established.

Procedure

The firmware update consists of several files, which are combined in a zip file.

1. Download the firmware update.
2. Unpack the ZIP file into a temporary directory.
3. In the network view, select the components whose firmware is to be updated.
4. Change to the device view.
5. Click on "Go online".
6. In the shortcut menu of the SITOP UPS1600, select "Online & Diagnostics".
The "Online access" menu opens.



7. In the "Functions" folder, select the "Firmware update" group.
8. Click on the "Browse" button in the "Firmware loader" area to select the path to the directory with the unzipped files.
9. Select the appropriate file "*.upd". All SITOP UPS1600 are displayed in the table, for which an update is possible with the selected firmware file.
10. Activate option "Activate firmware after update" if a restart is to be carried out after the download.
11. Click on the "Start update" button. If the selected file can be interpreted by the module, it will be loaded into the module. Depending on the SITOP UPS1600 type, the firmware file is called "ups20a.upd", for example. If this requires changing the operating state of the CPU, you will be prompted to do this with dialogs.
12. Confirm the notes that are displayed.
The firmware is sent to the SITOP UPS1600. While sending, LED 4 ("SF") and LED 6 ("RUN") flash at the SITOP UPS1600.
13. Confirm the message from the TIA Portal that the data was successfully sent by pressing "OK".

If option "Activate firmware after update" was selected, then the system is restarted and the firmware is saved in the internal component memory.

The following LEDs flash while saving:

- LED 1 ("OK/Bat")
- LED 2 (">85%")

Note

It can take several minutes to save the firmware in the component. Do not switch-off the devices.

14. Once the LEDs no longer flash, then the device is automatically restarted and the SITOP UPS1600 is started with the updated firmware.

Note

During the firmware update, if the power supply of the SITOP UPS1600, or PG/PC or intermediate switches, routers or gateways is interrupted, then under certain circumstances, a fallback firmware is activated. If the SITOP UPS1600 can then no longer be accessed remotely, you must assign a new IP address, or under the menu item "Assign name" you must enter a new name in field "PROFINET device names" (see the manual for the particular unit).

15. The firmware has been updated. Only now is it permissible to switch off the SITOP UPS1600.

Note

After updating the firmware, in the hardware configuration of your project, you must replace the SITOP UPS1600 involved by the SITOP UPS1600 with the current firmware version. The configured configuration then matches the actual configuration again.

Note

For GSD, the SITOP UPS1600 must be deleted, and newly integrated; this means that parameters, addresses and names must be newly set - and it is also possible that a new GSD file must first be installed.

3.4.11 Restore factory settings

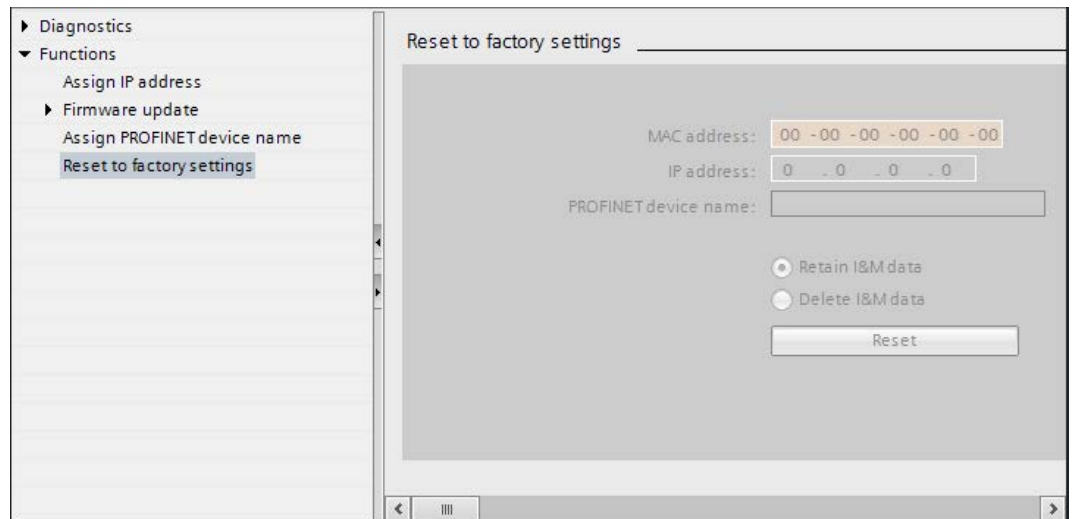
A reset to the factory settings deletes all configurations of the PROFINET interface saved in the SITOP UPS1600 and restores the factory settings. This affects, for example:

- IP address
- Device name

The parameter values for SITOP UPS1600 and the energy storage device are kept.

Proceed as follows to reset the SITOP UPS1600 factory settings:

1. Select SITOP UPS1600 in the Network view and change to the Device view.
2. Click on "Go online".
3. In the SITOP UPS1600 shortcut menu, select "Online & diagnostics".
4. In the "Functions" folder, select the "Reset to factory settings" group.



5. Click on the "Reset" button.
6. Respond to the confirmation prompt with "OK".

3.5 SIMATIC STEP 7

3.5.1 Introduction

The uninterruptible power supply SITOP UPS1600 can be used with SIMATIC STEP 7 from Version 5 and higher.

In SIMATIC STEP 7 the basic unit SITOP UPS1600 and its battery modules SITOP BAT1600 or UPS1100 can be integrated in projects, parameterized and diagnosed.

Note

SIMATIC STEP 7 and the SITOP Manager cannot simultaneously access the SITOP UPS1600. It is not permissible that the SITOP Manager service runs while the system is being accessed via SIMATIC STEP 7.

3.5.2 Installing the generic station description file (GSD)

To use the SITOP UPS1600 and the SITOP BAT1600 or SITOP UPS1100 battery modules in SIMATIC STEP 7, you must install the corresponding generic station description file (GSD). The GSD file is available at our SITOP-homepage (<http://www.siemens.com/sitop-ups1600>) or directly at (<https://support.industry.siemens.com/cs/ww/en/view/75854605>).

Preconditions

- SIMATIC STEP 7 has been opened and a project has been created.
- At least one station has been added.
- You know where the GSD data have been saved.

Procedure

1. Download the GSD file from the Internet.
2. Close all stations in HW Config.
3. Open menu "Options > Install GSD files...".
4. Click on "Browse ...", and select the folder in which the GSD-file is located.
5. Select the GSD file and click on "Install".

Note

If the file was not able to be installed, or if errors occurred during installation, then SIMATIC STEP 7 V5.6 creates a log file. Click on "Display log" to open the log file.

This GSD file can be used in SIMATIC STEP 7 V5.5 without any restrictions.

6. In the "Options" menu, click on "Update Catalog".

The installed devices are imported into the module catalog and can then be integrated in the project. You can find SITOP UPS1600 in the hardware catalog under "PROFINET IO/IO/UPS1600".

3.5.3 Inserting SITOP UPS1600 into a project

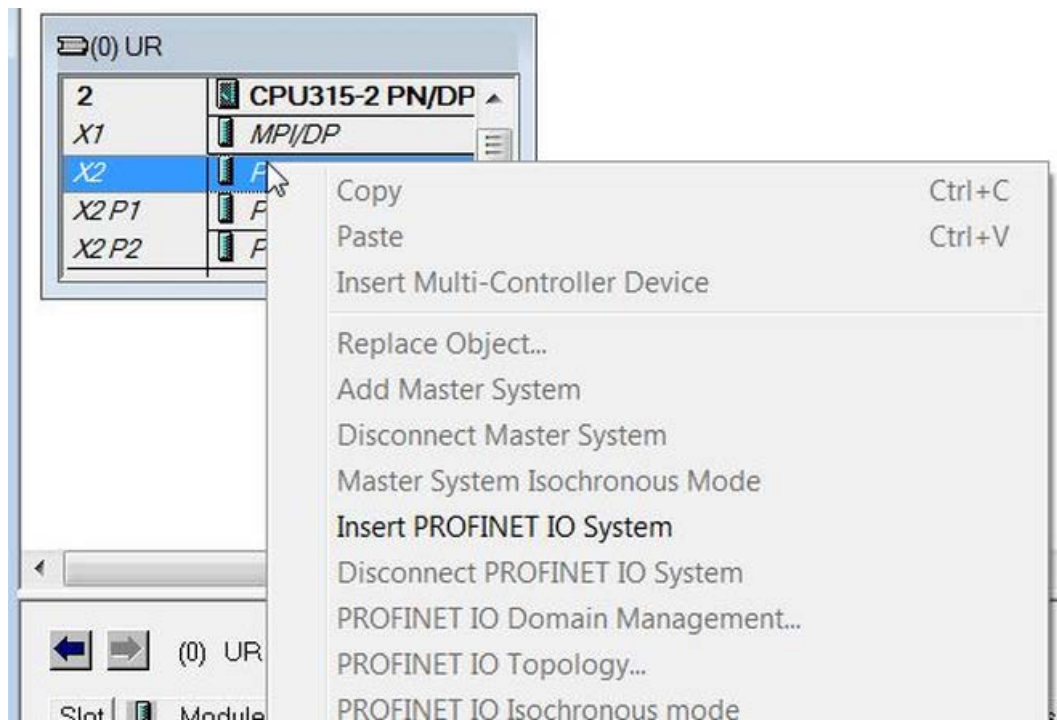
To be able to use the SITOP UPS1600, you must assign an IO controller as IO device (SIMATIC S7 controller).

Preconditions

- The GSD file of the SITOP UPS1600 has been correctly installed.
- SIMATIC STEP 7 has been opened and a project has been created with an IO controller (SIMATIC S7 control).

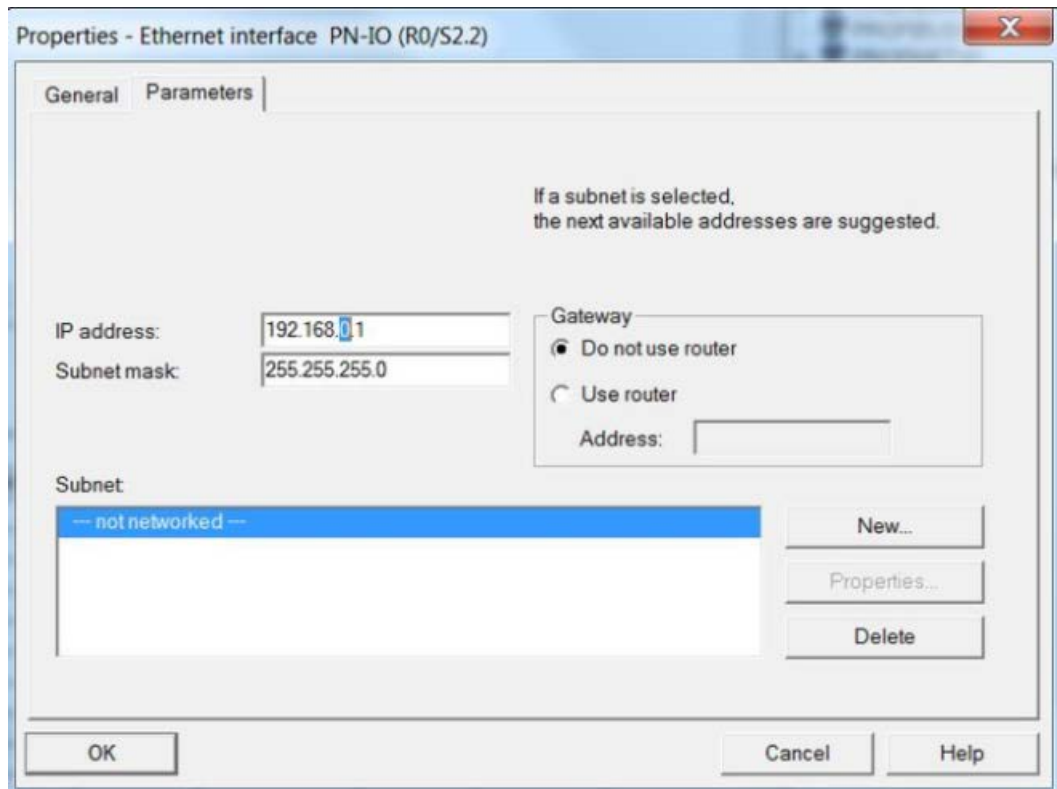
Creating a subnet

1. Open the Hardware view "HW Config".
2. Call the shortcut menu of line "PN-IO"
3. Select "Insert PROFINET IO system".



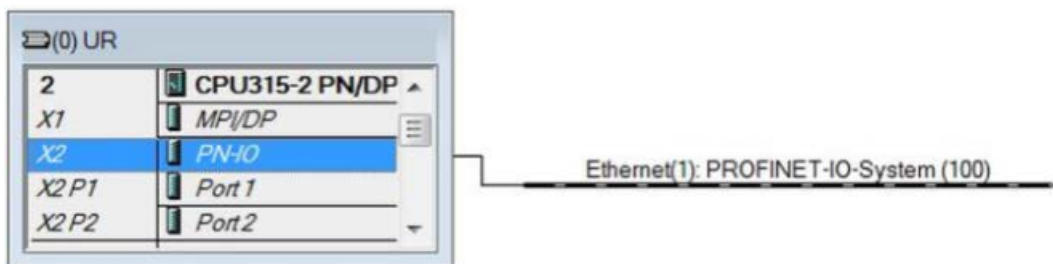
4. In dialog field "Properties - Ethernet interface PN-IO", select the "Parameters" tab.
5. Set the IP address of the PROFINET interface.

6. Create a new subnet.



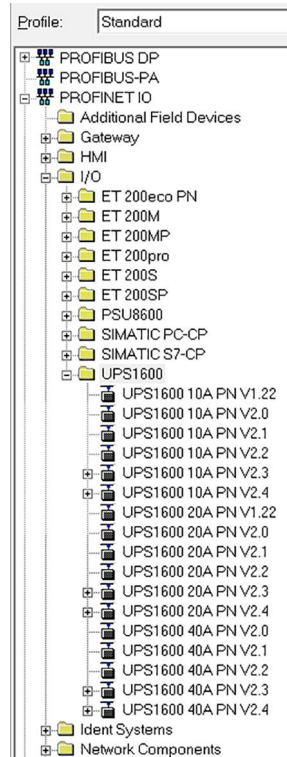
7. Confirm the properties of the new subnet.
8. Close the "Properties - Ethernet interface PN-IO" dialog box.

The subnet is displayed as a horizontal line in the hardware view.



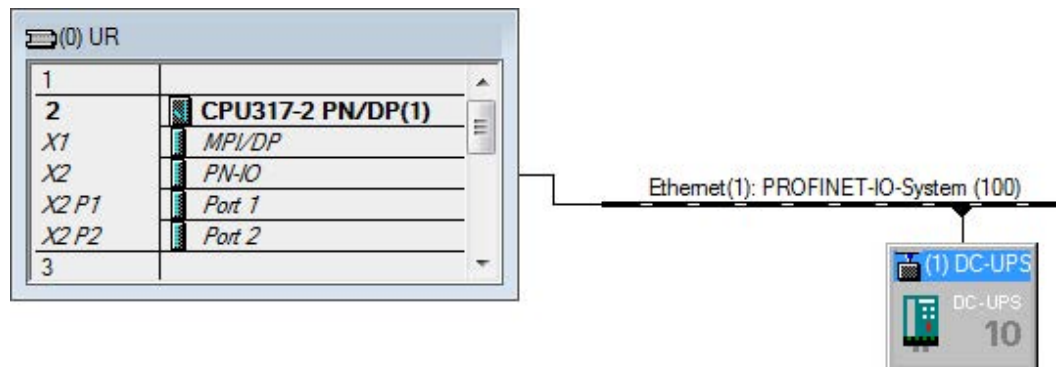
Inserting SITOP UPS1600 from the hardware catalog

1. Select the subnet.
2. Open the "Catalog" window using the "View > Catalog" menu command.
3. In the hardware catalog, navigate to the SITOP UPS1600 under "PROFINET IO \ I/O \ UPS1600".



4. Click the desired SITOP UPS1600; keep the left mouse button pressed and drag the SITOP UPS1600 to the subnet.
5. Double-click on "SITOP UPS1600".
6. In the open dialog Device name, enter the device number and IP address in the Ethernet.
7. Save the hardware configuration.

You have now inserted the SITOP UPS1600 into the project. The rectangle displayed in the editor symbolizes the SITOP UPS1600.



3.5.4 Parameter assignment

3.5.4.1 Parameters of the basic device and battery module

The adjustable parameters of the basic unit SITOP UPS1600 and the SITOP BAT1600 battery modules or SITOP UPS1100 are structured according to subgroups in SIMATIC STEP 7. These subgroups are shown in the table below.

Subgroup	Description
Buffer parameters	Parameters to configure the response of the SITOP UPS1600 when buffering
Reset parameters	Configuring the interruption when the supply voltage returns
Buffering parameters (2)	Parameters for determining the possible buffer time
Maintenance	Battery test interval
Third-party battery	Parameters for using third-party batteries
Charging	Parameters for the charging behavior: <ul style="list-style-type: none"> • End-of-charge voltage • Charge current
Web server	Web server settings
OPC UA	OPC UA server settings
NTP settings	Time synchronization via the Network-Time-Protocol
PROFINET security	PROFINET safety settings

A detailed description of the individual parameters of the subgroups is contained in the associated section under Parameterizing SITOP UPS1600 (Page 92).

3.5.4.2 Parameterizing SITOP UPS1600

The procedure is the same for all parameters. This section describes the general procedure to reach the configuration dialog. The individual parameters and their possible values are described in the following subsections.

Each parameter has a start value. A click on "Reset to initial values" resets all parameters of a subgroup to the associated start value.

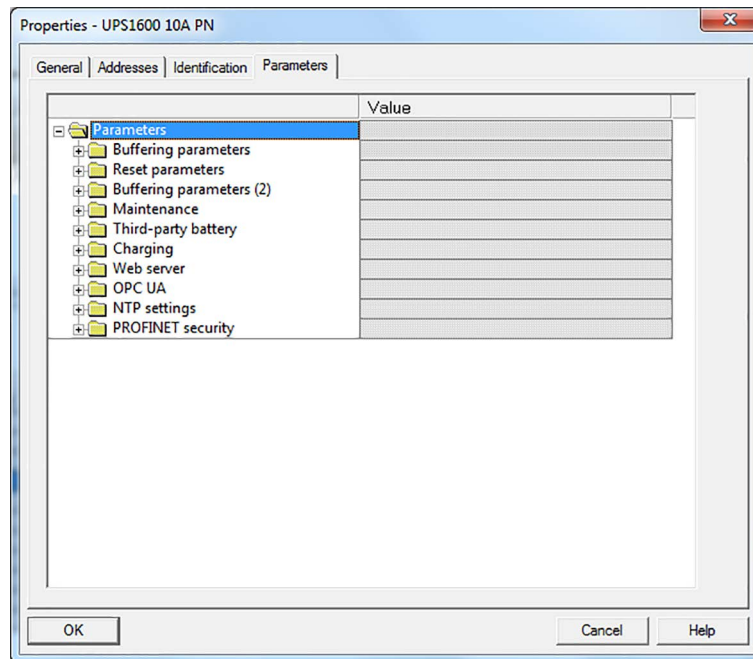
Preconditions

- The SITOP UPS1600 has been integrated in the opened project and networked.

Procedure

1. Open the Network view "NetPro" ("Options > Configure network").
The controller and the networked SITOP UPS1600 are displayed.
2. In the Network view click on SITOP UPS1600. The hardware configuration opens.
3. Double click in the hardware configuration on the SITOP UPS1600 entry in the station window for slot 0.1.
4. In the configuration dialog click on the "Parameters" tab.

- Click the desired subgroup.
The subgroup opens.



- Enter the values.
- Confirm your entry by clicking on "OK".
The parameters are stored in the project.

Buffer parameters

Parameter	Value range	Default setting
Buffer time [s]	1 ... 32767 s	600 s
Additional buffer time after PC shutdown ¹⁾ [s]	1 ... 300 s	60 s
Connection threshold [V/100]	21 ... 25 V	22.5 V
Discharge cut-off voltage [V/100]	18 ... 23 V	18.5 V (for LiFePO4 battery 20.5 V)
Wait time for stable input voltage [1 ms]	200 ... 65,000 ms	1000 ms
Downtime alarm [1 ms]	0 ... 20,000 ms	125 ms
Buffering allowed	Yes / No	Yes
Enable reset after buffering	Yes / No	No

¹⁾ valid from V2.0.4 or V2.1

- Buffer time**
Length of time during which the system should be buffered by the SITOP UPS1600.
- Additional buffer time after PC shutdown**
Time during which the system should be buffered by the SITOP UPS1600 after the PC was shut down.
- Connection threshold**
If the connection threshold value is fallen below, the SITOP UPS1600 starts buffering. If

the value of the connection threshold is subsequently exceeded again, then the SITOP UPS1600 stops buffering.

- **Discharge cut-off voltage**
Voltage where battery discharge is exited. For a system battery (SITOP BAT1600 or SITOP UPS1100) the discharge cut-off voltage defined for this type is always used.
- **Wait time for a stable input voltage**
Time where the input voltage must continually lie above the connection threshold so that buffering is exited and a transition is made into normal operation.
- **Downtime alarm**
The time in which no alarm is issued to the system although it is buffered.
- **Buffering permitted**
When the connection threshold is fallen below, selects whether the system is buffered or the output is shut down.
- **Activate reset after buffering**
If this option is activated, the output voltage is interrupted after the selected buffer time expires if, in the meantime, the input voltage returns. This option is useful, when, for example, computer networks are protected by the UPS that can be activated by a reset when the power supply is restored. For buffer time "MAX", the output voltage is not interrupted.

Reset parameters

Parameter	Value range	Default setting
Reset time [s]	1 ... 120 s	5 s

- **Reset time**
Duration of the output voltage interruption.

Here, you define the interrupt duration for the "Interrupt output voltage" function (reset after buffering)

Buffering parameters (2)

Parameter	Value range	Default setting
Expected buffer current [A/10]	0 ... 40 A	0 A

- **Expected buffer current**
Load current, which is expected at the device output during buffer mode. Please adjust the correct application load current required. For current settings between 0 A and rated current, the display in the diagram "Remaining buffer time" is adapted. If a value of 0 A is entered, then for this parameter, the average value of the actual load current measured at the output over the last 10 min is assumed. The value of this parameter is used when calculating the remaining buffer time. The entered value may not exceed the rated device current.

Note

From the instant in time when the SITOP UPS1600 is switched over into the buffer mode, the buffer current actually measured is used to determine the expected buffer time instead of the expected buffer current.

Maintenance

Parameter	Value range	Default setting
R test interval (from V2.1 to V2.3) [h]	1 ... 65535 h	4 h

The new R test (from V2.4) is performed once a week after short-term recharging. Therefore, it is no longer necessary to set the R test interval.

Third-party battery

Parameter	Value range	Default setting
Ignore data of coded battery	Yes / No	No
Battery type	Pb/pPb	Pb
Typical ambient temperature	-70 ... 100 °C	40 °C
Battery capacity	0 - 3,200 Ah	10.0 Ah
End-of-charge voltage at 20 °C	24.0 - 30.0 V	27.3 V
Temperature coefficient	0 - 200 mV/K	36 mV/K
Duration of the constant floating voltage charging phase	0 - 720 h	12 h
Charge current	0.001 - 3 or 4 A	0.3 A or 5 A
Start preserve charge voltage	23.0 - 30.0 V	25.2 V
Stop buffering voltage	18.0 - 23.0 V	18.5 V
Faulty battery voltage	1.0 - 18.0 V	6.0 V

- **Ignore data of coded battery**
Activate parameter set in section third-party battery
- **Battery type**
Make/type of battery: Pb ... lead-gel battery, pPb ... pure lead battery
- **Typical ambient temperature**
Typical ambient temperature of the battery in operation
- **Battery capacity**
Total capacity of the installed batteries.
- **End-of-charge voltage at 20 °C**
The end-of-charge voltage defines the maximum battery voltage during the charging phase. When reaching this end-of-charge voltage, the charging status changes from "constant current" into the "constant voltage" phase. The adjustable end-of-charge voltage is applicable for a battery ambient temperature of 20 °C. SITOP UPS1600 adapts the end-of-charge voltage corresponding to the connected SITOP BAT1600 or SITOP UPS1100 depending on the battery ambient temperature and the battery technology. For third-

party batteries, the adaptation is based on configuration parameters battery type, typical ambient temperature and temperature coefficient.

- **Temperature coefficient**
Relative dependency of the end-of-charge voltage on the ambient temperature
- **Duration of the constant floating voltage charging phase**
Duration of the constant voltage charging phase
- **Charge current**
The battery is only charged with maximum selected charge current during the "constant current" charging phase. When using system batteries, the charge current is automatically set, and is controlled by the temperature. When using third-party batteries, the permissible charge current specified by the battery manufacturer must be taken into consideration.
Further, the following device-dependent values apply:
 - SITOP UPS1600 10 A: Maximum permissible charge current 3,000 mA
Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 2,000 mA
 - SITOP UPS1600 20 A: Maximum permissible charge current 4,000 mA
Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 3,000 mA
 - SITOP UPS1600 40 A: Maximum permissible charge current 5,000 mA
Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 3,000 mA
- **Start preserve charge voltage**
Voltage value for the start of the preserve charge voltage
- **Stop buffering voltage**
Buffering is interrupted when this threshold value is fallen below.
- **Faulty battery voltage**
Batteries are considered to be defective when this threshold value is fallen below.

Charging

Parameter	Value range	Default setting
Deactivate charging function	Yes / No	No
Maximum permitted charge current [1 mA]	300 ... 5,000 mA	3,000 mA / 4,000 mA / 5,000 mA

- **Deactivate charging function**
Shut down battery charging
- **Maximum permitted charging current**
Max. permissible current to charge the battery

Web server

Parameter	Value range	Default setting
Activate web server on this module	Yes/no	No
Permit access only with HTTPS	Yes/no	Yes
Log off automatically after 15 minutes	Yes/no	No
Update interval	0 / 5 s / 10 s / 20 s / 30 s / 60 s	0 = no automatic update

Set here whether access to the SITOP UPS1600 via web server is permitted.

- **Activate web server on this module**
Define whether it is permissible that this device is accessed via the web server.
- **Permit access only with HTTPS**
Define whether access is only permissible via HTTPS.
- **Download certificate**
By pressing button "Download certificate", you can download the certificate for an encrypted connection via HTTPS.
- **Log off automatically after 15 minutes**
Define whether a user should be automatically logged off after closing the web server.
- **Update interval**
Define the intervals in which the actual values are sent to the web server.

OPC UA

Parameter	Value range	Default setting
OPC UA server activated	Yes / No	Yes
OPC UA server port	1 ... 65535	4840
No security	Yes / No	No
Basic128 - Sign & Encrypt	Yes / No	No
Basic256 - Sign & Encrypt	Yes / No	No
Basic256Sha256 - Sign & Encrypt	Yes / No	Yes

- **OPC UA server activated**
Activate or deactivate OPC UA server
- **OPC UA - server port**
Port number for OPC UA communication. 4840 is preset as default setting; however, it can be adapted when required. It is not recommended to use port numbers less than 1024, as these numbers are used by other logs.
- **No security**
If the option is activated, then unencrypted access via the OPC UA client is possible. Activating the option is not recommended.
- **Basic128 - Sign & Encrypt**
Allow Basic128 security profile for OPC UA communication.

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- **Basic256 - Sign & Encrypt**
Allow Basic256 security profile for OPC UA communication.
- **Basic256Sha256 - Sign & Encrypt**
Allow security profile Basic256Sha256 for OPC UA communication.

NTP settings

Parameter	Value range	Default setting
NTP client activated	Yes / No	No
NTP server address 1	IPv4	0.0.0.0 (none)
NTP server address 2 - 4	IPv4	0.0.0.0 (none)

- **NTP client activated**
If the NTP client is activated, then the local time is synchronized with the specified time of the specified NTP server.
- **NTP -server address 1**
IP address of the 1st NTP server. When the NTP client is activated, at least one address of an NTP server must be configured.
- **NTP server address 2 - 4**
IP address of up to 3 optional NTP servers

PROFINET security

Parameter	Value range	Default setting
DCP write protection activated	Yes / No	No

- **DCP write protection activated**
Activate or deactivate write protection for configuration changes via the DCP protocol

3.5.5 Loading the configuration to the SITOP UPS1600 (commissioning)

In the delivered state, the SITOP UPS1600 has not yet been assigned any IP address and the DHCP protocol is deactivated.

When the SITOP UPS1600 is first connected with a controller (SIMATIC S7 control), it must be assigned a device name and an IP address by the controller. A new configuration can be loaded to the device with STEP 7.

Preconditions

- The SITOP UPS1600 has been correctly connected and linked with the system.
- PG/PC with SIMATIC STEP 7 is connected with the network.

Displaying accessible nodes

Note

If nodes can only be accessed via interposed switches or routers (with protocol conversion), they are not displayed in the list of the accessible nodes.

1. Click in menu "Target system" on "Display accessible nodes".

The "Accessible nodes" window is opened with the following displays:

- Station
- SITOP UPS1600

The following table shows which information is displayed in the "Object name" column.

Accessible nodes	Object name	Description
S7-CPU, PC station	Name of the station	The "Details" view also shows the operating state, module type and, if available, information from the associated STEP 7 project (station name, CPU name, system identification).

Loading the IO controller for the first time

Once you have configured the SITOP UPS1600 and the station, you must load this configuration into the IO controller (SIMATIC S7 control system). This is the way that the IO controller is assigned its configured IP addresses.

Before loading, carry out a consistency test to check the configuration for duplicate addresses, identical names, etc.

Inform yourself whether the IO controller to be loaded can also be initially loaded via the PROFINET interface. If not, you must first load the hardware configuration via the MPI interface .

1. Select in the "Target system > Load" menu.
2. Select the module to be loaded.

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3. In the "Select node address" dialog, if necessary, click the "Display" button to display the actual accessible modules (these include the IO controller to be loaded with its current IP address or its MAC address, if no IP address is yet available).
4. Select the IO controller to be loaded from the accessible modules.
This module is displayed in the "Enter connection to target station" dialog box.
5. Start loading by clicking on the "OK" button.
The IO controller is assigned the configured IP address.

Note

Ensure that the article number of the SITOP UPS1600 configured offline matches the article number of the device connected online.

The following response is obtained after loading the configuration into the device:

Offline configured device / Online connected device	UPS1600 10 A	UPS1600 20 A	UPS1600 40 A
UPS1600 10 A	Device status: OK Diagnostics status: OK	Device status: Fault Diagnostics status: Differences were identified (not accepted)	Device status: Fault Diagnostics status: Differences were identified (not accepted)
UPS1600 20 A	Device status: OK Diagnostics status: Differences were identified (accepted)	Device status: OK Diagnostics status: OK	Device status: Fault Diagnostics status: Differences were identified (not accepted)
UPS1600 40 A	Device status: OK Diagnostics status: Differences were identified (accepted)	Device status: OK Diagnostics status: Differences were identified (accepted)	Device status: OK Diagnostics status: OK

Figure 3-2 Online / offline

Allocating the SITOP UPS1600 a device name (online)

In order that the configured IO controller can address the SITOP UPS1600, you must assign each individual IO device (including SITOP UPS1600) the configured device name.

For the procedure described below, the SITOP UPS1600 and the station for the PG/PC must be accessible online through Ethernet.

1. Open HW Config.
2. In the "Target system > Ethernet" menu, click on "Assign device name".
3. In the "Assign device name" dialog, in the "Device name" field, select SITOP UPS1600.
4. In the "Available devices" select the SITOP UPS1600. Using the "Flash" button, you can flash the LED on the SITOP UPS1600 so that the device can be uniquely identified.
5. Click on the "Assign name" button.

After the name assignment, you can bring the IO controller into the RUN operating state.

When powering up, the IO controller distributes the configuration information to the SITOP UPS1600 and then goes into cyclic operation.

3.5.6 Diagnostics


The following data can be fetched using the Diagnostics function:

Group	Value
SITOP UPS1600 general	Article number
	Serial number

Fetching diagnostics data

You can use the "Station > Open online" menu command in "HW Config" to select the SITOP UPS1600 and view the diagnostics data.

3.5.7 Firmware update

 WARNING
<p>The SITOP UPS1600 is reset while updating the firmware. For safety reasons, the output is switched off.</p> <p>Ensure that no damage is caused to the plant or system.</p> <p>Ensure that the PG/PC and/or all switches, routers and gateways that are used have an independent power supply during the firmware update.</p>



WARNING

Firmware update to V2.3.0 with UPS Manager

If the UPS Manager was used to update the firmware to V2.3.0 for devices with PROFINET interface, then the update cannot be successfully completed. In a case such as this, the device signals a software error using LED 1 (O.K./BAT.). Such a device can be made operational again by performing an update using the web server, see Firmware update with web server (Page 135).

Note

Install the current version of the SITOP Managers, before you start the firmware update. The installation file for the SITOP Manager is available at no charge on the SITOP home page (<http://www.siemens.com/sitop>) or directly (<https://support.industry.siemens.com/cs/ww/en/view/109760607>).

Note

Do not switch-off the devices during the firmware update.

The files for updating the firmware (firmware updates) are available online under (<http://support.automation.siemens.com/WW/view/en/79207181>). Different firmware updates are offered depending on the amp rating of the SITOP UPS1600.

Note

Observe the compatibility of the firmware!

Other firmware updates are not compatible.

Determine the amp rating of your SITOP UPS1600 and download the appropriate firmware update.

Note

From device firmware 2.3, a downgrade can be made to version 2.2.3. A downgrade is not supported for older versions. Information on how to read out the firmware release from the device is provided in Section Determining the firmware version (Page 135).

Note

"Reset to Factory" function:

All configuration parameters are reset to the default setting; 0.0.0.0 is used for the IP address. A new IP address must then be assigned, as otherwise a connection will not be able to be established to the SITOP Manager or the TIA Portal.

Preconditions

- The SITOP UPS1600 has been correctly connected and linked with the PROFINET IO system.
- PG/PC with STEP 7 is connected with the network.

Procedure

The firmware update consists of several files, which are combined in a zip file.

1. Download the firmware update.
2. Unpack the ZIP file into a temporary directory.
3. Open the "Accessible nodes" window with the "Target system > Display accessible nodes" menu command.

Note

For an online connection via the "Accessible nodes" window, PG/PC and "Accessible nodes" must be connected to the same physical Ethernet subnet.

4. Select the "Target system > Update firmware" menu command.
5. Select the SITOP UPS1600 whose firmware is to be updated.
6. In the open "Update firmware" dialog, press the "Browse" button to select the path to the directory with the unzipped files.
In this directory, select the corresponding "*.upd" file.
7. After you have selected a file, the information in the bottom fields of the "Update firmware" dialog box indicate the components for which the file is suitable and from which firmware version.
8. Click the "Run" button.
9. STEP 7 checks whether the selected file can be interpreted by the module; if the check is positive, then the file is loaded to the module.
10. If this requires changing the operating state of the IO controller, then you will be prompted to do this in the relevant dialog boxes.
11. When option "Activate firmware after loading" is activated, the UPS1600 then automatically updates the firmware.

Note

A separate connection is established to the CPU for the firmware update, if available. In this case, the task can be interrupted. If no resources are available for another connection, an existing connection will be used automatically. In this case, the task cannot be interrupted; the "Cancel" button in the transfer dialog is grayed-out and cannot be operated.

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12. Confirm the notes that are displayed.

The firmware is sent from the IO controller to the component, and saved in the internal component memory. The following LEDs flash while saving:

- LED 1 ("OK/Bat")
- LED 2 (">85%")

Note

It can take several minutes to save the firmware in the component. Do not switch-off the devices.

Note

During the firmware update, if the power supply of the SITOP UPS1600, or PG/PC or intermediate switches, routers or gateways is interrupted, then under certain circumstances, a fallback firmware is activated. If the SITOP UPS1600 can then no longer be accessed remotely, you must assign the SITOP UPS1600 a new IP address, or under the menu item "Assign name" you must enter a new name in the field "PROFINET device names" (see the manual for the particular device).

13. The SITOP UPS1600 automatically updates the firmware.

14. The firmware has been updated. Only now is it permissible to switch off the SITOP UPS1600.

15. Using STEP 7 (read out the diagnostics buffer of the IO controller), check whether SITOP UPS1600 successfully starts with the new firmware.

Note

After updating the firmware, in the hardware configuration of your project, you must replace the SITOP UPS1600 involved by the SITOP UPS1600 with the current firmware version. The configured configuration then matches the actual configuration again.

3.5.8 Restore factory settings

With STEP 7 from Version 5.5, it is possible to restore the factory setting of modules using menu "Target system → Edit Ethernet node".

1. To select the MAC address of the SITOP UPS1600, which should be reset to the factory setting, click in dialog "Edit Ethernet node" on "Browse".
2. Click on the "Reset" button.

This deletes the IP address and the device name from the module. The parameter values for SITOP UPS1600 and the energy storage device are kept.

Edit Ethernet Node

Ethernet node

Nodes accessible online

MAC address: 78-9F-87-01-29-F4 Browse...

Set IP configuration

Use IP parameters

IP address: 192.168.20.30 Gateway: 192.168.20.30

Subnet mask: 255.255.255.0 Do not use router Use router

Obtain IP address from a DHCP server

Identified by

Client ID MAC address Device name

Client ID:

Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit <http://www.siemens.com/industrialsecurity>

Assign IP Configuration

Assign device name

Device name: ups1600-1 Assign Name

Reset to factory settings

Reset

Close Help

3.6 Cyclic and acyclic data

The data communicated between SITOP UPS1600 and the PROFINET IO-Controller can be viewed in SIMATIC STEP 7 or SIMATIC STEP 7 in the TIA Portal. Here, a distinction is made between cyclic data (input/output data) and acyclic data (reading/writing data sets).

Input/output data

SITOP UPS1600 sends, in cyclic intervals (1 ms - 512 ms for IRT or 1 ms - 2048 ms for RT), data about the actual operating states to the PROFINET IO-Controller. You will find more information on this at Input and output data (Page 106).

Reading and writing data sets

Reading and writing data sets are sent acyclically from the SITOP UPS1600 to the PROFINET IO-Controller or from the PROFINET IO-Controller to the SITOP UPS1600. Additional information can be found at Reading and writing data sets (Page 107).

3.6.1 Input and output data

An overview of the input and output data, which is cyclically sent from the SITOP UPS1600 to the PROFINET IO controller is provided in the following tables.

Slot	Subslot	Data	Description	Data size
0	2	Input voltage	Input voltage is present: <ul style="list-style-type: none"> • 0: NOT OK • 255: OK 	Unsigned8
		Buffer mode	Buffer mode: The load connected to the SITOP UPS1600 is supplied via the energy storage device connected to the SITOP UPS1600: <ul style="list-style-type: none"> • 0: inactive • 255: active 	Unsigned8
		Ready for buffering	Ready for buffer operation as the energy storage device of the buffer component has been sufficiently charged. <ul style="list-style-type: none"> • 0: NOT OK • 255: OK 	Unsigned8
		Charge sufficient	Charge level sufficient: When this flag is set, the required charge level has been achieved: <ul style="list-style-type: none"> • 0: NOT OK • 255: OK 	Unsigned8

Slot	Subslot	Data	Description	Data size
		Battery change recommended	Battery replacement recommended: Battery capacity is insufficient to achieve the specified buffer time: <ul style="list-style-type: none"> • 0: no • 255: yes 	Unsigned8
		Not used	-	Unsigned8
		Battery charge level	Battery charge level in %: <ul style="list-style-type: none"> • 0-100: 0-100% • 255: unknown battery 	Unsigned8
		Battery connection maintenance from V2.1	Connection to the battery interrupted: Check the connection and fuse: <ul style="list-style-type: none"> • 0: no maintenance required • 255: maintenance required 	Unsigned8

3.6.2 Reading and writing data sets

An overview of all data sets, which are communicated between the SITOP UPS1600 and the PROFINET IO-Controller is provided in the following table. Here, a distinction is made between the following data sets:

- **Reading data sets:** Data that is sent from the SITOP UPS1600 to the PROFINET IO-Controller.
- **Writing data sets:** Data that is sent from the PROFINET IO-Controller to the SITOP UPS1600.

Index	Slot	Sub-slot	Data set	Type	Description	Data size
0x0001	0	1	Buffering parameters	Reading/ writing	Buffer parameters.	14 bytes 16 bytes (from V2.4)
0x0002	0	1	Battery parameters	Reading/ writing	Parameters of the connected battery modules	5 bytes
0x0003	0	1	Charging parameters	Reading/ writing	Charge parameters of the connected battery modules	4 bytes
0x0004	0	1	Reset parameters	Reading/ writing	Reset parameters.	1 byte
0x0005	0	1	Battery information parameters	Reading	Information about the connected SITOP BAT1600 or SITOP UPS1100 battery modules. This information is available via the link "Energy Storage".	1024 bytes 556 bytes (from V2.4)
0x0006	0	1	Device information Parameters	Reading	Information about the SITOP UPS1600.	124 bytes
0x0007	0	1	Hardware settings parameters	Reading	Hardware settings of the SITOP UPS1600 (settings that were made at the front of the device).	8 bytes

3.6 Cyclic and acyclic data

Index	Slot	Sub-slot	Data set	Type	Description	Data size
0x0008	0	1	Buffering parameters from V2.0	Reading/writing	Buffer parameters of the SITOP UPS1600	2 bytes
0x0009	0	1	Maintenance parameters from V2.1	Reading/writing	Maintenance parameters of the SITOP UPS1600	2 bytes
0x000A	0	1	Third-party battery parameters	Reading/writing	Parameters of the connected third-party battery	20 bytes
0x000B	0	1	Charging parameters	Reading/writing	Charge parameters of the connected battery modules	4 bytes
0x0010	0	1	DC-UPS command	Writing	Sends special commands to the SITOP UPS1600	4 bytes
0x0010	0	1	Result of DC-UPS command	Reading	Response to the previously sent "DC-UPS command"	4 bytes
0x0011	0	1	Battery 1 information parameters	Reading	Information about connected battery module 1 SITOP BAT1600 or SITOP UPS1100. This information is available via the link "Energy Storage".	68 bytes (from V2.2) 84 bytes (from V2.4)
0x0012	0	1	Battery 2 information parameters	Reading	Information about connected battery module 2 SITOP BAT1600 or SITOP UPS1100. This information is available via the link "Energy Storage".	68 bytes (from V2.2) 84 bytes (from V2.4)
0x0013	0	1	Battery 3 information parameters	Reading	Information about connected battery module 3 SITOP BAT1600 or SITOP UPS1100. This information is available via the link "Energy Storage".	68 bytes (from V2.2) 84 bytes (from V2.4)
0x0014	0	1	Battery 4 information parameters	Reading	Information about connected battery module 4 SITOP BAT1600 or SITOP UPS1100. This information is available via the link "Energy Storage".	68 bytes (from V2.2) 84 bytes (from V2.4)
0x0015	0	1	Battery 5 information parameters	Reading	Information about connected battery module 5 SITOP BAT1600 or SITOP UPS1100. This information is available via the link "Energy Storage".	68 bytes (from V2.2) 84 bytes (from V2.4)
0x0016	0	1	Battery 6 information parameters	Reading	Information about connected battery module 6 SITOP BAT1600 or SITOP UPS1100. This information is available via the link "Energy Storage".	68 bytes (from V2.2) 84 bytes (from V2.4)
0x0020	0	1	State information	Reading	Status information about SITOP UPS1600 and the connected battery modules SITOP BAT1600 or SITOP UPS1100. Information about the SITOP BAT1600 or SITOP UPS1100 battery modules is available via the link "Energy Storage".	64 bytes 70 bytes (from V2.1) 89 bytes (from V2.4)
0x0041	0	1	Web server parameters	Reading/writing	Web server settings of the SITOP UPS1600.	1 byte 6 bytes (from V2.1)
0x0042	0	1	OPC UA server	Reading/writing	OPC UA settings of the SITOP UPS1600	4 bytes (from V2.2) 8 bytes (from V2.4)
0x0043	0	1	NTP client parameters	Reading/writing	Setting for connection to NTP servers	66 bytes (from V2.2)

Index	Slot	Sub-slot	Data set	Type	Description	Data size
0x0044	0	1	NTP client status parameters	Reading	Status NTP client	40 bytes (from V2.2)
0x0045	0	1	PROFINETSecurity	Reading/writing	Setting for DCP write protection	2 bytes (from V2.2)

You can find detailed information about the individual data sets in Section Data sets (Page 109)

3.6.2.1 Data sets

In this section you can find detailed information about the individual data sets that are sent from the PROFINET IO-Controller to the SITOP UPS1600 - and which can be read from the SITOP UPS1600.

0x0001: Buffering parameters (reading/writing)

Data	Description	Data type
Buffer time [1 s]	Buffer time: After the selected buffer time has expired, the SITOP UPS1600 switches off the load output. The actual buffer time that can be achieved depends on the connected loads and energy storage devices.	Unsigned16
Buffer time 2 [1 s]	Additional buffer time after the PC was shut down. (only valid in conjunction with PC software SITOP Manager)	Unsigned16
Buffer threshold [0.01 V]	Connection threshold: Switching voltage for buffering. Buffering is active below this value.	Unsigned16
Stop buffering voltage [0.01 V]	Buffer mode is exited if the battery voltage is below this value.	Unsigned16
Input voltage OK time [1 ms]	Wait time for stable input voltage: Minimum time during which the input voltage during buffer mode must be available at the SITOP UPS1600 to exit buffer mode of the SITOP UPS1600 and to again supply the connected loads via the input voltage (normal operation).	Unsigned16
Downtime alarm [1 ms]	Downtime alarm: Alarm filter: An alarm is only sent if it is active for longer than the set time.	Unsigned16
Buffering allowed	Activate or deactivate buffer mode. This setting is only accepted by the SITOP UPS1600 in the Remote Enable (REN) operating mode.	Unsigned8
Enable reset after buffering	Enable reset after buffering: If, during buffer mode, the input voltage becomes available again, then the output is switched off for a selectable time in order to reset the connected devices.	Unsigned8
Discharge cut-off voltage	The discharge cut-off voltage is a voltage to be set, which must not be fallen below in the case of a buffering event.	Unsigned16

0x0004: Reset parameters (reading/writing)

Data	Description	Data type
Reset time [1 s]	Reset time: Time during which the SITOP UPS1600 output is shut down if the connected devices are reset.	Unsigned8

0x0005: Battery information parameters (reading)

Data	Description	Data type
Number of batteries	Number of connected battery modules. Here, only SITOP BAT1600 or SITOP UPS1100 battery modules (SITOP system batteries) are counted.	Unsigned8
Fill byte(s)	-	3 x Unsigned8
Batt 1: Standby time [1 s]	Standby time	Unsigned32
Batt 1: Buffer time [1 s]	Time in buffer mode	Unsigned32
Batt 1: Total charging current [1 mAh]	Total charge level (battery-specific data): Total charge within the service life of the SITOP UPS1600.	Unsigned32
Batt 1: Total culled current [1 mAh]	Total charge level used (battery-specific data): Total discharge over the service life of the SITOP UPS1600.	Unsigned32
Batt 1: EOCV [0.01 V]	"End-of-charge voltage": Battery voltage when charging changes to trickle charging. The energy storage device is then charged up to 100 %.	Unsigned16
Batt 1: Charge current [1 mA]	Charge current: Current magnitude used to charge the connected battery modules during the constant current charging phase.	Unsigned16
Batt 1: Battery capacity [0.1 Ah]	Battery capacity: Total battery capacity of all energy storage devices connected to the SITOP UPS1600.	Unsigned16
Batt 1: Stop buffering voltage [0.01 V]	Battery voltage, which when fallen below, buffer mode is exited (stop buffering voltage).	Unsigned16
Batt 1: Battery type	Battery type	Unsigned8
Batt 1: Minimal temperature [1 °C]	Lowest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Batt 1: Maximal temperature [1 °C]	Highest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Fill byte(s)	-	1 x Unsigned8
Batt 1: Order number	Order number (Article number).	VisibleString(20)
Batt 1: Serial number	Serial number	VisibleString(16)
Batt 1: Manufacturing date	Manufacturing date	VisibleString(8)
Batt 1: Version number	Version number	VisibleString(6)
Batt 1: Calculated battery health	Calculated battery health	Unsigned8
Batt 1: Operating state	Operating state	Unsigned8
Batt 1: LED state	LED states	Unsigned8
Fill byte(s)	-	3 x Unsigned8
Batt 1: SWD	SW revision	Unsigned32
Batt 1: Battery MID	Battery Module Ident Number	Unsigned32
Batt 2: Standby time [1 s]	Standby time	Unsigned32
Batt 2 Buffer time [1 s]	Time in buffer mode	Unsigned32
Batt 2: Total charging current [1 mAh]	Total charge level (battery-specific data): Total charge within the service life of the SITOP UPS1600.	Unsigned32
Batt 2: Total culled current [1 mAh]	Total charge level used (battery-specific data): Total discharge over the service life of the SITOP UPS1600.	Unsigned32
Batt 2: EOCV [0.01 V]	"End-of-charge voltage": Battery voltage when charging changes to trickle charging. The energy storage device is then charged up to 100 %.	Unsigned16
Batt 2: Charge current [1 mA]	Charge current: Current magnitude used to charge the connected battery modules during the constant current charging phase.	Unsigned16
Batt 2: Battery capacity [0.1 Ah]	Battery capacity: Total battery capacity of all energy storage devices connected to the SITOP UPS1600.	Unsigned16

Data	Description	Data type
Batt 2: Stop buffering voltage [0.01 V]	Battery voltage, which when fallen below, buffer mode is exited (stop buffering voltage).	Unsigned16
Batt 2: Battery type	Battery type	Unsigned8
Batt 2: Minimal temperature [1 °C]	Lowest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Batt 2: Maximal temperature [1 °C]	Highest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Fill byte(s)	-	1 x Unsigned8
Batt 2: Order number	Order number (Article number).	VisibleString(20)
Batt 2: Serial number	Serial number	VisibleString(16)
Batt 2: Manufacturing date	Manufacturing date	VisibleString(8)
Batt 2: Version number	Version number	VisibleString(6)
Batt 2: Calculated battery health	Calculated battery health	Unsigned8
Batt 2: Operating state	Operating state	Unsigned8
Batt 2: LED state	LED states	Unsigned8
Fill byte(s)	-	3 x Unsigned8
Batt 2: SWD	SW revision	Unsigned32
Batt 2: Battery MID	Battery Module Ident Number	Unsigned32
Batt 3: Standby time [1 s]	Standby time	Unsigned32
Batt 3: Buffer time [1 s]	Time in buffer mode	Unsigned32
Batt 3: Total charging current [1 mAh]	Total charge level (battery-specific data): Total charge within the service life of the SITOP UPS1600.	Unsigned32
Batt 3: Total culled current [1 mAh]	Total charge level used (battery-specific data): Total discharge in the service life of the SITOP UPS1600	Unsigned32
Batt 3: EOCV [0.01 V]	"End-of-charge voltage": Battery voltage when charging changes to trickle charging. The energy storage device is then charged up to 100 %.	Unsigned16
Batt 3: Charge current [1 mA]	Charge current: Current magnitude used to charge the connected battery modules during the constant current charging phase.	Unsigned16
Batt 3: Battery capacity [0.1 Ah]	Battery capacity: Total battery capacity of all energy storage devices connected to the SITOP UPS1600.	Unsigned16
Batt 3: Stop buffering voltage [0.01 V]	Battery voltage, which when fallen below, buffer mode is exited (stop buffering voltage).	Unsigned16
Batt 3: Battery type	Battery type	Unsigned8
Batt 3: Minimal temperature [1 °C]	Lowest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Batt 3: Maximal temperature [1 °C]	Highest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Fill byte(s)	-	1 x Unsigned8
Batt 3: Order number	Order number (Article number).	VisibleString(20)
Batt 3: Serial number	Serial number	VisibleString(16)
Batt 3: Manufacturing date	Manufacturing date	VisibleString(8)
Batt 3: Version number	Version number	VisibleString(6)
Batt 3: Calculated battery health	Calculated battery health	Unsigned8
Batt 3: Operating state	Operating state	Unsigned8
Batt 3: LED state	LED states	Unsigned8
Fill byte(s)	-	3 x Unsigned8
Batt 3: SWD	SW revision	Unsigned32
Batt 3: Battery MID	Battery Module Ident Number	Unsigned32

3.6 Cyclic and acyclic data

Data	Description	Data type
Batt 4: Standby time [1 s]	Standby time	Unsigned32
Batt 4: Buffer time [1 s]	Time in buffer mode	Unsigned32
Batt 4: Total charging current [1 mAh]	Total charge level (battery-specific data): Total charge within the service life of the SITOP UPS1600.	Unsigned32
Batt 4: Total culled current [1 mAh]	Total charge level used (battery-specific data): Total discharge over the service life of the SITOP UPS1600.	Unsigned32
Batt 4: EOCV [0.01 V]	"End-of-charge voltage": Battery voltage when charging changes to trickle charging. The energy storage device is then charged up to 100 %.	Unsigned16
Batt 4: Charge current [1 mA]	Charge current: Current magnitude used to charge the connected battery modules during the constant current charging phase.	Unsigned16
Batt 4: Battery capacity [0.1 Ah]	Battery capacity: Total battery capacity of all energy storage devices connected to the SITOP UPS1600	Unsigned16
Batt 4: Stop buffering voltage [0.01 V]	Battery voltage, which when fallen below, buffer mode is exited (stop buffering voltage).	Unsigned16
Batt 4: Battery type	Battery type	Unsigned8
Batt 4: Minimal temperature [1 °C]	Lowest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Batt 4: Maximal temperature [1 °C]	Highest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Fill byte(s)	-	1 x Unsigned8
Batt 4: Order number	Order number (Article number).	VisibleString(20)
Batt 4: Serial number	Serial number	VisibleString(16)
Batt 4: Manufacturing date	Manufacturing date	VisibleString(8)
Batt 4: Version number	Version number	VisibleString(6)
Batt 4: Calculated battery health	Calculated battery health	Unsigned8
Batt 4: Operating state	Operating state	Unsigned8
Batt 4: LED state	LED states	Unsigned8
Fill byte(s)	-	3 x Unsigned8
Batt 4: SWD	SW revision	Unsigned32
Batt 4: Battery MID	Battery Module Ident Number	Unsigned32
Batt 5: Standby time [1 s]	Standby time	Unsigned32
Batt 5: Buffer time [1 s]	Time in buffer mode	Unsigned32
Batt 5: Total charging current [1 mAh]	Total charge level (battery-specific data): Total charge within the service life of the SITOP UPS1600.	Unsigned32
Batt 5: Total culled current [1 mAh]	Total charge level used (battery-specific data): Total discharge in the service life of the SITOP UPS1600	Unsigned32
Batt 5: EOCV [0.01 V]	"End-of-charge voltage": Battery voltage when charging changes to trickle charging. The energy storage device is then charged up to 100 %.	Unsigned16
Batt 5: Charge current [1 mA]	Charge current: Current magnitude used to charge the connected battery modules during the constant current charging phase.	Unsigned16
Batt 5: Battery capacity [0.1 Ah]	Battery capacity: Total battery capacity of all energy storage devices connected to the SITOP UPS1600	Unsigned16
Batt 5: Stop buffering voltage [0.01 V]	Battery voltage, which when fallen below, buffer mode is exited (stop buffering voltage).	Unsigned16
Batt 5: Battery type	Battery type	Unsigned8
Batt 5: Minimal temperature [1 °C]	Lowest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8

Data	Description	Data type
Batt 5: Maximal temperature [1 °C]	Highest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Fill byte(s)	-	1 x Unsigned8
Batt 5: Order number	Order number (Article number).	VisibleString(20)
Batt 5: Serial number	Serial number	VisibleString(16)
Batt 5: Manufacturing date	Manufacturing date	VisibleString(8)
Batt 5: Version number	Version number	VisibleString(6)
Batt 5: Calculated battery health	Calculated battery health	Unsigned8
Batt 5: Operating state	Operating state	Unsigned8
Batt 5: LED state	LED states	Unsigned8
Fill byte(s)	-	3 x Unsigned8
Batt 5: SWD	SW revision	Unsigned32
Batt 5: Battery MID	Battery Module Ident Number	Unsigned32
Batt 6: Standby time [1 s]	Standby time	Unsigned32
Batt 6: Buffer time [1 s]	Time in buffer mode	Unsigned32
Batt 6: Total charging current [1 mAh]	Total charge level (battery-specific data): Total charge within the service life of the SITOP UPS1600.	Unsigned32
Batt 6: Total culled current [1 mAh]	Total charge level used (battery-specific data): Total discharge in the service life of the SITOP UPS1600	Unsigned32
Batt 6: EOCV [0.01 V]	"End-of-charge voltage": Battery voltage when charging changes to trickle charging. The energy storage device is then charged up to 100 %.	Unsigned16
Batt 6: Charge current [1 mA]	Charge current: Current magnitude used to charge the connected battery modules during the constant current charging phase.	Unsigned16
Batt 6: Battery capacity [0.1 Ah]	Battery capacity: Total battery capacity of all energy storage devices connected to the SITOP UPS1600.	Unsigned16
Batt 6: Stop buffering voltage [0.01 V]	Battery voltage, which when fallen below, buffer mode is exited (stop buffering voltage).	Unsigned16
Batt 6: Battery type	Battery type	Unsigned8
Batt 6: Minimal temperature [1 °C]	Lowest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Batt 6: Maximal temperature [1 °C]	Highest specified operating temperature of the SITOP BAT1600 or SITOP UPS1100 battery module being used	Signed8
Fill byte(s)	-	1 x Unsigned8
Batt 6: Order number	Order number (Article number).	VisibleString(20)
Batt 6: Serial number	Serial number	VisibleString(16)
Batt 6: Manufacturing date	Manufacturing date	VisibleString(8)
Batt 6: Version number	Version number	VisibleString(6)
Batt 6: Calculated battery health	Calculated battery health	Unsigned8
Batt 6: Operating state	Operating state	Unsigned8
Batt 6: LED state	LED states	Unsigned8
Fill byte(s)	-	3 x Unsigned8
Batt 6: SWD	SW revision	Unsigned32
Batt 6: Battery MID	Battery Module Ident Number	Unsigned32

0x0006: Device information parameters (reading)

Data	Description	Data type
HW revision	Hardware version	Unsigned16
SW revision	Software release	Unsigned16
Boot loader version	Boot loader version	Unsigned16
Max output current [1 A]	Maximum output current	Unsigned8
Fill byte(s)	-	1 x Unsigned8
MLFB/Order number	MLFB/order number (Article number)	VisibleString(20)
Serial number	Serial number	VisibleString(16)
Device name	Device name	VisibleString(30)
Version number	Version number	VisibleString(50)

0x0007: Hardware settings parameters (reading)

Data	Description	Data type
Buffer time [1 s]	Buffer time: After the selected buffer time has expired, the SITOP UPS1600 switches off the load output. The actual buffer time that can be achieved depends on the connected loads and energy storage devices.	Unsigned16
Buffer threshold [0.01 V]	Connection threshold: Switching voltage for buffering. Buffering is active below this value.	Unsigned16
Buffering allowed	Activate or deactivate buffer mode. This setting is only accepted by the SITOP UPS1600 in the Remote Enable (REN) operating mode.	Unsigned8
Enable reset	Enable reset: If, during buffer mode, the input voltage becomes available again, then the output of the SITOP UPS1600 is switched off for a selectable time in order to reset connected loads.	Unsigned8
Start from battery	Start from battery: Setting at the signal terminal for function "Start from battery".	Unsigned8
Selected battery profile	Profile of the selected battery: The battery charging behavior is set at the signal terminals. The setting is only used, if the SITOP UPS1600 is not in the "Remote Enable" (REN) mode.	Unsigned8

0x0008: Buffering parameters (reading/writing)

Data	Description	Data type
Expected buffer current [0.1 Ah] from V2.0 and higher	Expected buffer current: Estimated average load current during buffer mode.	Unsigned16

0x0009: Maintenance parameters (reading/writing)

Data	Description	Data type
Resistor test interval [1 h] from V2.1	R test interval	Unsigned16

0x000A: Third-party battery parameters (reading/writing)

Data	Description	Data type
Ignore data of coded battery	Ignore SITOP battery data: When this parameter is set to "1", SITOP battery data is ignored, and instead data from the third-party battery parameter set is used.	Unsigned8
Battery type	Make/type of battery 0 = Pb ... lead-gel battery, 1 = pPb ... pure lead battery	Unsigned8
Typical ambient temperature [°C]	Typical ambient temperatures for battery modules in operation.	Integer8
Battery capacity [Ah/10]	Total capacity of the installed batteries	Unsigned16
End-of-charge voltage at 20 °C [V/100]	Max. permissible battery voltage referred to 20 °C during the charging phase. When reaching this threshold value, a switch is made into the "Constant voltage" charging mode.	Unsigned16
Temperature coefficient [mV/K]	Together with the end-of-charge voltage at 20 °C, the temperature coefficient is used in the system to calculate the temperature-controlled end-of-charge voltage.	Unsigned16
Duration of constant floating voltage charging phase [h]	Duration of the constant voltage charging phase	Unsigned16
Charge current [mA]	Max. permissible charge current. The manufacturer's data for the permissible charge current of the battery must be observed. The lowest permissible charge current is applicable when several batteries are connected.	Unsigned16
Start preserve charge voltage [V]	Threshold when switching over from normal battery charging to pure preserve charge voltage (brief post charging)	Unsigned16
Stop buffering voltage [V/100]	Discharge threshold at which buffer mode is stopped	Unsigned16
Faulty battery voltage [V/100]	Voltage value below which a battery is considered to be defective and should no longer be charged	Unsigned16

0x000B: Charging parameters (reading/writing)

Data	Description	Data type
Deactivate charging function	Shutdown battery charging	Unsigned8
Maximum permitted charge current [mA]	Maximum permissible current to charge the battery	Unsigned16

0x0010: DC-UPS command (writing)

Data	Description	Data type
CommandID	Remote reset: 8195	Unsigned16
Parameter 1	Not used	Unsigned8
Parameter 2	T _{off} : output voltage down time [s] >= V1.0	Unsigned8

Data	Description	Data type
CommandID	Remote reset 2: 8207	Unsigned16
Parameter 1	T _d : Waiting time after end of communication [s]	Unsigned8
Parameter 2	T _{off} : output voltage down time [s] >= V2.0.0	Unsigned8

Data	Description	Data type
CommandID	Output ON/OFF: 8200	Unsigned16
Parameter 1	0	Unsigned8
Parameter 2	0: output OFF 1: output ON	Unsigned8

Data	Description	Data type
CommandID	Reset to Factory Values: 8209	Unsigned16
Parameter 1	Not used	Unsigned8
Parameter 2	Not used >= V2.1.0	Unsigned8

Data	Description	Data type
CommandID	Shutdown: 8194	Unsigned16
Parameter 1	Not used	Unsigned8
Parameter 2	Not used	Unsigned8

0x0010: Result of DC-UPS command (reading)

Data	Description	Data type
CommandID	CommandID (of the previously sent command)	Unsigned16
Parameter 1	0: OK > 0: Error	Unsigned16

0x0011: Battery 1 information parameters (reading)

Data	Description	Data type
Number of batteries	Number of connected batteries	Unsigned8 from V2.2
Battery 1 available	0 ... not available 1 ... available	Unsigned8 from V2.2
Minimal temperature	Minimal temperature	Signed8 from V2.2
Maximal temperature	Maximal temperature	Signed8 from V2.2
Standby time	Standby time	Unsigned32 from V2.2
Buffer time	Buffer time	Unsigned32 from V2.2
Total charging current	Total charging current	Unsigned32 from V2.2
Total culled current	Total culled current	Unsigned32 from V2.2

Data	Description	Data type
EOCV	End-of-charge voltage	Unsigned16 from V2.2
Charge current	Charge current	Unsigned16 from V2.2
Battery capacity	Battery capacity	Unsigned16 from V2.2
Stop buffering voltage	Stop buffering voltage	Unsigned16 from V2.2
Battery type	Battery type	Unsigned8 from V2.2
Fill byte(s)	-	1 x Unsigned8
Order number	Order number	VisibleString(20) from V2.2
Serial number	Serial number	VisibleString(16) from V2.2
Manufacturing date	Manufacturing date	3 x Unsigned8 from V2.2
Version number	Version number (SW / HW)	2 x Unsigned8 from V2.2
Calculated battery health	Calculated battery health	Unsigned8
Operating state	Operating state	Unsigned8
LED state	LED states	Unsigned8
Fill byte(s)	-	2 x Unsigned8
SWD	SW revision	Unsigned32
Battery MID	Battery Module Ident Number	Unsigned32

0x0012: Battery 2 information parameters (reading)

Data	Description	Data type
Number of batteries	Number of connected batteries	Unsigned8 from V2.2
Battery 2 available	0 ... not available 2 ... available	Unsigned8 from V2.2
Minimal temperature	Minimal temperature	Signed8 from V2.2
Maximal temperature	Maximal temperature	Signed8 from V2.2
Standby time	Standby time	Unsigned32 from V2.2
Buffer time	Buffer time	Unsigned32 from V2.2
Total charging current	Total charging current	Unsigned32 from V2.2
Total culled current	Total culled current	Unsigned32 from V2.2
EOCV	End-of-charge voltage	Unsigned16 from V2.2
Charge current	Charge current	Unsigned16 from V2.2

Data	Description	Data type
Battery capacity	Battery capacity	Unsigned16 from V2.2
Stop buffering voltage	Stop buffering voltage	Unsigned16 from V2.2
Battery type	Battery type	Unsigned8 from V2.2
Fill byte(s)	-	1 x Unsigned8
Order number	Order number	VisibleString(20) from V2.2
Serial number	Serial number	VisibleString(16) from V2.2
Manufacturing date	Manufacturing date	3 x Unsigned8 from V2.2
Version number	Version number (SW / HW)	2 x Unsigned8 from V2.2
Calculated battery health	Calculated battery health	Unsigned8
Operating state	Operating state	Unsigned8
LED state	LED states	Unsigned8
Fill byte(s)	-	2 x Unsigned8
SWD	SW revision	Unsigned32
Battery MID	Battery Module Ident Number	Unsigned32

0x0013: Battery 3 information parameters (reading)

Data	Description	Data type
Number of batteries	Number of connected batteries	Unsigned8 from V2.2
Battery 3 available	0 ... not available 3 ... available	Unsigned8 from V2.2
Minimal temperature	Minimal temperature	Signed8 from V2.2
Maximal temperature	Maximal temperature	Signed8 from V2.2
Standby time	Standby time	Unsigned32 from V2.2
Buffer time	Buffer time	Unsigned32 from V2.2
Total charging current	Total charging current	Unsigned32 from V2.2
Total culled current	Total culled current	Unsigned32 from V2.2
EOCV	End-of-charge voltage	Unsigned16 from V2.2
Charge current	Charge current	Unsigned16 from V2.2
Battery capacity	Battery capacity	Unsigned16 from V2.2
Stop buffering voltage	Stop buffering voltage	Unsigned16 from V2.2

Data	Description	Data type
Battery type	Battery type	Unsigned8 from V2.2
Fill byte(s)	-	1 x Unsigned8
Order number	Order number	VisibleString(20) from V2.2
Serial number	Serial number	VisibleString(16) from V2.2
Manufacturing date	Manufacturing date	3 x Unsigned8 from V2.2
Version number	Version number (SW / HW)	2 x Unsigned8 from V2.2
Calculated battery health	Calculated battery health	Unsigned8
Operating state	Operating state	Unsigned8
LED state	LED states	Unsigned8
Fill byte(s)	-	2 x Unsigned8
SWD	SW revision	Unsigned32
Battery MID	Battery Module Ident Number	Unsigned32

0x0014 Battery 4 information parameters (reading)

Data	Description	Data type
Number of batteries	Number of connected batteries	Unsigned8 from V2.2
Battery 4 available	0 ... not available 4 ... available	Unsigned8 from V2.2
Minimal temperature	Minimal temperature	Signed8 from V2.2
Maximal temperature	Maximal temperature	Signed8 from V2.2
Standby time	Standby time	Unsigned32 from V2.2
Buffer time	Buffer time	Unsigned32 from V2.2
Total charging current	Total charging current	Unsigned32 from V2.2
Total culled current	Total culled current	Unsigned32 from V2.2
EOCV	End-of-charge voltage	Unsigned16 from V2.2
Charge current	Charge current	Unsigned16 from V2.2
Battery capacity	Battery capacity	Unsigned16 from V2.2
Stop buffering voltage	Stop buffering voltage	Unsigned16 from V2.2
Battery type	Battery type	Unsigned8 from V2.2
Fill byte(s)	-	1 x Unsigned8
Order number	Order number	VisibleString(20) from V2.2

Data	Description	Data type
Serial number	Serial number	VisibleString(16) from V2.2
Manufacturing date	Manufacturing date	3 × Unsigned8 from V2.2
Version number	Version number (SW / HW)	2 × Unsigned8 from V2.2
Calculated battery health	Calculated battery health	Unsigned8
Operating state	Operating state	Unsigned8
LED state	LED states	Unsigned8
Fill byte(s)	-	2 x Unsigned8
SWD	SW revision	Unsigned32
Battery MID	Battery Module Ident Number	Unsigned32

0x0015: Battery 5 information parameters (reading)

Data	Description	Data type
Number of batteries	Number of connected batteries	Unsigned8 from V2.2
Battery 5 available	0 ... not available 5 ... available	Unsigned8 from V2.2
Minimal temperature	Minimal temperature	Signed8 from V2.2
Maximal temperature	Maximal temperature	Signed8 from V2.2
Standby time	Standby time	Unsigned32 from V2.2
Buffer time	Buffer time	Unsigned32 from V2.2
Total charging current	Total charging current	Unsigned32 from V2.2
Total culled current	Total culled current	Unsigned32 from V2.2
EOCV	End-of-charge voltage	Unsigned16 from V2.2
Charge current	Charge current	Unsigned16 from V2.2
Battery capacity	Battery capacity	Unsigned16 from V2.2
Stop buffering voltage	Stop buffering voltage	Unsigned16 from V2.2
Battery type	Battery type	Unsigned8 from V2.2
Fill byte(s)	-	1 x Unsigned8
Order number	Order number	VisibleString(20) from V2.2
Serial number	Serial number	VisibleString(16) from V2.2
Manufacturing date	Manufacturing date	3 × Unsigned8 from V2.2

Data	Description	Data type
Version number	Version number (SW / HW)	2 × Unsigned8 from V2.2
Calculated battery health	Calculated battery health	Unsigned8
Operating state	Operating state	Unsigned8
LED state	LED states	Unsigned8
Fill byte(s)	-	2 × Unsigned8
SWD	SW revision	Unsigned32
Battery MID	Battery Module Ident Number	Unsigned32

0x0016: Battery 6 information parameters (reading)

Data	Description	Data type
Number of batteries	Number of connected batteries	Unsigned8 from V2.2
Battery 6 available	0 ... not available 6 ... available	Unsigned8 from V2.2
Minimal temperature	Minimal temperature	Signed8 from V2.2
Maximal temperature	Maximal temperature	Signed8 from V2.2
Standby time	Standby time	Unsigned32 from V2.2
Buffer time	Buffer time	Unsigned32 from V2.2
Total charging current	Total charging current	Unsigned32 from V2.2
Total culled current	Total culled current	Unsigned32 from V2.2
EOCV	End-of-charge voltage	Unsigned16 from V2.2
Charge current	Charge current	Unsigned16 from V2.2
Battery capacity	Battery capacity	Unsigned16 from V2.2
Stop buffering voltage	Stop buffering voltage	Unsigned16 from V2.2
Battery type	Battery type	Unsigned8 from V2.2
Fill byte(s)	-	1 × Unsigned8
Order number	Order number	VisibleString(20) from V2.2
Serial number	Serial number	VisibleString(16) from V2.2
Manufacturing date	Manufacturing date	3 × Unsigned8 from V2.2
Version number	Version number (SW / HW)	2 × Unsigned8 from V2.2
Calculated battery health	Calculated battery health	Unsigned8
Operating state	Operating state	Unsigned8

Data	Description	Data type
LED state	LED states	Unsigned8
Fill byte(s)	-	2 x Unsigned8
SWD	SW revision	Unsigned32
Battery MID	Battery Module Ident Number	Unsigned32

0x0020: State information (reading)

Data	Description	Data type
Remaining buffer time [1 s]	Probable remaining buffer time. The remaining buffer time is calculated based on the present battery charge and the average current over a 10 minute period.	Unsigned32
Total operating time [1 h]	Total operating time.	Unsigned32
Total calculated battery capacity [0.1 Ah]	Total calculated battery capacity For < V2.3.x, the variable is not supported and supplies value 0.	Unsigned16
Calculated battery 1 capacity [0.1 Ah]	Battery 1: Calculated battery capacity For < V2.3.x, the variable is not supported and supplies value 0.	Unsigned16
Calculated battery 2 capacity [0.1 Ah]	Battery 2: Calculated battery capacity For < V2.3.x, the variable is not supported and supplies value 0.	Unsigned16
Calculated battery 3 capacity [0.1 Ah]	Battery 3: Calculated battery capacity For < V2.3.x, the variable is not supported and supplies value 0.	Unsigned16
Calculated battery 4 capacity [0.1 Ah]	Battery 4: Calculated battery capacity For < V2.3.x, the variable is not supported and supplies value 0.	Unsigned16
Calculated battery 5 capacity [0.1 Ah]	Battery 5: Calculated battery capacity For < V2.3.x, the variable is not supported and supplies value 0.	Unsigned16
Calculated battery 6 capacity [0.1 Ah]	Battery 6: Calculated battery capacity For < V2.3.x, the variable is not supported and supplies value 0.	Unsigned16
Input voltage [0.01 V]	Input voltage: Measured rms value of the supply voltage at the input of the SITOP UPS1600.	Unsigned16
Input current [5 mA]	Current measured at the input of the SITOP UPS1600.	Unsigned16
Output voltage [0.01 V]	Voltage measured at the output of the SITOP UPS1600.	Unsigned16
Load current [5 mA]	Load current measured at the output of the SITOP UPS1600.	Unsigned16
Measured charge current [1 mA]	Measured battery charge current of the SITOP UPS1600.	Unsigned16
Battery voltage [0.01 V]	Measured battery voltage of the connected battery modules	Unsigned16
Output current [5 mA]	Load current measured at the output of the SITOP UPS1600.	Unsigned16
Charge voltage [0.01 V]	Voltage used to charge the battery during the constant-current charging phase	Unsigned16
Fill byte(s)	-	3 x Unsigned8
Valid configuration	Valid configuration: Indicates whether the software parameters or the parameters at the rotary coding switch are used. The corresponding setting should be made at the rotary coding switch for the buffer threshold.	Unsigned8
Number of batteries	Number of connected battery modules. Here, only SITOP BAT1600 or SITOP UPS1100 battery modules (SITOP system batteries) are counted.	Unsigned8
Fill byte(s)	-	7 x Unsigned8
Battery 1 change recommended	Battery 1: Battery replacement recommended: The battery capacity is not sufficient for the defined buffer time.	Unsigned8
Battery 2 change recommended	Battery 2: Battery replacement recommended: The battery capacity is not sufficient for the defined buffer time.	Unsigned8

Data	Description	Data type
Battery 3 change recommended	Battery 3: Battery replacement recommended: The battery capacity is not sufficient for the defined buffer time.	Unsigned8
Battery 4 change recommended	Battery 4: Battery replacement recommended: The battery capacity is not sufficient for the defined buffer time.	Unsigned8
Battery 5 change recommended	Battery 5: Battery replacement recommended: The battery capacity is not sufficient for the defined buffer time.	Unsigned8
Battery 6 change recommended	Battery 6: Battery replacement recommended: The battery capacity is not sufficient for the defined buffer time.	Unsigned8
Battery 1 Connection Fault	Battery 1: Connection fault	Unsigned8
Battery 2 Connection Fault	Battery 2: Connection fault	Unsigned8
Battery 3 Connection Fault	Battery 3: Connection fault	Unsigned8
Battery 4 Connection Fault	Battery 4: Connection fault	Unsigned8
Battery 5 Connection Fault	Battery 5: Connection fault	Unsigned8
Battery 6 Connection Fault	Battery 6: Connection fault	Unsigned8
Battery 1 temperature [1 °C]	Battery 1: Battery temperature	Integer8
Battery 2 temperature [1 °C]	Battery 2: Battery temperature	Integer8
Battery 3 temperature [1 °C]	Battery 3: Battery temperature	Integer8
Battery 4 temperature [1 °C]	Battery 4: Battery temperature	Integer8
Battery 5 temperature [1 °C]	Battery 5: Battery temperature	Integer8
Battery 6 temperature [1 °C]	Battery 6: Battery temperature	Integer8
Device temperature [1 °C]	Temperature in the housing	Integer8
LED pattern	Status of LEDs 1 to 4 for the SITOP UPS1600 ¹⁾	Unsigned8
Battery 1 Calculated battery health	Battery 1: Calculated battery health	Unsigned8
Battery 2 Calculated battery health	Battery 2: Calculated battery health	Unsigned8
Battery 3 Calculated battery health	Battery 3: Calculated battery health	Unsigned8
Battery 4 Calculated battery health	Battery 4: Calculated battery health	Unsigned8
Battery 5 Calculated battery health	Battery 5: Calculated battery health	Unsigned8
Battery 6 Calculated battery health	Battery 6: Calculated battery health	Unsigned8
Battery 1 Operating state	Battery 1: Operating state	Unsigned8
Battery 2 Operating state	Battery 2 Operating state	Unsigned8
Battery 3 Operating state	Battery 3: Operating state	Unsigned8
Battery 4 Operating state	Battery 4: Operating state	Unsigned8
Battery 5 Operating state	Battery 5: Operating state	Unsigned8
Battery 6 Operating state	Battery 6: Operating state	Unsigned8
Battery 1 LED state	Battery 1: LED states	Unsigned8
Battery 2 LED state	Battery 2: LED states	Unsigned8
Battery 3 LED state	Battery 3: LED states	Unsigned8
Battery 4 LED state	Battery 4: LED states	Unsigned8
Battery 5 LED state	Battery 5: LED states	Unsigned8
Battery 6 LED state	Battery 6: LED states	Unsigned8
Charging operating state	Status of the charging unit	Unsigned8

¹⁾ Object structure LED pattern

3.6 Cyclic and acyclic data

7	6	5	4	3	2	1	0
Led 4		Led 3		Led 2		Led 1	
a	b	a	b	a	b	a	b

a	b	
0	0	Off
0	1	Red
1	0	Green
1	1	Yellow

0x0041: Web server parameters (reading/writing)

Data	Description	Data type
WebserverEnabled	Activating/deactivating the web server of the SITOP UPS1600: <ul style="list-style-type: none"> 0: disable 255: enable 	Unsigned8
AutoReloadEnabled from V2.1	Enable/disable automatic update: <ul style="list-style-type: none"> 0: disable 255: enable 	Unsigned8
ReloadTime from V2.1	Update interval: <ul style="list-style-type: none"> 0: Off 5: 5s 10: 10s 20: 20s 30: 30s 60: 60s 	Unsigned8
AutoLogout from V2.1	Enable/disable automatic logoff: <ul style="list-style-type: none"> 0: disable 255: enable When automatic logoff is activated, the logged on user ("Guest" or "Admin") is automatically logged off when the SITOP UPS1600 web server is inactive for 15 minutes.	Unsigned8
HttpAccessEnable from V2.1	Enable/disable HTTP access: <ul style="list-style-type: none"> 0: disable 255: enable 	Unsigned8
Fill byte(s) from V2.1	-	Unsigned8

0x0042: OPC UA server (reading/writing)

Data	Description	Data type
OPCServerEnabled	Activate/deactivate the OPC UA interface of the SITOP UPS1600: <ul style="list-style-type: none"> • 0: disable • 255: enable 	Unsigned8
OPCUnencryptedAccessEnable	Activate/deactivate unencrypted access via the OPC UA interface of the SITOP UPS1600: <ul style="list-style-type: none"> • 0: disable • 255: enable 	Unsigned8
OPCBasic128AccessEnabled	Activate/deactivate encrypted and signed access with Basic 128 via the OPC UA interface of the SITOP UPS1600: <ul style="list-style-type: none"> • 0: disable • 255: enable 	Unsigned8
OPCBasic256AccessEnabled	Activate/deactivate encrypted and signed access with Basic 256 via the OPC UA interface of the SITOP UPS1600: <ul style="list-style-type: none"> • 0: disable • 255: enable 	Unsigned8
OPCBasic256SHA256AccessEnabled	Activate/deactivate encrypted and signed access with Basic 256 and SHA 256 via the OPC UA interface of the SITOP UPS1600: <ul style="list-style-type: none"> • 0: disable • 255: enable 	Unsigned8
OPCPort	Set port for OPC UA interface (1 to 65535)	Unsigned16
Fill byte(s)	-	1 x Unsigned8

0x0043: NTP client parameters (reading/writing)

Data	Description	Data type
NTPServerEnabled	Activate/deactivate NTP server: <ul style="list-style-type: none"> • 0: disable • 255: enable 	Unsigned8 from V2.2
Fill byte(s)	-	Unsigned8 from V2.2
NTPServer1	IP address of NTP server 1	VisibleString(16) from V2.2
NTPServer2	IP address of NTP server 2	VisibleString(16) from V2.2
NTPServer3	IP address of NTP server 3	VisibleString(16) from V2.2
NTPServer4	IP address of NTP server 4	VisibleString(16) from V2.2

0x0044: NTP client status parameters (reading)

Data	Description	Data type
Last synchronization time	Time that the last synchronization took place	VisibleString(20) from V2.2
Next synchronization time	Time of the next planned synchronization	VisibleString(20) from V2.2

0x0045: PROFINETSecurity (reading/writing)

Data	Description	Data type
DCPReadOnlyIfConnected	Setting for DCP write protection	Unsigned8 from V2.2
Fill byte(s)	-	Unsigned8 from V2.2

3.7 SITOP Manager

SITOP Manager is a software tool for commissioning, engineering and monitoring existing and future OPC UA-capable SITOP devices with communication interface in a customer network in offline and online operation.

The SITOP Manager comprises three modular services that can be individually installed and operated:

- SITOP Manager Service (MGR)
- SITOP Gateway Service (GWS)
- SITOP Shutdown Service (SDS)

SITOP Manager and SITOP Shutdown Service provide a web-based graphic user interface (web GUI).

This version of the SITOP Manager supports the power supply system SITOP PSU8600, the uninterruptible power supply SITOP UPS1600 as well as product families SITOP DC UPS module, SITOP UPS500P and SITOP UPS500S activated by OPC UA. Additional detailed information about the devices supported is provided in the User Manual of the SITOP Manager.

The SITOP Manager software is available at no charge via the SIOS download portal. Entry ID 109760607 (<https://support.industry.siemens.com/cs/ww/en/view/109760607>)

3.7.1 System overview

The SITOP Manager comprises three modular services that can be individually installed and operated: These are SITOP Manager Service (MGR), the SITOP Gateway Service (GWS) and the SITOP Shutdown Service (SDS). This means that users can freely decide which services should be installed on each computer.

SITOP Manager can be installed on every personal computer (PC) with Microsoft Windows operating system or on any industrial PC (IPC) on which SIMATIC Industrial OS is running.

All three services: SITOP Manager Service (MGR), SITOP Gateway Service (GWS) and SITOP Shutdown Service (SDS), can be installed on a computer running Microsoft Windows. However, from these three services, only the following two can be installed on computers with SIMATIC Industrial OS: The SITOP Gateway Service (GWS) and the SITOP Shutdown Service (SDS).




Note

SIMATIC Industrial OS is a Linux-based operating system for applications that run in an industrial environment. This represents a proven alternative to the Microsoft Windows operating system. More information on SIMATIC Industrial OS is provided at Simatic Industrial OS (<https://support.industry.siemens.com/cs/us/en/view/109772995/de>).

Note

In this document, the term IPC is used as synonym for PC and IPCs, as generally IPCs are used in industrial environments.

The scope of the services is described below:

1. The SITOP Manager service (MGR) - represented by symbol  - is used to browse, develop, commission and monitor several SITOP objects such as SITOP PSU8600, SITOP UPS1600, SITOP DC UPS module, SITOP UPS500P, SITOP UPS500S, SITOP Shutdown Service and/or SITOP Gateway Service. The user interface is implemented using a web interface, and can either be locally or remotely called.
2. The SITOP Shutdown Service (SDS) - represented by symbol  - is responsible for communication between IPC, on which it is installed, and a buffer device (i.e. SITOP PSU8600 SITOP, UPS1600, SITOP DC UPS module, SITOP UPS500P and SITOP UPS500S). This service is required as a minimum in order to initiate that the IPC runs down after a (buffered) power failure. SDS can be configured in the MGR, but also directly via an integrated web interface (required for systems without MGR).
3. The SITOP Gateway Service (GWS) - represented by symbol  - is responsible for communication between SITOP UPS1600 with USB interface, SITOP DC UPS module with USB interface, SITOP UPS500P with USB interface and between SITOP UPS500S with USB interface on one side and the OPC UA interface on the other side, which is required for SDS and MGR. The Gateway Service is installed on the IPC at which devices SITOP UPS1600, SITOP DC UPS module, SITOP UPS500P or SITOP UPS500S are physically connected via a USB port.

Together, these three services form the SITOP Manager software product.

Application

Using the SITOP Manager, you can execute the most important tasks:

- Commissioning and monitoring several SITOP PSU8600 SITOP, UPS1600, SITOP DC UPS module, SITOP UPS500P and SITOP UPS500S
- Online engineering involving several SITOP PSU8600 SITOP, UPS1600, SITOP DC UPS module, SITOP UPS500P and SITOP UPS500S
- Offline engineering involving several SITOP PSU8600 SITOP, UPS1600, SITOP DC UPS module, SITOP UPS500P and SITOP UPS500S
- Controlled shutdown of buffered IPC systems (24 Volt)
- Backup and import of project configurations for archiving and replacement
- Secure data exchange and communication

3.7.2 Components

SITOP Manager is a development and monitoring tool for SITOP devices with communication interface. It comprises three modular components, which can be individually installed and operated: The SITOP Manager Service (MGR), the SITOP Shutdown Service (SDS) and the SITOP Gateway Service (GWS). These services can be accessed using the three symbols in the system directory.

The interaction of the individual tool components with the supported services is shown below:

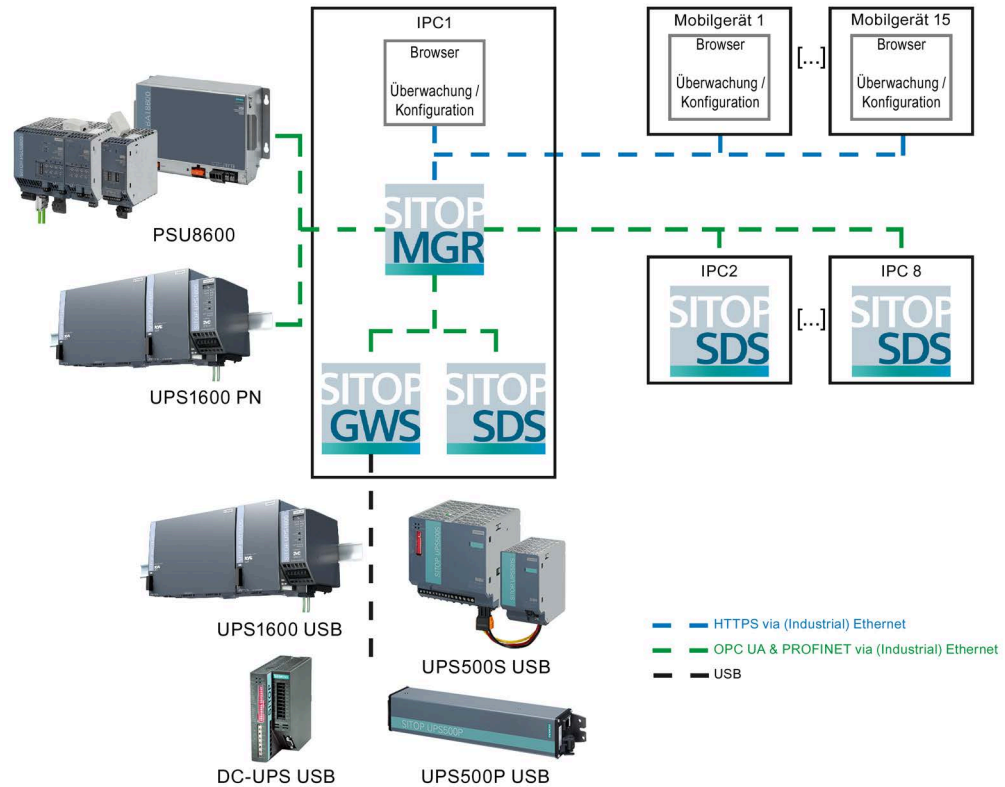


Figure 3-3 Server-client architecture of the SITOP Manager

3.8 SITOP UPS Manager

The SITOP UPS Manager from SITOP UPS1600 firmware Version V 2.3 is no longer supported.

We recommend migrating to SITOP Manager. Support on carrying out this migration is available through the Siemens Industry Support website at From SITOP UPS Manager to SITOP Manager (<https://support.industry.siemens.com/cs/de/en/view/109760629>).

3.9 Web server

The web server is used to monitor the SITOP UPS1600. It operates independently of SITOP Manager and PROFINET access.

New functions of the web server from V2.1 and higher:

- Write access
- User administration
- Access via https

3.9.1 Accessing the web server

A Web browser is used for the access and operation.

The following Web browsers are suitable:

- Microsoft Windows 7 Enterprise (32 and 64 bit) from SP1 Build 7601
- Microsoft Windows 10 Enterprise (64 bit) from Build 1511

Any IPC, which as a minimum uses one of the following browsers, can be used:

- Microsoft Internet Explorer V11
- Mozilla Firefox V54
- Google Chrome V60
- Microsoft Edge V25

Preconditions

- The computer with installed web browser is connected with the SITOP UPS1600 via Ethernet.
- The Web browser can display SVG graphics. From version V2.1 and higher, it is no longer necessary that SVG graphics are supported.

If your web browser cannot display SVG graphics, then "Please install the SVG viewer for a correct display" message appears on the start screen. To permit the correct display, perform the following steps:

- Download the SVG update at (<http://www.savarese.com/software/svgplugin>).
- Install the SVG update.
- If required, restart your computer.

- The SITOP UPS1600 has an IP address that is known to you.
- Activate access to the web server:
 - SIMATIC STEP 7 in the TIA Portal, see Parameterizing the UPS1600 (Page 70).
 - SIMATIC STEP 7 see Parameter assignment (Page 92).
 - without SIMATIC STEP 7:

Device in the state when supplied:

1. Turn both rotary coding switches into the REN and OFF positions.
2. Switch the device off and on again. Please wait approximately 1 minute as a new certificate is created due to the IP address change.
The device can now be accessed via <https://192.168.20.220>.
3. Login with name "admin" and password "admin".
4. Under "HW Configuration → General → Web server → Settings", the web server must be permanently activated ("Activate web server on this module").
5. Under "HW Configuration → General → Communication interface", IP address, subnet mask and router address can be set.
6. By clicking on "Download to device" configuration changes are transferred to the SITOP UPS1600 and become immediately effective. The connection to the web server is interrupted if the IP address is changed. After regenerating the certificate, the device can be accessed under the new IP address.

Note

For devices with software version V2.1.1, after changing the IP address, the device must be switched off and switched on again.

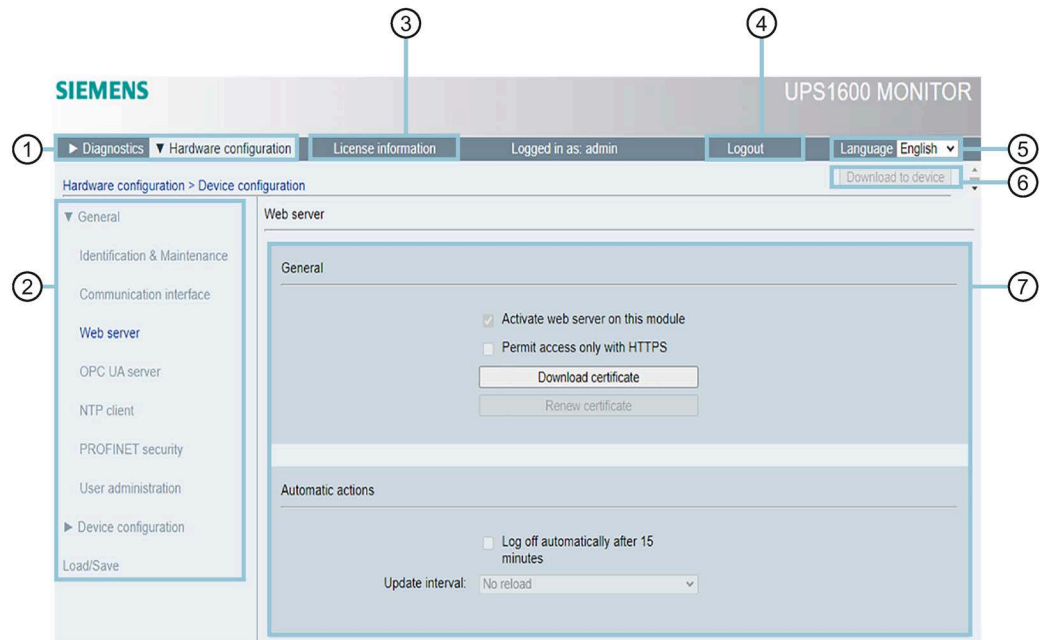
If an IP address was previously configured, and if this is not known, then this can be changed using SITOP Manager, Step 7 or PRONETA - or the device can be reset to the original delivery state.

Procedure

1. Connect the client (PG, PC) via the PROFINET interface with the SITOP UPS1600 device.
2. Open the web browser.
In the address dialog box of the web browser, enter the IP address of the SITOP UPS1600 in the form <http://www.xx.yy.zz> (input example: <http://192.168.0.14>).
The overview page is displayed after the connection to the web server has been successfully established. Click on the logon button to display the logon page.
3. Enter the logon information in the logon page.
Initial values:
 - User name: "admin"
 - Password: "admin"
On the logon page, the license information of the SITOP UPS1600 system - as well as the current web server certificate - can be downloaded.
4. Press the enter key.

The start page of SITOP UPS1600 opens. You can navigate to further menus from the start page.

3.9.2 The web server user interface



- ① Menu selection
- ② Navigation submenus
- ③ "License information" button
- ④ "Logout" button
- ⑤ Language selection
- ⑥ "Download to device" button
- ⑦ Editor area

The menu selection ① allows you to access menus "Diagnostics" and "HW configuration" and the various submenus. The functions of the menus are described in the following sections.

You access the submenus from the navigation submenus ②.

The associated settings possible in the selected submenu are made in the editor area ⑦.

You load the configuration to the devices by pressing button ⑥.

The language selection ⑤ is used to select the user interface language of the web server. The German, English, French, Italian, Spanish, and Chinese languages are available.

Click on the "Logout" ④ button to log out from the current web server session. The web server can only be accessed by logging in again.

You can download the license information of the SITOP UPS1600 system using the "License information" ③ button.

Grayed out menus

If the SITOP UPS1600 was assigned a SIMATIC S7 control as I/O device, or the SITOP Manager is connected to the SITOP UPS1600, then the web server is in the read-only mode. The following applies in the read-only mode:

- Write access not possible, the parameter settings can only be read (input values shown in gray, valid for software version up to V2.0).

3.9.3 Functions of the web server

The functions of the web server are split up between the two menus "Diagnostics" and "HW Configuration".

Use the "Download to device" function to load changes that you have made to the device, see Load / Save (Page 155).

Diagnostics

You can find the following submenus here:

- Alarms:
For an overview of past and active alarms, see Alarm monitoring (Page 136).
- Operating data:
For an overview of the operating data, see View the data of the SITOP UPS1600 (basic device) (Page 137) and Viewing the energy storage data (Page 138)
- Online functions with the options:
 - Output ON/OFF
 - Firmware update
 - Reset to factory setting

For the online functions, see Online functions (Page 140).

HW configuration

Here, in the following areas you can make changes:

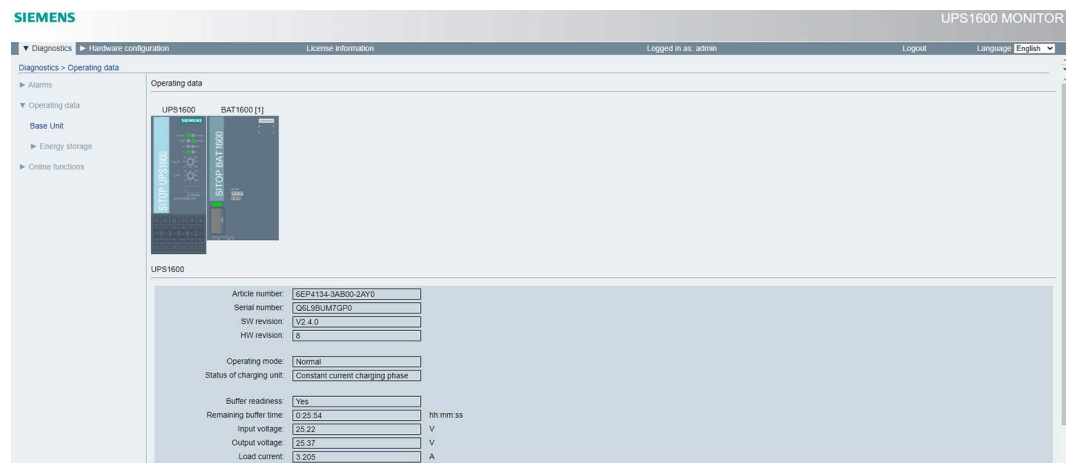
- Enter identification data on the device and location of use
- Configuring the communication interface, see General (Page 142)
- Changing the web server settings, see Web server (Page 144)
- Configuring the OPC UA interface, see OPC UA server (Page 145)
- NTP Configuring time synchronization
- Making PN security settings, see PROFINET security (Page 147).
- User management, see User administration (Page 147)
- Configuring basic units and energy storage devices, see Device configuration (Page 149)

You can save the configurations and load the existing configurations into the device, see Load / Save (Page 155).

3.9.4 Determining the firmware version

The firmware version of the SITOP UPS1600 can be determined as follows via Ethernet using the web server:

Using the menu command "Diagnostics > Operating data > Base Unit" the firmware version of the SITOP UPS1600 is displayed.



In the example shown, firmware version V2.4.0 is installed on the SITOP UPS1600.

3.9.5 Firmware update with web server

Precondition

- The SITOP UPS1600 has been correctly connected and linked with the system.
- PG/PC with the actual web browser is connected to the system and is logged on.

Note

The user logged on to the web server must be authorized to update the firmware.

Procedure

1. Select "Diagnostics > Online function > Firmware update".
2. Click on button "Select file". Select the appropriate update file.

3. Click on "Download"
Firmware update starts.
A message is displayed after a successful update.
4. Carry out a manual restart at the SITOP UPS1600 by clicking on button "Reboot".
5. After the restart, the SITOP UPS1600 automatically updates the firmware.
The firmware update has been performed successfully.

3.9.6 Diagnostics

3.9.6.1 Alarm monitoring

You can use the web server to obtain information about active alarms and the history of the alarms. Every alarm that concerns the SITOP UPS1600 and the connected battery modules is recorded. You can display active alarms using "Diagnostics > Alarms > Pending alarms".

Pending alarms

The currently pending system alarms are provided in this list.

The screenshot shows the 'Diagnostics -> Operating data' section. On the left, a navigation menu includes 'Alarms', 'Pending alarms', 'Alarm history', 'Operating data', and 'Online functions'. The main content area is titled 'Pending alarms' and contains a table with the following data:

Event	Date and time	Details on event
Buffer mode not possible	10.03.2017 07:37:26	Buffer mode not possible - check settings, cabling, fuse, and battery voltages
Deep discharge battery	10.03.2017 07:37:26	Battery is deep discharged - no buffering possible
Battery defective (battery index: 1)	10.03.2017 07:37:16	Battery defective - check fuse and battery voltages

Displaying the alarm history

1. Select menu "Diagnostics".
2. Select the "Alarm history" entry under "Alarms" in the navigation.

The alarm history is displayed in a tabular form.

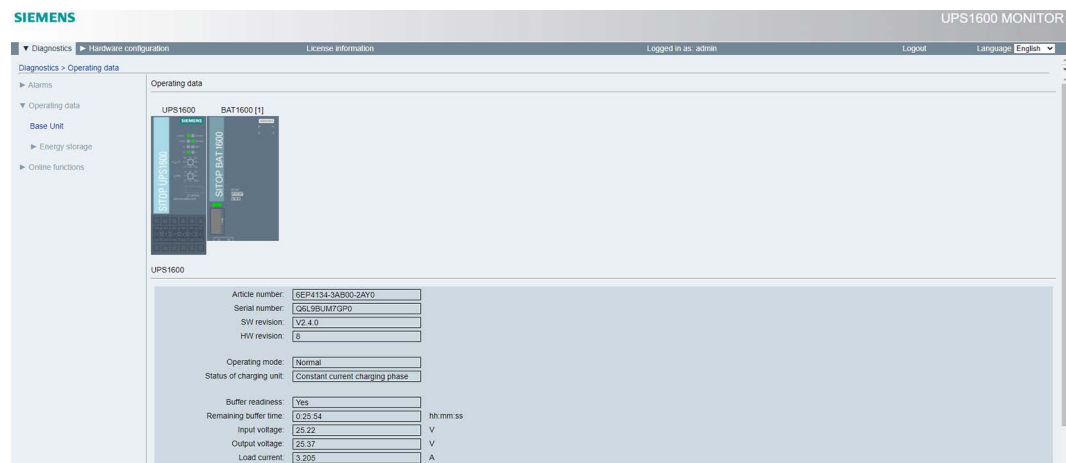
The screenshot shows the 'Diagnostics > Alarms > Alarm history' section. The top navigation bar includes 'Diagnostics', 'Hardware configuration', 'License information', 'Logged in as: admin', 'Logout', and 'Language English'. The main content area is titled 'Alarm history' and contains a table with the following data:

ID	Event	Severity	Date and time	Incoming/outgoing
257 / 31	Battery fully charged	0	15.04.2021 08:56:33:042	
257 / 26	Insufficient charge level	1	15.04.2021 08:55:13:060	
258 / 6	New battery detected (battery index: 1)	0	15.04.2021 08:53:00:394	
257 / 11	Output switched on	0	15.04.2021 08:52:59:394	
257 / 26	Insufficient charge level	1	15.04.2021 08:52:59:384	
257 / 1	Buffer mode not possible	2	15.04.2021 08:52:59:374	
257 / 1	Buffer mode not possible	2	15.04.2021 08:52:59:373	

The individual columns contain the following information:

- Name: A descriptive name of the alarm identifier
- Date and time: Time, degree of severity and date when the alarm comes and goes
- Incoming/outgoing:
 - incoming: Occurrence of the alarm event
 - outgoing: Rectification of the alarm event

3.9.6.2 View the data of the SITOP UPS1600 (basic device)



1. Select menu "Diagnostics".
2. Select the "Base unit" entry under "Operating data" in the navigation.

Here, you can find the following information:

- Data of the SITOP UPS1600:
 - Article number
 - Serial number
 - SW revision
 - Hardware revision
- Operating state (normal or buffer mode)
- Status of the charging unit
- Buffer readiness
- Remaining buffer time

Note

From the instant in time when the SITOP UPS1600 is switched over into the buffer mode, the buffer current actually measured is used to determine the expected buffer time instead of the expected buffer current.

- Input voltage
- Output voltage
- Load current

3.9.6.3 Viewing the energy storage data

BAT1600

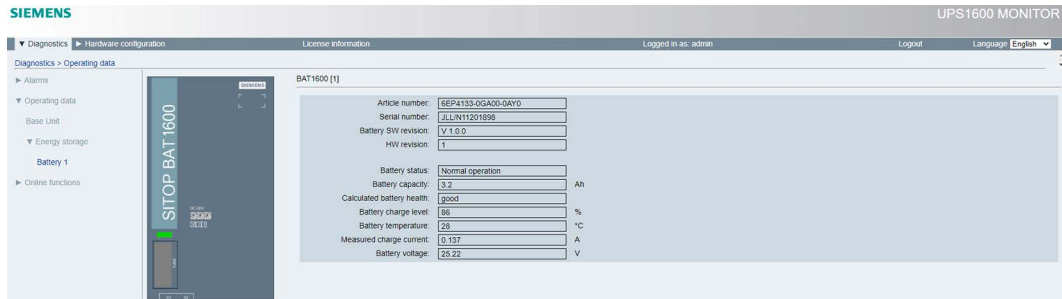


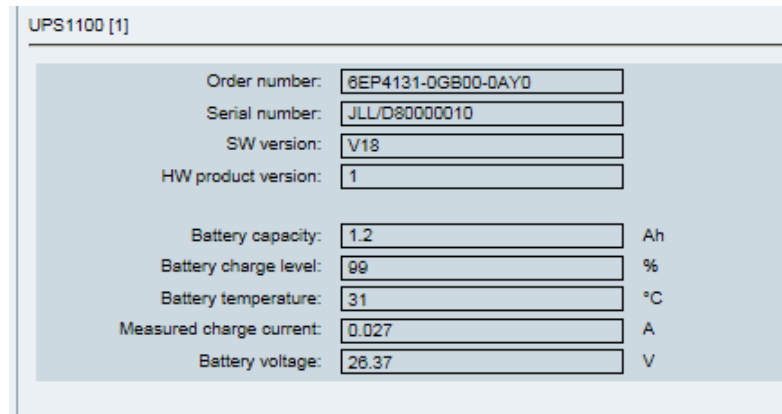
Figure 3-4 Diagnostics, energy storage BAT1600 devices

1. Select menu "Diagnostics".
2. Select the "Energy storage" entry under "Operating data" in the navigation.

Here, you can find the following information about the connected energy storage devices:

- Article number
- Serial number
- Battery software revision
- Hardware revision
- Battery status
- Battery capacity
- Calculated battery health
- Battery charge level
- Battery temperature
- Measured charge current
- Battery voltage

UPS1100



The screenshot displays the 'UPS1100 [1]' diagnostics page. It features a table of parameters with their corresponding values and units. The parameters are: Order number (8EP4131-0GB00-0AY0), Serial number (JLL/D80000010), SW version (V18), HW product version (1), Battery capacity (1.2 Ah), Battery charge level (99%), Battery temperature (31 °C), Measured charge current (0.027 A), and Battery voltage (28.37 V).

Parameter	Value	Unit
Order number:	8EP4131-0GB00-0AY0	
Serial number:	JLL/D80000010	
SW version:	V18	
HW product version:	1	
Battery capacity:	1.2	Ah
Battery charge level:	99	%
Battery temperature:	31	°C
Measured charge current:	0.027	A
Battery voltage:	28.37	V

Figure 3-5 Diagnostics, energy storage UPS1100 devices

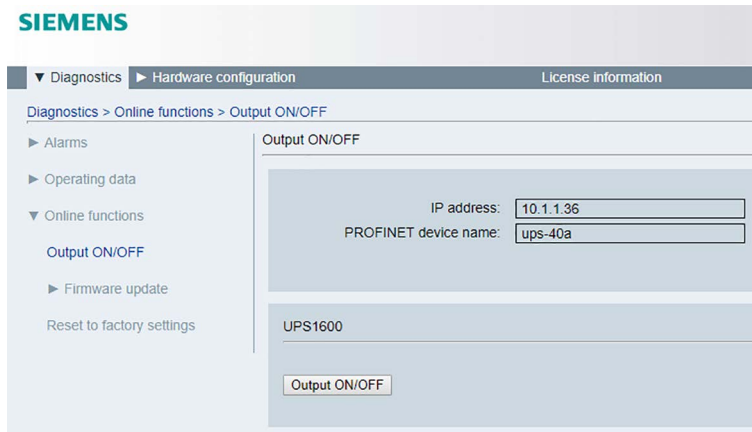
1. Select menu "Diagnostics".
2. Select the "Energy storage" entry under "Operating data" in the navigation.

Here, you can find the following information about the connected energy storage devices:

- Order number
- Serial number
- SW version
- HW product version
- Battery capacity
- Battery charge level
- Battery temperature
- Measured charge current
- Battery voltage

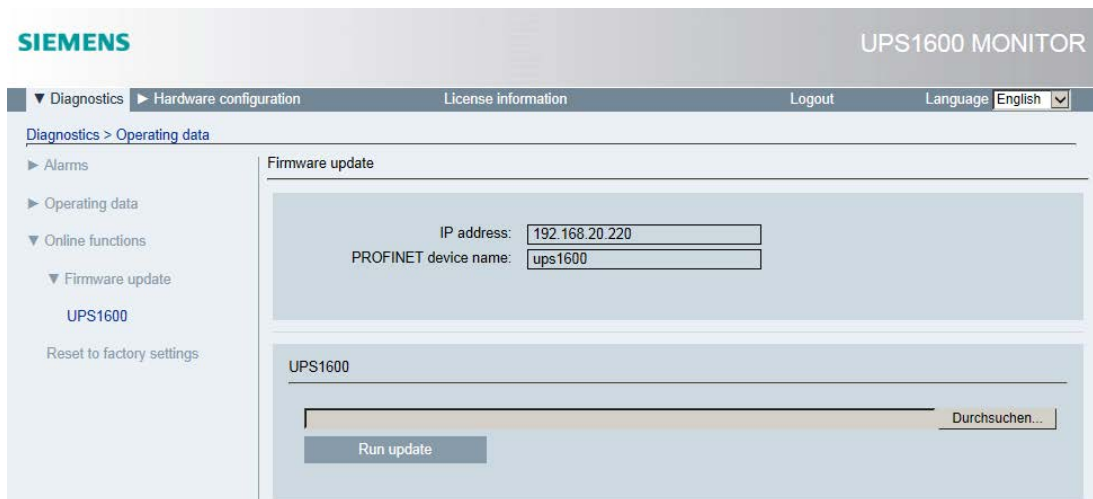
3.9.6.4 Online functions

From firmware release V2.3.0, the output of the SITOP UPS1600 can be switched on and switched off via the WEB interface.



Switching off the output is not retentive, and is deactivated when the SITOP UPS1600 restarts. This function initiates an alarm "Output switched off" and has alarm ID "257/10".

Firmware update

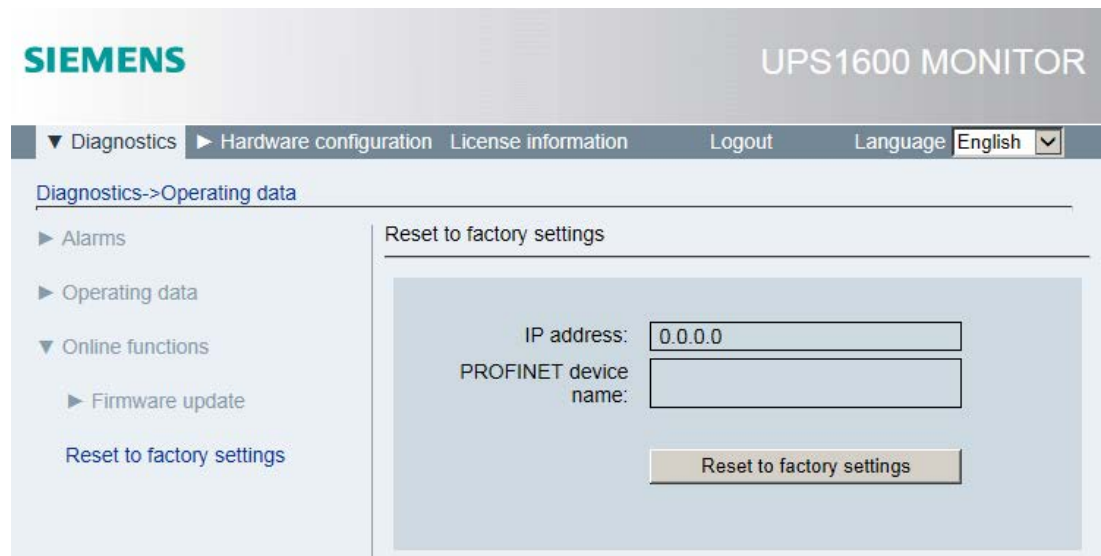


The firmware update process is described in detail in the "Firmware update readme", which is provided with the firmware update download package.

Follow the instructions provided there carefully. The files for updating the firmware are available online at: (<https://support.industry.siemens.com/cs/ww/en/view/79207181>)

Refer also to Section Firmware update with web server (Page 135).

Reset to factory settings



A reset to the factory settings deletes all hardware and software configurations stored in the SITOP UPS1600 and restores the factory settings.

This affects, for example:

- IP address
- Device name
- Parameter values for the SITOP UPS1600 and assigned supplementary modules.
- "Web server activated" setting. Web server is de-activated.

Procedure

1. Select menu "Diagnostics".
2. Select submenu "Online functions".
3. Select entry "Reset to factory setting".
4. In the editor area, click on "Reset to factory settings".
5. Acknowledge the confirmation prompt with "OK".

3.9.7 HW configuration

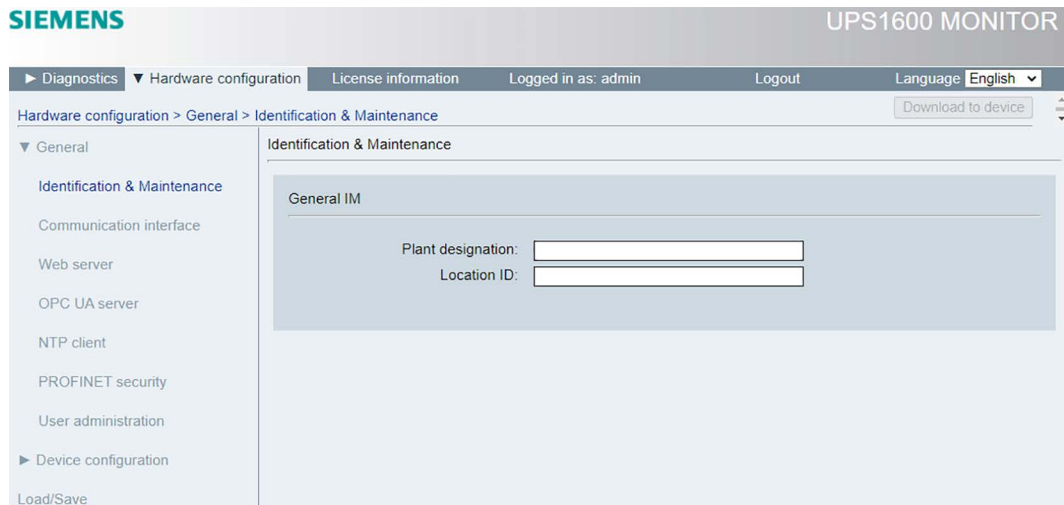
3.9.7.1 General

You have the following options under menu item "HW Configuration > General":

- Configuring identification & maintenance data
- Configuring the communications interface
- Making settings for the web server
- Making settings for the OPC UA server
- Making settings for the NTP client
- Making settings for PROFINET security
- Managing users

Identification & Maintenance

You configure the following points under menu item "HW Configuration > General > Identification & Maintenance".



General IM

- Plant designation: Defining the plant designation
- Location identifier: Defining the location identifier

Communication interface

You have the option of configuring the communication interface regarding the following points:

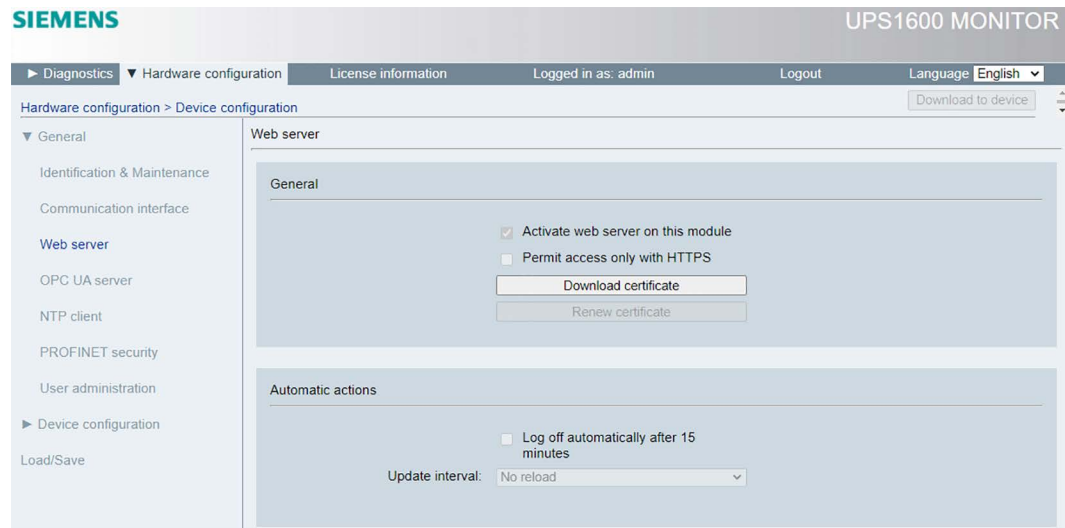
- Device name Defining the device name
- DHCP: Defining whether the IP address is dynamically assigned (activate DHCP) or whether it should be fixed.
- Fixed IP address with IP address, Subnet mask and Router address

Procedure

1. Select the "Hardware configuration" menu.
2. Select submenu "General".
3. Select the "Communication interface" entry.
4. In the editor area, under "Device name" enter the required device name.
5. To dynamically assign the IP address: Activate checkbox "Source IP address via DHCP".
6. To assign a fixed IP address: Activate checkbox "Fixed IP address" and enter the appropriate parameters in the editor area.
7. Load the data to the device, see Load / Save (Page 155).

Web server

Here, you can make general settings and define which actions should be automatically executed.



Parameter	Value range	Default setting
Activate web server on this module	Yes/no	No
Permit access only with HTTPS	Yes/no	Yes
Log off automatically after 15 minutes	Yes/no	No
Update interval	0 / 5 s / 10 s / 20 s / 30 s / 60 s	0 = no automatic update

- Activate web server on this module**
 Define whether it is permissible that this device is accessed via the web server.
- Permit access only with HTTPS**
 Define whether access is only permissible via HTTPS.
- Download certificate**
 By pressing button "Download certificate", you can download the certificate for an encrypted connection via HTTPS.
- Log off automatically after 15 minutes**
 Define whether a user should be automatically logged off after closing the web server.
- Update interval**
 Define the intervals in which the actual values are sent to the web server.

OPC UA server

Configure the OPC UA server here.



General

- **OPC UA server activated**
Define whether it is permissible to access the device via the OPC UA interface. If the option is activated, then the SITOP PSU8600 acts as OPC UA server.
- **OPC UA Server Port**
The preset port number is 4840. You can enter another port number.

Security Policies

- **Activation of anonymous access**
- **No security**
If the option is activated, then unencrypted access via the OPC UA client is possible. Activating the option is not recommended.
- **Basic128 - Sign & Encrypt**
- **Basic256 - Sign & Encrypt**
- **Basic256Sha256 - Sign & Encrypt**

Note

For security reasons, always select the highest possible security level possible and deactivate settings that are not used.

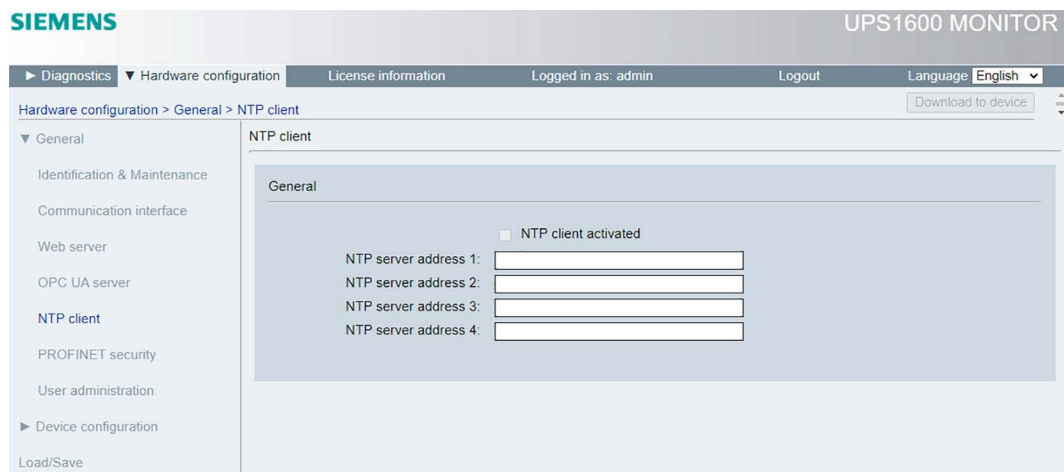
Note regarding assigning TCP/UDP port numbers

Please note the following when configuring TCP/UDP port numbers:

Port numbers in the range from 0 up to 1023 are called "system ports" or "well-known ports". They are used by system processes that provide widely established network service types. It is recommended that these port numbers are not used.

NTP client

Configure the NTP client under "HW Configuration > General > NTP client".



If the NTP client is activated, then the local time is synchronized with the specified time of the specified NTP server.

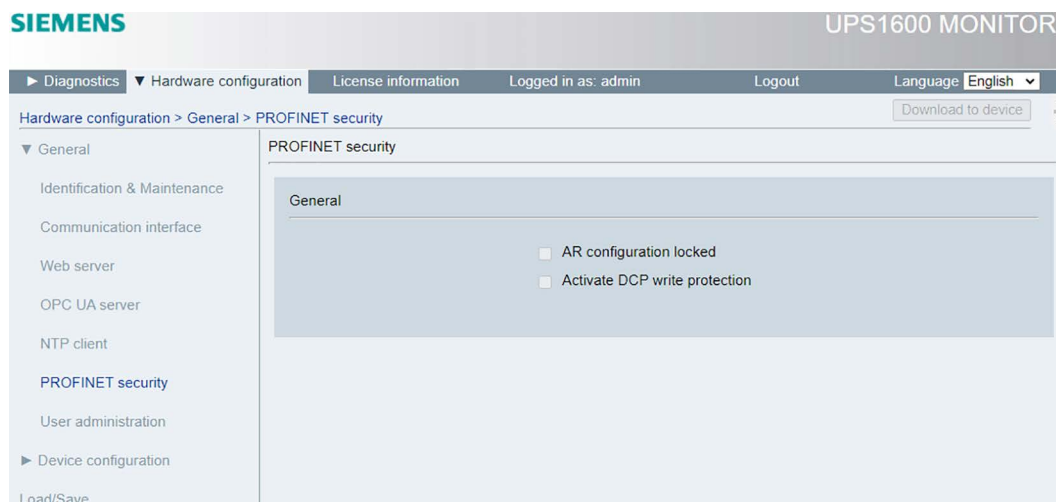
The NTP update interval is automatically and dynamically adapted between 64 seconds and 68 minutes 16 seconds.

The time of the last synchronization and the next scheduled synchronization are displayed.

- NTP client activated
Activate the NTP client here.
- NTP server address 1 ... 4
Enter up to 4 NTP server IP addresses.

PROFINET security

General



Activate these options in order to protect the system against changes initiated externally.

- AR configuration locked
- DCP write protection activated

User administration

You can access user administration under "HW configuration > General > User administration".

User administration

Here, you can change the administrator password and set up the system so that guests can access the system - and up to 14 additional user accounts with different authorization levels.

The screenshot shows the SIEMENS UPS1600 MONITOR web interface. The top navigation bar includes 'Diagnostics', 'Hardware configuration', 'License information', 'Logged in as: admin', 'Logout', and 'Language: English'. The main content area is titled 'User administration' and contains a table with the following data:

Name	Access level	Password	Password confirmation	Delete user
admin	Administrative +			<input type="checkbox"/>
guest	Minimum +			<input type="checkbox"/>
test3	Minimum +			<input type="checkbox"/>
Add new user				

Procedure for changing the administrator password

Note

Users "admin" and "guest" are preset and cannot be deleted.

1. Select the "Hardware configuration" menu.
2. Select submenu "General > User administration".
3. Enter the new password in the editor area, in line "admin" under "Password".

Note

The password must satisfy the following minimum requirements:

- min. 8 characters
- min. 1 uppercase letter
- min. 1 lowercase letter
- min. 1 digit
- min. 1 special character

The following characters are possible: $^[a-z0-9A-Z\-_]+\$$

4. Enter the new password again under "Confirm password".
5. Load the data to the device, see Load / Save (Page 155).

Note

For security reasons, when installing for the first time, the default password should be changed. Further, it is recommended that passwords are regularly changed.

Procedure for setting up a guest access

1. Select the "Hardware configuration" menu.
2. Select submenu "General > User administration".
3. Enter a password in the editor area under "guest" and select the individual access rights for guest access.
4. Enter the password again under "Confirm password".
5. Load the data to the device.

Procedure for setting up a user account

1. Select the "Hardware configuration" menu.
2. Select submenu "General > User administration".
3. In the editor area, click on "Add new user" and in this line enter the name for the new user.
4. Select the individual access rights for the new user.
5. Enter a password for the new user - and repeat this to confirm the password.
6. Load the data to the device.

3.9.7.2 Device configuration

You set the parameters for basic units and energy storage devices under menu item "HW Configuration > Device configuration".

Basic unit

SIEMENS UPS1600 MONITOR

► Diagnostics ▼ Hardware configuration License information Logged in as: admin Logout Language English

Hardware configuration > Device configuration Download to device

► General
▼ Device configuration
Base Unit
Energy storage
Load/Save

Base Unit

Buffering

Connection threshold: 22.50 V
Buffer time: 600 s
Maximum buffer time:
Discharge cut-off voltage: 17.50 V
Additional buffer time after PC shutdown: 60 s
Expected buffer current: 0.0 A
Reset time: 5 s
Buffering allowed:
Enable reset after buffering:

Signaling

Downtime alarm: 0.100 s
Wait time for stable input voltage: 1.000 s

Charging

Deactivate charging function:
Maximum permitted charging current: 3.000 A

Maintenance

R test interval: 4 h

Buffering

Parameter	Value range	Default setting
Connection threshold	21 - 25 V	22.5 V
Buffer time	1 - 32767 s	600 s
Maximum buffer time ¹⁾	Yes / No	No
Discharge cut-off voltage at 20 °C	18 - 23 V	18.5 V (for LiFePO4 battery 20.5 V)
Additional buffer time after the PC was powered down. ³⁾	1 - 300 s	60 s
Expected buffer current ¹⁾	0 - 40 A	0 A
Reset time:	1 - 120 s	5 s
Buffering allowed	Yes / No	Yes
Enable reset after buffering	Yes / No	No

1) Parameter only available from SW version V2.0 and higher

2) Parameter only available from SW version V2.1 and higher

3) Valid from V2.0.4 or V2.1

- **Switch-in threshold**
Setting the switch-in threshold.
- **Buffer time**
Length of time during which the system should be buffered by the SITOP UPS1600.
- **Maximum buffer time**
The setting means that buffering is realized for as long as possible. The device only shuts down when the battery has discharged down to the defined stop buffering voltage. The value entered for the "Buffer time" parameter is not relevant in this case.
- **Discharge cut-off voltage at 20 °C**
Voltage where battery discharge is exited. For a system battery (SITOP BAT1600 or SITOP UPS1100) the discharge cut-off voltage defined for this type is always used.
- **Additional buffer time after PC shutdown**
Time during which the system should be buffered by the SITOP UPS1600 after the PC was shut down.
- **Expected buffer current**
Load current, which is expected at the device output during buffer mode. Please adjust the correct application load current required. For current settings between 0 A and rated current, the display in the diagram "Remaining buffer time" is adapted. If a value of 0 A is entered, then for this parameter, the average value of the actual load current measured at the output over the last 10 min is assumed. The value of this parameter is used when calculating the remaining buffer time. The entered value may not exceed the rated device current.

Note

From the instant in time when the SITOP UPS1600 is switched over into the buffer mode, the buffer current actually measured is used to determine the expected buffer time instead of the expected buffer current.

- **Reset time**
Duration of the output voltage interruption.
- **Buffering permitted**
When the connection threshold is fallen below, selects whether the system is buffered or the output is shut down.
- **Enable reset after buffering**
If the value is set to "Yes", then the output voltage is interrupted after the selected buffer time expires if, in the meantime, the input voltage returns. This option is useful, when, for example, computer networks are protected by the UPS that can be activated by a reset when the power supply is restored. For buffer time "MAX", the output voltage is not interrupted.

Signaling

Parameter	Value range	Default setting
Downtime alarm	0 - 20,000 ms	100 ms
Wait time for stable input voltage	0.2 - 65 s	1 s

- **Downtime alarm**
The time in which no alarm is issued to the system although it is buffered.
- **Wait time for a stable input voltage**
Time where the input voltage must continually lie above the connection threshold so that buffering is exited and a transition is made into normal operation.

Charging

Parameter	Value range	Default setting
Deactivate charging function	0 - 1	0
Maximum permitted charging current	SITOP UPS1600 10 A: 0.3 - 3 A, SITOP UPS1600 20 A: 0.3 - 4 A, SITOP UPS1600 40 A: 0.3 - 5 A	SITOP UPS1600 10 A: 3 A, SITOP UPS1600 20 A: 4 A, SITOP UPS1600 40 A: 5 A

- **Deactivate charging function**
The charging function can be deactivated using this parameter.
- **Maximum permitted charging current**
The battery is charged to the maximum level with the selected charging current. The manufacturer's data for the permissible charge current of the battery must be observed.

Note

The value is available from Version V2.4.0.

Maintenance

Parameter	Value range	Default setting
R test interval (from V2.1 to V2.3)	1 ... 65535 h	4 h

The new R test (from V2.4) is performed once a week after short-term recharging. Therefore, it is no longer necessary to set the R test interval.

Energy storage

"Energy storage" has two different areas that depend on the battery type being used. First select whether you are using a SITOP UPS1100 or SITOP BAT1600 battery module or some other energy storage.

Using a SITOP BAT1600 or SITOP UPS1100 battery module

No additional parameterization.

Using a different battery module

Parameter	Value range	Default setting
Battery type	0 - 1	0
Typical ambient temperature	-70 - 100 °C	40 °C
Battery capacity	0.1 - 3,200 Ah	10 Ah
End-of-charge voltage at 20 °C	24 - 30 V	27.3 V
Temperature coefficient	0 - 200 mV/K	36 mV/K
Duration of the constant floating voltage charging phase	0 - 720 h	12 h
Charge current	0.001 - 3 or 4 or 5 A	0.3 A
Start preserve charge voltage	23 - 30 V	25.20 V
Stop buffering voltage	18 - 23 V	18.50 V
Faulty battery voltage	1 - 18 V	6 V

- **Battery type**
Make/type of battery: Pb ... lead-gel battery, pPb ... pure lead battery
- **Typical ambient temperature**
Typical ambient temperature of the battery in operation

- **Battery capacity**
Total capacity of the installed batteries.
- **End-of-charge voltage at 20 °C**
The end-of-charge voltage defines the maximum battery voltage during the charging phase. When reaching this end-of-charge voltage, the charging status changes from "constant current" into the "constant voltage" phase. The adjustable end-of-charge voltage is applicable for a battery ambient temperature of 20 °C. SITOP UPS1600 adapts the end-of-charge voltage corresponding to the connected SITOP BAT1600 or SITOP UPS1100 depending on the battery ambient temperature and the battery technology. For third-party batteries, the adaptation is based on configuration parameters battery type, typical ambient temperature and temperature coefficient.
- **Temperature coefficient**
Relative dependency of the end-of-charge voltage on the ambient temperature
- **Duration of the constant floating voltage charging phase**
Duration of the constant voltage charging phase
- **Charge current**
The battery is only charged with maximum selected charge current during the "constant current" charging phase. When using system batteries, the charge current is automatically set, and is controlled by the temperature. When using third-party batteries, the permissible charge current specified by the battery manufacturer must be taken into consideration.
Further, the following device-dependent values apply:
 - SITOP UPS1600 10 A: Maximum permissible charge current 3,000 mA
Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 2,000 mA
 - SITOP UPS1600 20 A: Maximum permissible charge current 4,000 mA
Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 3,000 mA
 - SITOP UPS1600 40 A: Maximum permissible charge current 5,000 mA
Derating for $T_u > 40\text{ °C}$ or $U_{in} < 24\text{ V}$: 3,000 mA
- **Start preserve charge voltage**
Voltage value for the start of the preserve charge voltage
- **Stop buffering voltage**
Buffering is interrupted when this threshold value is fallen below.
- **Faulty battery voltage**
Batteries are considered to be defective when this threshold value is fallen below.

3.9.7.3 Load / Save

Configurations made in the web server can be saved as zip file. Saved configurations can be loaded back to the web server.



Procedure for loading the device configuration

1. Select the "Hardware configuration" menu.
2. Select submenu "Load/Save".
3. In the editor area, click on "Browse", and in the file dialog, select the path where the configuration file should be saved.
4. Click on the "OK" button to load the configuration.

Procedure for saving the device configuration

1. Select the "Hardware configuration" menu.
2. Select submenu "Load/Save".
3. The zip file now displayed can be saved as a file using the "Save target as" function of the shortcut menu (call by pressing the right-hand mouse key).
4. Enter a file name.
5. Click on "OK" to save the configuration as zip file.

3.10 OPC UA server

3.10.1 Introduction

OPC UA (Open Platform Communications - Unified Architecture) for non-proprietary communication in automation systems.

You can find information in the Internet at opcfoundation.org (<https://opcfoundation.org/about/opc-technologies/opc-ua/>).

Note

In order to guarantee the optimum performance regarding the data transfer rate, the number of simultaneously used communication interfaces (PROFINET, OPC UA, web) should be kept as low as possible.

3.10.2 Preconditions

Note

Example of an installation

Using "UaExpert" as example, this section describes how, using a client, you access SITOP UPS1600 data.

- UaExpert V1.4.4 or higher is installed.
The OPC UA client for Microsoft Windows can be downloaded from the Internet site of Unified Automation: (<https://www.unified-automation.com/downloads/opc-ua-clients.html>)
 - Main module SITOP UPS1600 operates with firmware version v2.2.0 or higher.
 - The IP address of SITOP UPS1600 is configured.
 - The OPC UA server of the SITOP UPS1600 is activated (default setting).
-

Note

For OPC UA, every device is assigned a profile, which describes the capability of the particular device.

The OPC UA server of the SITOP UPS1600 corresponds to the "Micro Embedded Device Server" profile.

Note

Additional information on the OPC UA client is provided in the online documentation in menu "Help > UaExpert Manual".

3.10.3 Activating the OPC UA server via the SITOP UPS1600 web server

Activating the OPC-UA server and starting the web server for REMOTE operation

1. Navigate to "HW Configuration > General > OPC UA server".
2. Activate option "OPC UA server activated".
3. Click on "Download to device".

The OPC UA server is activated.

Server port

- OPC UA server activated
Define whether it is permissible to access the device via the OPC UA interface. If the option is activated, then the SITOP PSU8600 acts as OPC UA server.
- OPC UA Server Port
The preset port number is 4840. You can enter another port number.

Security Policies

- Activation of anonymous access
- No security
If the option is activated, then unencrypted access via the OPC UA client is possible. Activating the option is not recommended.
- Basic128 - Sign & Encrypt
- Basic256 - Sign & Encrypt
- Basic256Sha256 - Sign & Encrypt

Note

For security reasons, always select the highest possible security level possible and deactivate settings that are not used.

See also

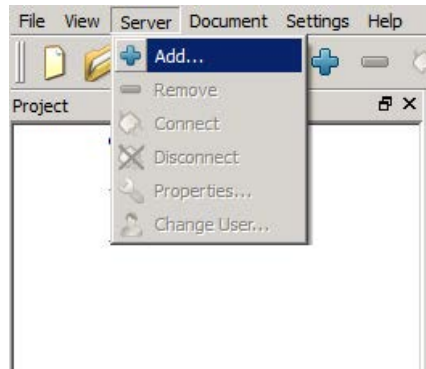
Web server (Page 131)

3.10.4 Establishing a connection to the OPC UA server of the SITOP UPS1600

Note

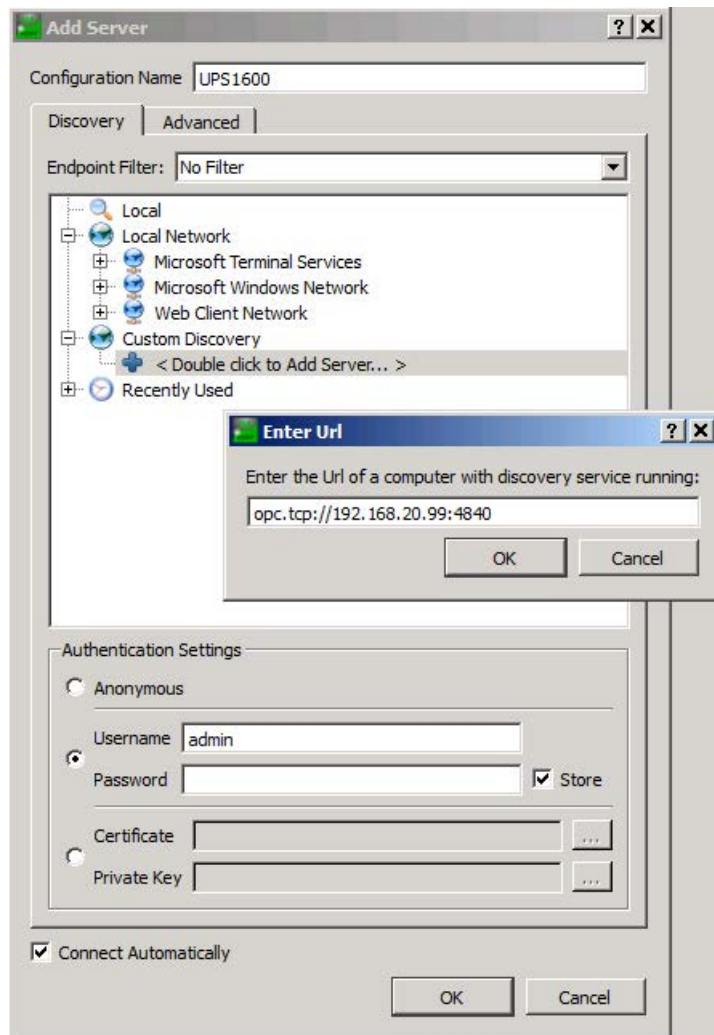
The "Ua Expert" program is displayed in English.

1. Launch the "Ua Expert" program.
2. In the main menu, select "Server > Add".



3. In the "Add Server" dialog box, click on "Double click to Add Server ...".

4. In dialog "Enter Url", enter the protocol being used, the IP address of the SITOP UPS1600 and the number of ports.



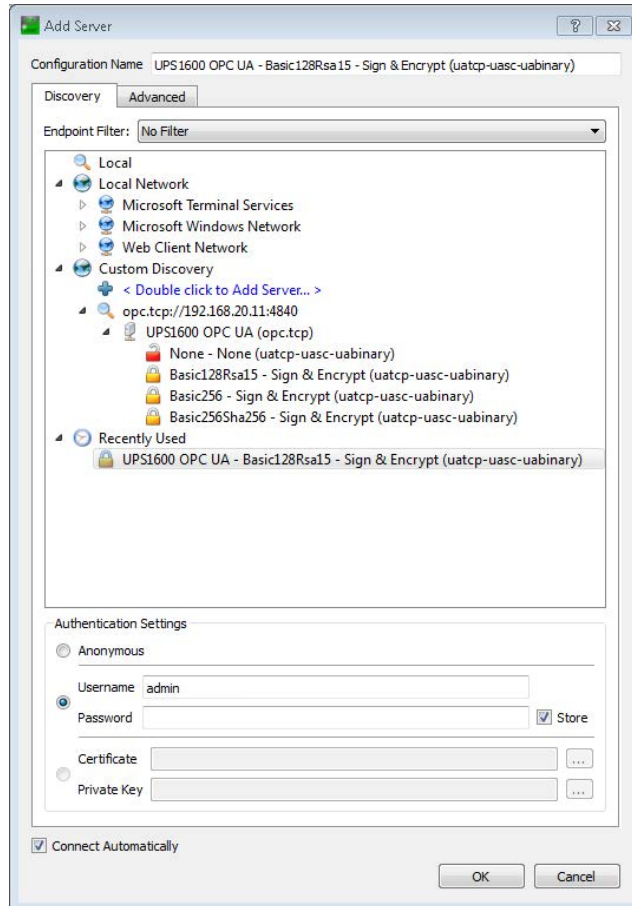
The preset port number for OPC UA is 4840.

Another port number can be set using the web server, PROFINET or OPC UA.

5. In dialog "Add Server" in area "Authentication Settings", enter the logon information for the SITOP UPS1600.
6. Click on the newly created server link "opc.tcp:\\...".

7. Select the connection type and enter the appropriate login data.

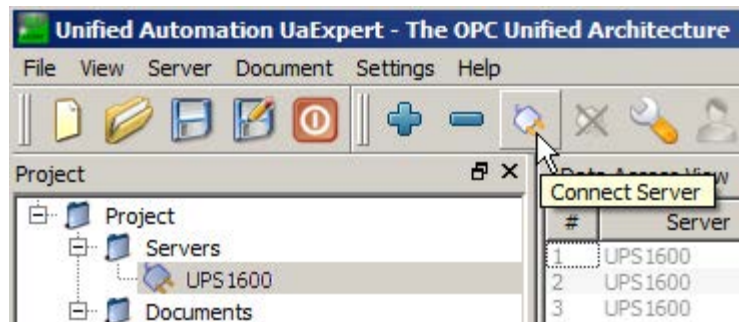
For security reasons we recommend using the Basic256Sha256 encrypted connection type. The use of encrypted connection types Basic128Rsa15 and Basic256 is not recommended, as the Sha-1 hash algorithm is no longer considered as being secure.



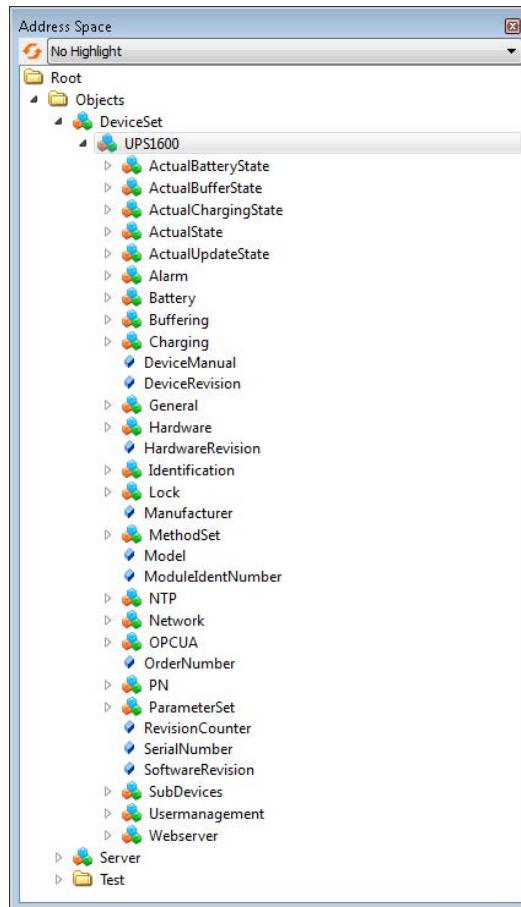
Default Username: **admin**

Default password: **admin**

8. Select SITOP UPS1600 in the project tree.
9. Click on symbol "Connect Server".



In area "Address Space", the data objects available for the SITOP UPS1600 are shown in a tree topology.

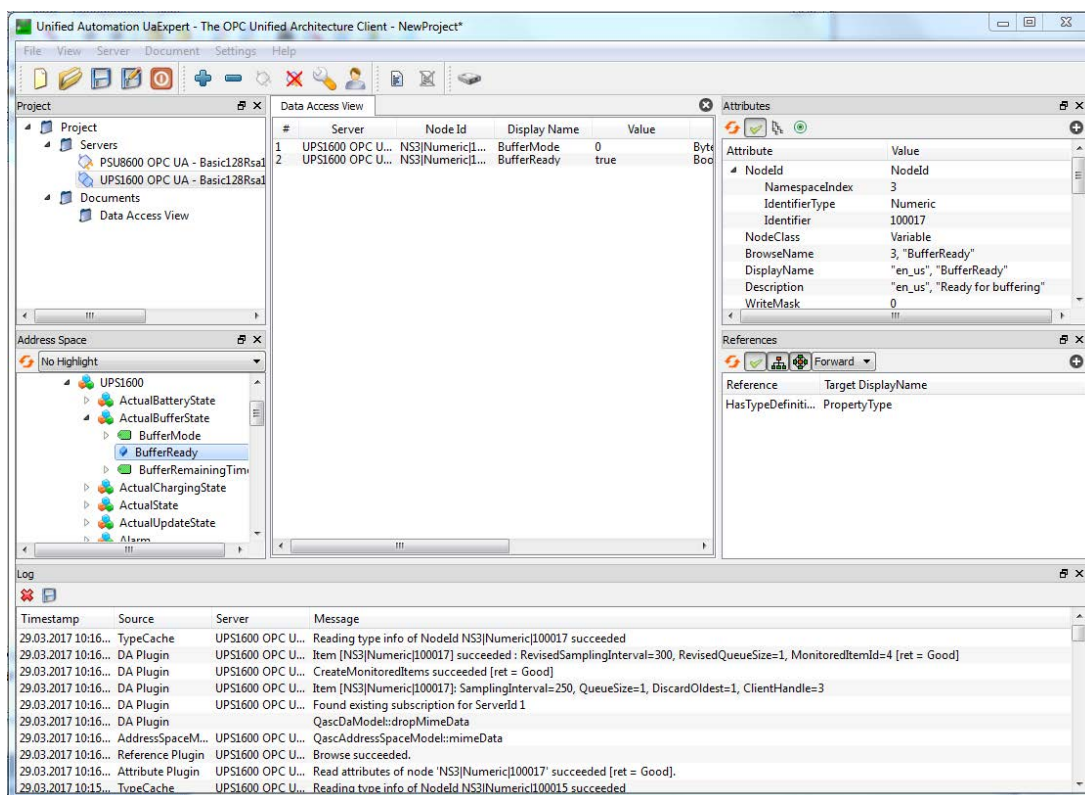


3.10.5 Working with the OPC UA client

3.10.5.1 Displaying SITOP UPS1600 parameters

Browse nodes - display parameters

Input and output data – as well as the operating states of the SITOP UPS1600 – are displayed in area "Address Space" in a tree topology as nodes. The properties of a marked node are displayed in area "Attributes".



Addressing OPC UA parameters

Addressing parameters in the OPC UA Server of the SITOP UPS1600 is based on the unchanging BrowsePath (complete path made up of BrowseNames to a specific OPC UA parameter; i.e. "BrowseName1.BrowseName2.BrowseName3"; for example "UPS1600.ActualBufferState.BufferReady") - and on the specific BrowsePath dynamically assigned NodeId (for example "ns=3;i=100017").

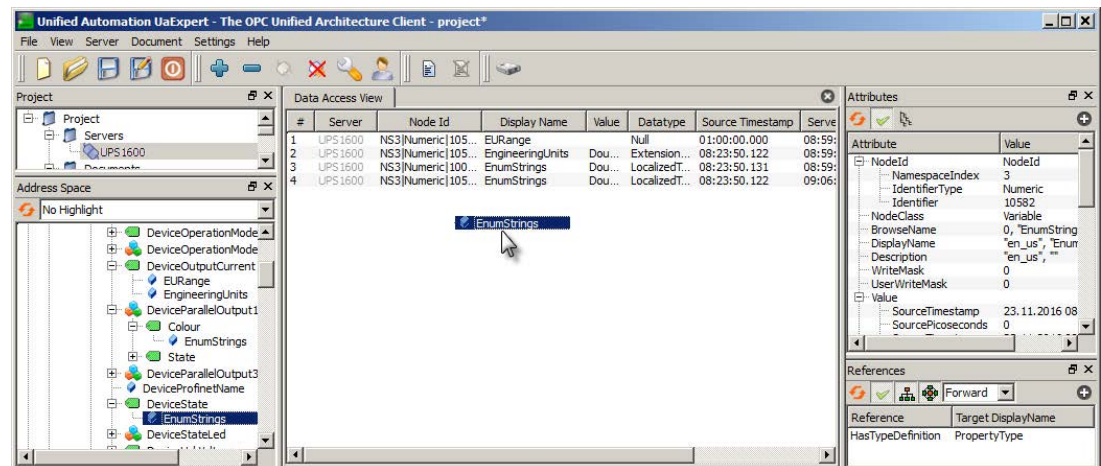
Please note that the link between BrowsePath and NodeId is re-established at each system start and as a consequence can be variable. However, the link relationships between BrowsePath and NodeId only change within the context of configuration changes (e.g. when adding or removing system modules) or after firmware updates.

As a consequence it is recommended that OPC UA parameters are always addressed based on the BrowsePath that does not change - or to automatically determine the NodeId of each OPC UA parameter at each system start.

Subscribe to a node

The actual values of a subscribed node are permanently displayed in area "Data Access View".

To subscribe to a node, drag the appropriate node from area "Address Space" - and drop into area "Data Access View".



A subscription can only be made to nodes of NodeClass "Variable".

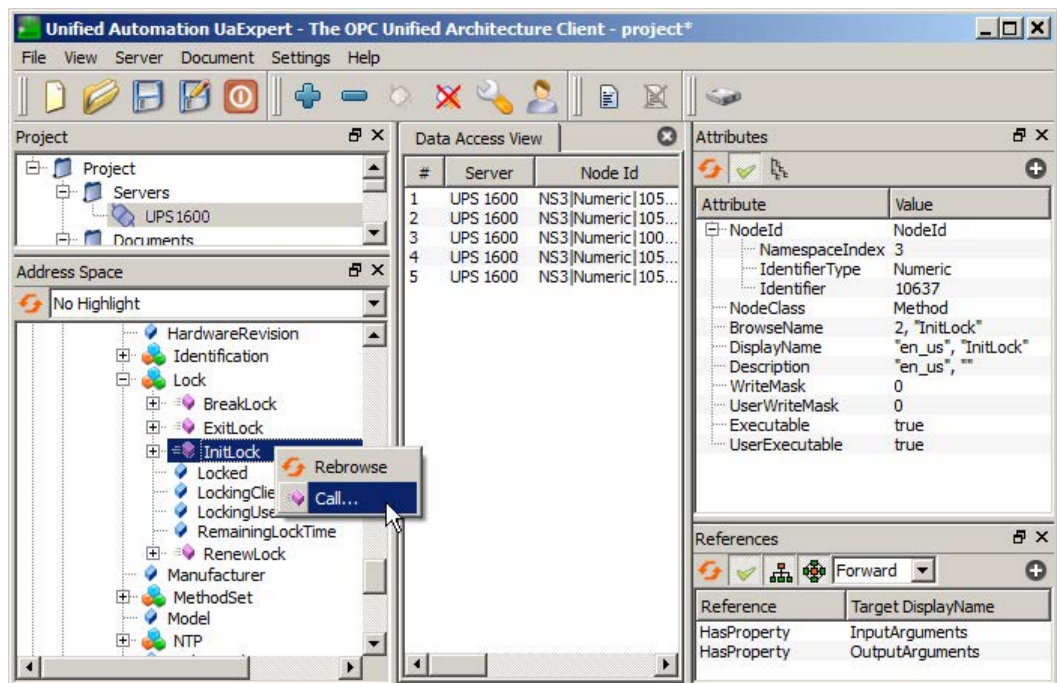
3.10.5.2 Changing the value of a node

Write access operations to values are not permitted in order to avoid making undesirable changes.

Write access is made possible by calling method "InitLock". After 10 seconds, access is automatically blocked again.

Permitting write access

1. In the "Address Space" select <Root> → <Objects> → <DeviceSet> → <UPS1600> → <Lock> → <InitLock>.
2. Right click on method "InitLock" and in the shortcut menu, select "Call ...".



3. In the "Call InitLock" dialog box, click on "Call".

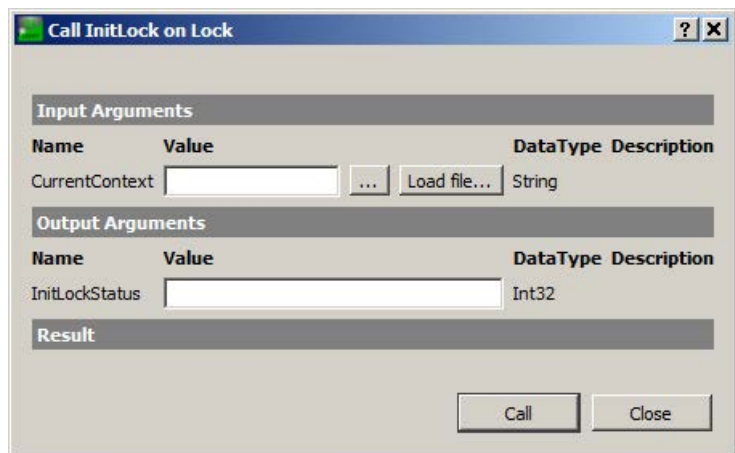


Figure 3-6 "Call InitLock on Lock" dialog

3.10.5.3 Calling a method

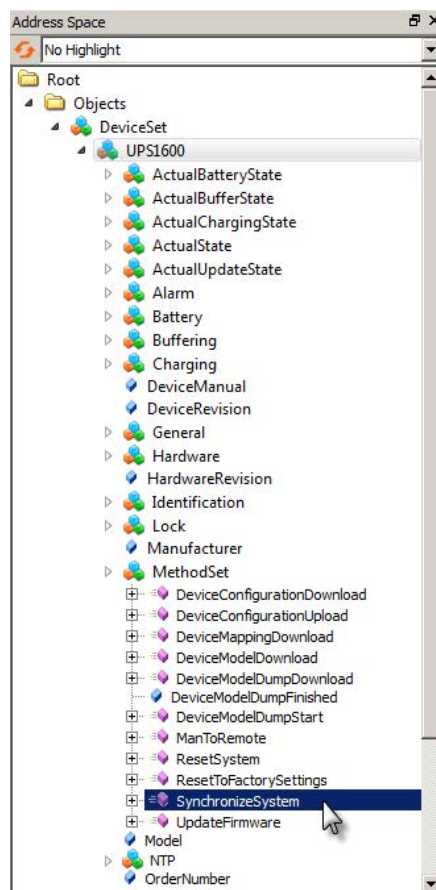
Calling a method from the "MethodSet"

The call is described using example "SynchronizeSystem".

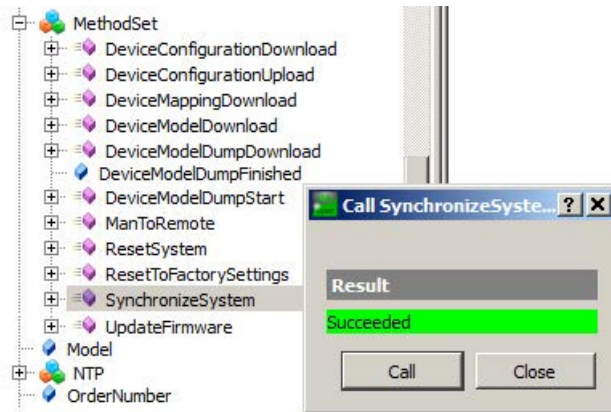
Note

Methods are shown in the UA client with the symbol .

1. In "Address Space" select <Root> → <Objects> → <DeviceSet> → <UPS1600> → <MethodSet> → <SynchronizeSystem>.
2. Right click on method "SynchronizeSystem" and in the shortcut menu, select "Call ...".








The result of the method call is displayed in a dialog.



3.10.6 SITOP UPS1600 parameters in the OPC UA client

3.10.6.1 Introduction

The OPC UA client uses the following symbols:

-  Object
-  Object (supported modules)
-  Method
-  Variable with other attributes (EURange, EngineeringUnits, EnumStrings)
-  Variable

Information on the selected object is displayed in area "Attributes". Relationships to other objects are displayed in area "References".

A dialog is displayed when calling a method. "InputArguments" and "OutputArguments" can be entered here.

Values that can be changed (e.g. IP addresses or path data) can be directly edited in area "Attributes".

3.10.6.2 ActualBatteryState

Display name	Data type	Definition	Description
BatteryChangeRecommended	Boolean	PropertyType	Battery capacity is insufficient to achieve the specified buffer time.
BatteryCharge	Byte	AnalogItemtype	Battery charge level in percent
BatteryChargeVoltage	Float	AnalogItemtype	Voltage used to charge battery during the constant charging phase.
BatteryConnectionFault	Boolean	PropertyType	The connection to the battery has been interrupted or has a high impedance.
BatteryCount	Byte	PropertyType	Number of connected batteries. Only SITOP system batteries are counted.
BatteryVoltage	Float	AnalogItemtype	Actual battery voltage

3.10.6.3 ActualBufferState

Display name	Data type	Definition	Description
BufferMode	Enumeration	MultiStateDiscreteType	Indicates buffer mode
BufferReady	Boolean	PropertyType	Sufficient buffer readiness
BufferRemainingTime	UInt32	AnalogItemtype	Estimated remaining buffer time. The remaining buffer time is calculated using the current battery charge level and average current over 10 minutes.

3.10.6.4 ActualChargingState

Display name	Data type	Definition	Description
ChargeMeasuredCurrent	Float	AnalogItemtype	Measured battery charge current
ChargeSufficient	Boolean	PropertyType	Charge status of the batteries > 85 %

3.10.6.5 ActualState

Display name	Data type	Definition	Description
ChargingOperatingState	Byte	AnalogItemtype	Status of the charging unit
DeviceAlarmLed	Object	Sitop_1600_LedType	Status of LED "Alarm"
DeviceBatteryFaultLed	Object	Sitop_1600_LedType	Status of LED "BatteryFault"
DeviceBatteryOver85Led	Object	Sitop_1600_LedType	Status of LED "BatteryOver85"
DeviceCalculatedCapacity	Float	AnalogItemtype	Available battery capacity
DeviceCalculatedHealth	Byte	AnalogItemtype	State-of-Health (SoH) as percentage of the rated capacity

Display name	Data type	Definition	Description
DeviceInputCurrent	Float	AnalogItem	Measured input current of SITOP UPS1600
DeviceInputVoltage	Float	AnalogItem	Input voltage
DeviceInputVoltageOK	Boolean	PropertyType	Input voltage has exceeded the configured threshold voltage. Connected devices are powered with the input supply.
DeviceLoadCurrent	Float	AnalogItem	Measured output current of SITOP UPS1600
DeviceMaxCurrent	Float	AnalogItem	Maximum output current supported by the SITOP UPS1600
DeviceOutputCurrent	Float	AnalogItem	Measured output current of SITOP UPS1600
DeviceOutputVoltage	Float	AnalogItem	Measured output voltage
DeviceP1LinkLed	Object	Sitop_1600_LedType	Status of LED "P1"
DeviceP2LinkLed	Object	Sitop_1600_LedType	Status of LED "P2"
DeviceRunLed	Object	Sitop_1600_LedType	Status of LED "RUN"
DeviceSFLed	Object	Sitop_1600_LedType	Status of LED "SF"
DeviceSWSettingsValid	Boolean	PropertyType	This object provides information about whether the SW parameters or the parameters at the rotary switches are used. The corresponding setting should be made at the rotary coding switch for the buffer threshold.
DeviceStateLed	Object	Sitop_1600_LedType	Status of LED "OK" Device status
DeviceTemperature	Sbyte	AnalogItem	Device temperature
DeviceTotalOperatingTime	UInt32	AnalogItem	Battery-specific data: Total time for which battery was in buffer mode during its service life

3.10.6.6 ActualUpdateState

Display name	Data type	Definition	Description
UpdateProgress	Integer	PropertyType	Update progress
UpdateState	Enumeration	MultiStateDiscreteType	Update status

3.10.6.7 Alarm

Display name	Data type	Definition	Description
AlarmBatteryConnectionBroken	Boolean	PropertyType	Connection to battery interrupted - check connection and fuse
AlarmBatteryConnectionHighResistive	Boolean	PropertyType	High-resistance connection to battery - check battery power cable
AlarmBatteryDeepDischarge	Boolean	PropertyType	Battery is deep discharged - no buffering possible.
AlarmBatteryDeepDischargeNoChargingPossible	Boolean	PropertyType	Battery is deep discharged - replace battery.
AlarmBatteryDefect	Boolean	PropertyType	Battery defective - check fuse and battery voltages.

Display name	Data type	Definition	Description
AlarmBatteryDischargeBecauseChargingDeactivated	Boolean	PropertyType	Low charge status of the battery as a result of deactivated charging function.
AlarmBatterySOHtestCanceledBuffering	Boolean	PropertyType	Capacity test canceled. Buffering was started.
AlarmBatterySOHtestCanceledByConfiguration	Boolean	PropertyType	Capacity test canceled due to changed or invalid configuration
AlarmBatterySOHtestCanceledByUser	Boolean	PropertyType	User canceled the capacity test.
AlarmBatterySOHtestCanceledInputVoltageHigh	Boolean	PropertyType	Capacity test canceled. Input voltage is too high
AlarmBatterySOHtestCanceledInsufficientLoad	Boolean	PropertyType	The capacity test was canceled due to an insufficient system load.
AlarmBatterySOHtestCanceledNotFull	Boolean	PropertyType	Capacity test canceled. Batteries are not fully charged.
AlarmBatterySOHtestRunning	Boolean	PropertyType	Capacity test being performed.
AlarmBatterySOHtestRunning	Boolean	PropertyType	Battery 'State of Health' tests (SoH) are in progress.
AlarmBufferModeNotPossible	Boolean	PropertyType	Buffer mode not possible - check settings, cabling, fuse, and battery voltages
AlarmBufferTimerReset	Boolean	PropertyType	PC is shutting down
AlarmBuffering	Boolean	PropertyType	Device is in buffer mode.
AlarmChargeCurrentManualChanged	Boolean	PropertyType	Max. permissible charging current was limited as a result of the configuration parameters
AlarmCommunicationToDeviceFailed	Boolean	PropertyType	PROFINET connection available - SITOP UPS1600 is defective
AlarmDeviceFailure	Boolean	PropertyType	Device failure
AlarmDeviceOvertemperature	Boolean	PropertyType	Output and battery charging is switched off to prevent damage to the device.
AlarmDeviceParameterCorrupt	Boolean	PropertyType	SITOP UPS1600 parameters corrupt - try to update the software.
AlarmDevicePoweredUp	Boolean	PropertyType	Device powered up
AlarmDeviceTemperatureHigh	Boolean	PropertyType	Device temperature higher than 100° C. Caution: The highest permitted temperature could be exceeded!
AlarmDeviceTemperatureLow	Boolean	PropertyType	Device temperature lower than -10° C. Device could leave the operating range.
AlarmDeviceTurnedOff	Boolean	PropertyType	SITOP UPS1600 off - buffer time exceeded or PC was shut down
AlarmFirmwareUpdateOK	Boolean	PropertyType	Previous software update was successful - SITOP UPS1600 is operational again.
AlarmFuseBroken	Boolean	PropertyType	Fuse is defective.
AlarmInputVoltageHigh	Boolean	PropertyType	Input voltage exceeds 30 V. SITOP UPS1600 is not operational.
AlarmInsufficientCharge	Boolean	PropertyType	The configured buffer time may not be reached at this time due to the low battery charge.

Display name	Data type	Definition	Description
AlarmLowVoltageMode	Boolean	PropertyType	Input voltage of SITOP UPS1600 is too low. The buffer of the SITOP UPS1600 is not operational.
AlarmNoChargingManualDeactivated	Boolean	PropertyType	Charging function was deactivated by a control command
AlarmOutputTurnedOff	Boolean	PropertyType	Output of SITOP UPS1600 has been switched off due to the execution of a command or because an error situation has occurred (e.g. temperature or output current too high).
AlarmOutputTurnedOn	Boolean	PropertyType	Output of SITOP UPS1600 has been switched on again due to the execution of a command or because an error situation has been remedied.
AlarmOverCurrent	Boolean	PropertyType	Output current of SITOP UPS1600 is too high. Output is switched off for 20 s. The output is switched on again after 20 s.
AlarmResetExecuted	Boolean	PropertyType	Input voltage connected to SITOP UPS1600 was already OK before the buffer time expired. Connected devices are reset by switching off the SITOP UPS1600 outputs for the parameterized time.
AlarmSurplusBattery	Boolean	PropertyType	More than 6 batteries are connected. Connect max. of 6 batteries to the Energy Storage Link.
AlarmUnknownBattery	Boolean	PropertyType	Data from the battery cannot be read correctly. Battery is defective or not supported by SIEMENS.
AlarmWrongBatteryPolarity	Boolean	PropertyType	Wrong battery polarity - check battery connections.

3.10.6.8 Battery

Display name	Data type	Definition	Description
BatteryCapacitySetpoint	Float	AnalogItem	Total battery capacity in Ah
BatteryDefectVoltageSetpoint	Float	AnalogItem	If battery voltage is lower than this value, the battery is considered defective.
BatteryIgnoreCodingSetpoint	Boolean	PropertyType	When this parameter is set to '1', data from the coded battery is ignored. The data is taken from the parameter assignment in this case.
BatteryInspectionTimeSetpoint	Byte	PropertyType	Battery test interval in hours

3.10.6.9 Buffering

Display name	Data type	Definition	Description
BufferExpectedCurrentSetpoint	Float	AnalogItem	Estimated average output current during buffer mode
BufferThresholdSetpoint	Float	PropertyType	Trigger voltage for buffering - buffering is activated below this value
BufferTime2Setpoint	UInt16	AnalogItem	Additional buffer time after PC shutdown (valid only in conjunction with SITOP Manager)
BufferTimeSetpoint	UInt16	AnalogItem	Desired buffering time before device switches off
BufferingEnableSetpoint	Boolean	PropertyType	Enable buffering

Display name	Data type	Definition	Description
BufferingEndVoltageSetpoint	Float	AnalogItem	When battery voltage is lower than this voltage, the battery charge is no longer sufficient. Buffering is stopped.
BufferingValidSupplyVoltageTimeSetpoint	Float	AnalogItem	When the SITOP UPS1600 is in buffer mode, time for which the input voltage must be OK again before SITOP UPS1600 buffering is stopped and connected devices are operated again with input supply.
DischargeCutOffVoltageSetpoint	Float	AnalogItem	Voltage, where discharge of the battery is cut off

3.10.6.10 Charging

Display name	Data type	Definition	Description
ChargingCurrentSetpoint	Float	AnalogItem	Charge current
ChargeEndVoltageSetpoint	Float	AnalogItem	Battery voltage when charging changes to trickle charging. The battery is charged 100 %.
DisableChargingSetpoint	Boolean	Property	Battery charging deactivated
MaximumAllowedChargeCurrentSetpoint	Float	AnalogItem	Setting the max. charge current

3.10.6.11 General

Display name	Data type	Definition	Description
AlarmInvalidSupplyVoltageTimeSetpoint	Float	AnalogItem	Alarm filter: an alarm is only sent if it is pending for longer than the configured time
DeviceOutputEnableSetpoint	Boolean	Property	DeviceOutputEnableSetpoint
ResetEnableSetpoint	Boolean	Property	When input voltage returns during buffering, the output is switched off for a configurable time in order to reset connected devices.
ResetTimeSetpoint	Byte	AnalogItem	Time for which the output of SITOP UPS1600 is switched off when connected devices are reset.
ResistorTestIntervalSetpoint	Byte	AnalogItem	Battery test interval

3.10.6.12 Hardware

Display name	Data type	Definition	Description
HardwareBatteryProfileClamp	Enumeration	MultiStateDiscreteType	The charge characteristic for batteries on signal terminals is set. This setting is only applied if hardware settings are effective.
HardwareBufferThresholdSwitch	Enumeration	MultiStateDiscreteType	Trigger voltage for buffering - buffering is activated below this value
HardwareBufferTimeSwitch	Enumeration	MultiStateDiscreteType	Desired buffering time before device switches off

Display name	Data type	Definition	Description
HardwareBuffering EnableClamp	Boolean	PropertyType	Enable buffering
HardwareEnable ResetClamp	Boolean	PropertyType	When input voltage returns during buffering, the output is switched off for a configurable time in order to reset connected devices.
HardwareStartFrom BatteryClamp	Boolean	PropertyType	Setting for 'Start from battery' on signal terminal

3.10.6.13 Identification

Display name	Data type	Definition	Description
IdentificationContact Setpoint	String[64]	PropertyType	Contact
IdentificationDevice NameSetpoint	String[32]	PropertyType	PROFINET device name
IdentificationLocation Setpoint	String[44]	PropertyType	Location ID

Note

The various S7 systems interpret parameter "IdentificationLocationSetpoint" differently. S7-1200 and S7-1500 correctly process the data sets.

S7-300, S7-400 and ET200SP do not fully support this data. Proceed as follows to correctly save this data to these PLCs:

- Write the data to identify the devices in the PLC code using function "WR_REC".
 - Read the data to identify the devices using the "RD_REC" functions.
For the ET200SP, a description of the two functions can be found here: (<https://support.industry.siemens.com/cs/de/en/view/58649293>)
 - Alternatively, use the PRONETA (<https://support.industry.siemens.com/cs/ww/de/view/67460624>) tool to read and write data
-

3.10.6.14 Lock

Display name	Data type	Definition	Description
BreakLock ¹⁾	Method	Method	
ExitLock	Method	Method	Lock for write access is withdrawn
InitLock	Method	Method	Locks write access for other users
Locked	Boolean	PropertyType	Locked
LockingClient	String[16]	PropertyType	IP address of the blocking user
LockingUser	String	PropertyType	User that had locked

Display name	Data type	Definition	Description
RemainingLockTime	Duration	PropertyType	Remaining time to the inhibit
RenewLock	Method	Method	Renew lock in order to prevent the lock from expiring

¹⁾ Method is not supported.

3.10.6.15 MethodSet

Display name	Data type	Definition	Description
AddUser	Method	Method	Adds a user.
ChangeUserPassword	Method	Method	Changes a user password.
ClearAlarmHistory	Method	Method	Deletes the alarm history.
DeleteUser	Method	Method	Removes a user.
DownloadDevice Configuration	Method	Method	Downloads the device configuration.
RegenerateCertificate	Method	Method	Initiate the generation of a new safety certificate.
RemoteReset	Method	Method	Executes a remote reset.
RemoteReset2	Method	Method	Executes a remote reset.
ResetSystem	Method	Method	Resets the system to the initial state.
ResetToFactory Settings	Method	Method	Reset to factory settings.
SendRSignal	Method	Method	Initiate that a reset signal is sent
SendSSignal	Method	Method	Initiate that a shutdown signal is sent
SetNetworkParameter	Method	Method	Sets the network parameters.
ShowAlarmHistory	Method	Method	Shows the alarm history.
ShowPending AlarmList	Method	Method	Shows the list of active alarms.
UpdateFirmware	Method	Method	Updates the firmware.
UploadAlarmHistory	Method	Method	Uploads the alarm history.
UploadCertificate	Method	Method	Uploads a certificate.
UploadDevice Configuration	Method	Method	Uploads the device configuration.
UploadLicence Information	Method	Method	Uploads license information.
UploadPendingAlarm List	Method	Method	Uploads the list of active alarms.

3.10.6.16 Network

Display name	Data type	Definition	Description
NetworkDHCPEnable	Boolean	PropertyType	Activation of DHCP
NetworkGateway	String[16]	PropertyType	Router address
NetworkIP	String[16]	PropertyType	IP address
NetworkSubnetmask	String[16]	PropertyType	Subnet mask

3.10.6.17 NTPClientSettings

Display name	Data type	Definition	Description
NTPEnableSetpoint	Boolean	PropertyType	NTP client activated
NTPServer1Setpoint	String	PropertyType	NTP server address 1
NTPServer2Setpoint	String	PropertyType	NTP server address 2
NTPServer3Setpoint	String	PropertyType	NTP server address 3
NTPServer4Setpoint	String	PropertyType	NTP server address 4

NTPClientState

Display name	Data type	Definition	Description
NTPLastSynchronisationTime ¹⁾		PropertyType	Last synchronization instant
NTPNextSynchronisationTime ¹⁾		PropertyType	Next synchronization instant

¹⁾ read only

3.10.6.18 Notification

Display name	Data type	Definition	Description
Notification1	Object	SitopNotificationType	Notification event
Notification2	Object	SitopNotificationType	Notification event
Notification3	Object	SitopNotificationType	Notification event
Notification4	Object	SitopNotificationType	Notification event

3.10.6.19 OPC UA

Display name	Data type	Definition	Description
OPCUABasic128AccessEnableSetpoint	Boolean	PropertyType	Security Policy Basic128 Sign & Encrypt
OPCUABasic256AccessEnableSetpoint	Boolean	PropertyType	Security Policy Basic256 Sign & Encrypt
OPCUABasic256Sha256AccessEnableSetpoint	Boolean	PropertyType	Security Policy Basic256Sha256 Sign & Encrypt
OPCUAServerEnableSetpoint	Boolean	PropertyType	OPC UA server activated

Display name	Data type	Definition	Description
OPCUAServerPort Setpoint	Integer	PropertyType	OPC UA server port
OPCUAUnencrypted AccessEnable Setpoint	Boolean	PropertyType	Unencrypted access activated

3.10.6.20 ParameterSet



All variables of the SITOP UPS1600 are listed together under the "ParameterSet" node.

3.10.6.21 PN (PROFINET)

Display name	Data type	Definition	Description
PNARSetupLocked Setpoint	Boolean	PropertyType	AR configuration locked
PNDKCPReadonly EnableSetpoint	Boolean	PropertyType	ODCP write protection activated

3.10.6.22 SubDevices

In folder "SupportedTypes", variables and methods are listed, which are available for the buffer modules.

SITOP BAT1600 and SITOP UPS1100

ActualBufferState

Display name	Data type	Definition	Description
BufferTime	UInt32	AnalogItem	Desired buffering time before device switches off
BufferingEndVoltage	Float	AnalogItem	When battery voltage is lower than this voltage, the battery charge is no longer sufficient. Buffering is stopped.

ActualChargingState

Display name	Data type	Definition	Description
ChargeCurrent	Float	AnalogItem	Current used to charge battery during the constant charging phase.
ChargeEndVoltage	Float	AnalogItem	Battery voltage when charging changes to trickle charging. Battery is charged 100 %.
ChargingTotalCurrent	Float	AnalogItem	Battery-specific data: Total charge to the battery during its service life

ActualState

Display name	Data type	Definition	Description
BatteryCalculatedHealth	Byte	AnalogItem	Calculated battery state (only for SITOP BAT1600)
BatteryOperatingState	Byte	AnalogItem	Battery status (only for SITOP BAT1600)
ModuleCapacity	Float	AnalogItem	Battery capacity: Total battery capacity of all energy storage devices connected to the SITOP UPS1600.
ModuleChangeRecommended	Boolean	Property	Battery capacity is insufficient to achieve the specified buffer time.
ModuleCompound	Enumeration	MultiStateDiscrete	Connected device
ModuleConnectionFault	Boolean	Property	Connection to battery interrupted - check connection and fuse
ModuleManufacturingDate	Date	Property	Manufacturing date
ModuleMaxTemperature	Sbyte	AnalogItem	Maximum specified operating temperature of the battery.
ModuleMinTemperature	Sbyte	AnalogItem	Minimum specified operating temperature of the battery.
ModuleStandbyTime	UInt32	AnalogItem	Battery-specific data: Time for which battery was connected but no power was consumed.
ModuleStateLed	Object	Sitop_1600_Led	ModuleStateLed
ModuleTemperature	Sbyte	AnalogItem	Battery temperature

Alarm

Display name	Data type	Definition	Description
AlarmBatteryChangeCanceled	Boolean	Property	Battery replacement canceled - battery parameters are not reset.
AlarmBatteryChangeFinished	Boolean	Property	Battery replacement finished - counters have been reset.
AlarmBatteryChangeStarted	Boolean	Property	Battery replacement started by user
AlarmBatteryCommunicationFault	Boolean	Property	Communication with formerly known battery is no longer possible - check communication
AlarmBatteryDeepDischargedNoChargingPossible	Boolean	Property	Battery is deep discharged, charging not possible.
AlarmBatteryDefect	Boolean	Property	Battery defective - check fuse and battery voltages.
AlarmBatteryEndOfLifetimePrewarning	Boolean	Property	Calculated battery service life almost reached. Only restricted buffer readiness probable.
AlarmBatteryEndOfLifetimeWarning	Boolean	Property	Calculated battery service life reached, battery replacement recommended.
AlarmBatteryTemperatureHigh	Boolean	Property	Battery temperature too high - battery life will be shortened
AlarmBatteryTemperatureLow	Boolean	Property	Battery temperature too low - reduced output current
AlarmFuseBroken	Boolean	Property	Fuse is defective.
AlarmIncompatibleModuleDetected	Boolean	Property	Incompatible battery module detected.

Display name	Data type	Definition	Description
AlarmLessCapableModuleDetected	Boolean	PropertyType	Battery module with reduced power detected.
AlarmMoreCapableModuleDetected	Boolean	PropertyType	A battery module with excessive power detected.
AlarmNewBatteryDetected	Boolean	PropertyType	A new battery was connected. The battery will be included in the calculation of the total capacity and the charge parameters.
AlarmUnexpectedModuleDetected	Boolean	PropertyType	Unexpected module type detected.
AlarmWrongBatteryConfiguration	Boolean	PropertyType	Wrong battery configuration

Additional parameters

Display name	Data type	Definition	Description
BatteryModuleIdentNumber	UInt32	PropertyType	Module identification number
DeviceManual	String	PropertyType	Address (path in the file system or URL/web address) of the operating instructions for the unit.
HardwareRevision	String	PropertyType	Hardware revision of the device
Manufacturer	LocalizedText	PropertyType	Name of the company that manufactured the device
Model	LocalizedText	PropertyType	Model
OrderNumber	String[20]	PropertyType	Article number
RevisionCounter	Int32	PropertyType	Incremental counter that specifies how often the static data in the device was modified.
SerialNumber	String[16]	PropertyType	ID, which uniquely identifies the device for the device manufacturer
SlotId	UInt16	PropertyType	Number of the slot
SoftwareRevision	Integer	PropertyType	Revision status of the device software
VersionNumber	String	PropertyType	Software Version (only SITOP BAT1600)

3.10.6.23 ThirdPartyBatteryParameter

Display name	Data type	Definition	Description
BatteryCapacitySetpoint	Float	AnalogItemType	Total capacity of the installed batteries in Ah.
BatteryDefectVoltageSetpoint	Float	AnalogItemType	Voltage value below which a battery is considered to be defective and should no longer be charged.
BatteryDurationConstantVoltagePhaseSetpoint	UInt16	AnalogItemType	Duration of the constant voltage charging phase.
BatteryTypeSetpoint	Byte	PropertyType	Make/type of battery 0 ... lead-gel battery (Pb), 1 ... pure lead battery (pPb)
ChargeCurrentSetpoint	Float	AnalogItemType	Max. permissible current to charge the battery
OperatingTemperatureSetpoint	Sbyte	AnalogItemType	Typical ambient temperatures for battery modules in operation.
StartOfPreserveVoltageSetpoint	Float	AnalogItemType	Threshold when switching over from normal battery charging to preserve charge voltage (brief post charging).

3.10 OPC UA server

Display name	Data type	Definition	Description
StopBufferingVoltageSetpoint	Float	AnalogItem	Discharge threshold at which level buffering is stopped.
TemperatureCoefficientSetpoint	UInt16	PropertyType	Temperature coefficient of the charging current for battery charging.

3.10.6.24 UserManagement

Display name	Data type	Definition	Description
AddUser	Method	Method	Adds a user.
ChangeUserPassword	Method	Method	Changes the password for the user.
DeleteUser	Method	Method	Deletes the user.
UsermanagementUser 1 ... 16	SitopUserType	SitopUserType	AccessLevel1Setpoint (read operating data) AccessLevel2Setpoint (read configuration from device) AccessLevel3Setpoint (write configuration to device) AccessLevel4Setpoint (read settings from device) AccessLevel5Setpoint (write settings to device) AccessLevel6Setpoint (read alarm list) AccessLevel7Setpoint (delete/save alarm list) AccessLevel8Setpoint (change operating states) AccessLevel9Setpoint (update firmware) AccessLevel10Setpoint (run special functions) AccessLevel11Setpoint (manage users) UserName - user name

3.10.6.25 Web server

Display name	Data type	Definition	Description
WebserverAutoLogoutEnableSetpoint	Boolean	PropertyType	Execute automatic log off after 15 minutes.
WebserverEnableSetpoint	Boolean	PropertyType	Activate web server on this module.
WebserverPermitAccessOnlyWithHttpsSetpoint	Boolean	PropertyType	Permit access only with HTTPS
WebserverReloadTimeSetpoint	Enumeration	MultiState DiscreteType	Update interval:

3.10.6.26 Additional parameters

These nodes are listed at the first level in the object tree

Display name	Data type	Definition	Description
DeviceManual	String	PropertyType	Address (path in the file system or URL / web address) of the operating instructions for the device.
Hardware Revision	String	PropertyType	Revision status of the device hardware.
Manufacturer	LocalizedText	PropertyType	Name of the company that manufactured the device.
Model	LocalizedText	PropertyType	Model
ModuleIdentNumber	UInt32	PropertyType	Module identification number
OrderNumber	String[20]	PropertyType	Article number
RevisionCounter	Int32	PropertyType	Incremental counter that specifies how often the static data in the device was modified.
SerialNumber	String	PropertyType	ID, which uniquely identifies the device for the device manufacturer.
SoftwareRevision	String	PropertyType	Revision status of the device software.

3.10.7 OPC UA performance

OPC UA provides the option of collectively transferring modified actual values in the form of a subscription. The minimum pole interval of such a subscription is 100 ms. A maximum of 150 data nodes can be simultaneously monitored, independent of whether these data nodes are assigned one or various subscriptions.

OPC UA does not support any type of realtime communication, neither for actual values (read data) nor for setpoints (written data). As a consequence, it is not possible to specify an update/refresh rate or a maximum data flow rate.

3.10.8 Recommissioning after a basic device has been replaced - or after restoring the factory settings

If, for service reasons it is necessary to replace the basic unit - or store the factory settings, then please observe the following notes:

1. Brand new basic units or basic units, where the factory settings have been restored, have no IP address. However, this is generally necessary so that the device can be accessed using OPC UA. Proceed as described in Chapter "General (Page 142)", Section "Communication interface" to assign the device a certain IP address.
2. The configuration must be loaded to the device. This can be done in the following ways:
 - Proceed as described in Chapter "Load / Save (Page 155)" to load a valid configuration into the device (previously saved via web server).
 - Load a valid configuration to the device via OPC UA. Ensure that the necessary user account is available in the device for access via OPC UA. The latter can be created using a web server, see Chapter "Web server (Page 144)".

3.11 SNMP Agent

An SNMP agent is integrated in SITOP UPS1600 corresponding to the PROFINET specification. Via this SNMP agent, a network management system (e.g. SINEMA server) can call up administrative information about the unit. Corresponding to the SNMPv1/SNMPv2 notation, this information is summarized in the "system" group
(iso(1).org(3).dod(6).internet(1).mgmt(2).mib-2(1).system(1)).

The following example illustrates the associated nomenclature:

Name	Access	Explanation	Default setting
sysDescr	Read	A character string with the following content is used: "[<Supplier>, <Product family>, <Product name>, <Order number>, <HwVersion>, <FwVersion>, <Serial number>]"	"Siemens, SITOP Power, UPS1600, 6EP4136-3AB00-2AY0, HW: Version 7, FW: Version V02.04.00, SQ6H4BNL7F5G"
sysObjectID	Read	Object identification of the automation component	".0.0"
sysUpTime	Read	Time in 1/100 s since switching on	-
sysContact	Read/write	Text identifier of the contact person for this unit, as well as information to make contact with this person. Is provided by the network manager.	-
sysName	Read/write	A name assigned by the administrator for this unit	-
sysLocation	Read/write	The physical location of this unit. Is provided by the network manager.	-
sysServices	Read	A value, which specifies the set of services that this unit offers. The value is coded as the sum of the individual service identifiers.	"76" (application + end-to-end + internet)

Troubleshooting

You can obtain more information on an active alarm from the help text. The extended error type is used to interpret alarms in S7 function blocks that you have programmed yourself.

The severity indicates the severity of the alarm:

- N = Diagnostics
- MR = Maintenance Required
- MD = Maintenance Demanded
- F = Failure (module has failed)

Error Type	Extended Error Type	Severity	Alarm Text	Help Text
256	1	F	Software corrupted	Software is corrupt - try to update the software
256	2	MR	Wrong checksum	Internal error: Communication disrupted
256	3	MR	Parameter corrupt	Attempting to write to an unknown or read-only object.
256	4	MR	Unknown parameter	Attempting to set a parameter that is not known by UPS1600.
256	5	MR	Wrong message length	Internal error: Communication disrupted
256	6	MR	Wrong parameter	Parameter value is not within the specified range
256	7	MR	Command not accepted	An incorrect command was sent to the UPS1600.
256	8	MR	Communication error: Wrong length field	Syntax error in command
256	9	MR	Wrong request	Error in sent message: Unknown request sent.
256	10	MR	Cannot write to object	Attempting to write to a parameter that is 'read-only'
256	11	MR	Object pending: obsolete	UPS1600 cannot provide data for the requested object.
256	12	MR	Battery not available	Attempting to access a battery that is not available. Either the battery with the requested number was never connected or communication with this battery was interrupted.
256	13	MR	EEPROM write error	Saving UPS1600 parameters failed. Device is defective.
256	14	MR	Unknown alarm	Internal error: Wrong parameter at execution of test command.
256	15	MR	Command outside range	An incorrect command was sent to the UPS1600.
256	16	MR	Software update is being performed	The command sent cannot be executed as long as the program is running.
256	17	MR	No software update	Cannot execute the sent command because no software update has been started.
256	18	MR	Wrong battery number	Attempting to retrieve data about a battery which does not exist or is not connected.
256	19	MR	Wrong address	Wrong Flash address in software update - software update file is corrupt.
256	20	MR	Write error	Cannot write to Flash - hardware may be defective
256	21	MR	Read error	Unable to read EEPROM. Device is defective.

Error Type	Extended Error Type	Severity	Alarm Text	Help Text
256	22	MR	Wrong device ID	An attempt was made to update the software with an update file that is not suitable for the UPS1600.
256	23	MR	Corrupt data record	Error during software update - try to update the software again
256	24	MR	Wrong update	An attempt was made to update the software with an invalid update file. The update file is probably too old.
256	25	MR	Too much data	An entry in the software update cannot contain more than 32 bytes of reference data.
256	26	F	Device failure	Device failure
256	27	F	No boot loader available	No boot loader available
257	1	MD	Buffer mode is not possible	Buffer mode not possible - check cabling, fuse and battery voltages
257	2	MR	Device temperature critical (too high)	Device temperature higher than 100 °C. Caution: The highest permitted temperature could be exceeded!
257	3	MR	Device temperature critical (too low)	Device temperature less than -10 °C. Device could leave the operating range.
257	4	MR	High-resistance connection to battery	High-resistance connection to battery - check battery power cable
257	5	MD	Power supply to at least one battery interrupted	Connection to battery interrupted - check connection and fuse
257	6	MR	Unknown battery	Data from the battery cannot be read correctly. Battery is defective or not supported by SIEMENS.
257	7	MD	Overcurrent	Output current of UPS1600 is too high. Output is switched off for 20 s. The output is switched on again after 20 s.
257	8	N	Reset buffer timer	PC is shutting down
257	9	N	UPS1600 off	UPS1600 off - buffer time exceeded.
257	10	MR	Output switched off	The UPS1600 output was shut down as result of executing an instruction or an error situation (e.g. overtemperature, excessive output current).
257	11	N	Output switched on obsolete from V2.3	The UPS1600 output was switched on again as result of executing an instruction or the correction of an error situation.
257	12	N	Reset executed	Input voltage at UPS1600 was OK again before the buffer time expired. Connected devices are reset by switching off the UPS1600 outputs for the configured time.
257	13	MD	Battery test is negative	A cyclic battery test will be performed Remark: For firmware versions from V2.2 - and for versions V2.0.x from version V2.0.5, the alarm is deactivated.
257	14	N	Software update successful	Previous software update was successful - UPS1600 is operational again.
257	15	MD	Input voltage is too high	Input voltage exceeds 30 V. UPS1600 is not operational.
257	16	MR	Surplus battery	More than 6 batteries are connected. Connect max. of 6 batteries to the Energy Storage Link.
257	17	F	UPS1600 parameters corrupt	UPS1600-parameters corrupt - try to update the software.
257	18	F	Device overtemperature	Output and battery charging is switched off to prevent damage to the device.
257	19	MR	Capacity test	Capacity test being performed

Error Type	Extended Error Type	Severity	Alarm Text	Help Text
257	20	MD	Low voltage mode	Input voltage of UPS1600 is too low. UPS1600 is not ready for buffering.
257	21	MR	Buffering	Device is in buffer mode.
257	22	MD	Communication with device failed	PROFINET connection available - UPS1600 is defective
257	23	N	Device powered up	Device powered up
257	24	MD	Wrong battery polarity	Wrong battery polarity - check battery connections.
257	26	MR	Insufficient charge level	The battery charge level is too low to guarantee the configured buffer capacity.
257	27	MR	Deep discharge battery	Battery is deep discharged - no buffering possible
257	28	N	Buffer readiness disabled	Buffer mode was deactivated by the bridge, rotary coding switch or in REMOTE mode per command.
257	29	N	Shutdown completed, ping test successfully completed.	UPS1600 was successfully shut down.
257	30	N	Charge current reduced due to system load	Charge current was reduced due to system load
257	31	N	Battery fully charged	Battery is fully charged, buffer standby available
257	32	N	Charging current reduced manually	The charging current has been reduced by manual adjustment.
257	33	N	The charging function was deactivated by a control command	The charging function was deactivated by a control command The batteries are no longer charged.
257	41	MR	Battery almost discharged as the charging function is deactivated.	The battery is almost discharged as the charging function is deactivated. It is recommended that the charging function is immediately reactivated.
257	42	MD	Battery parameters corrupt (battery index: 1)	Battery defective - replace battery
257	43	MD	Battery parameters corrupt (battery index: 2)	Battery defective - replace battery
257	44	MD	Battery parameters corrupt (battery index: 3)	Battery defective - replace battery
257	45	MD	Battery parameters corrupt (battery index: 4)	Battery defective - replace battery
257	46	MD	Battery parameters corrupt (battery index: 5)	Battery defective - replace battery
257	47	MD	Battery parameters corrupt (battery index: 6)	Battery defective - replace battery
258	1	MD	Battery defective (battery index: {1:d})	Battery defective - check fuse and battery voltages.
258	2	MD	Deep discharge battery, no charging possible (battery index: {1:d}).	Battery is deep discharged - replace battery.
258	3	MR	Battery temperature high (battery index: {1:d})	Battery temperature too high - battery life will be shortened
258	4	MR	Battery temperature low (battery index: {1:d}).	Battery temperature too low - reduced buffer current
258	5	MD	Communication with battery fault (battery index: {1:d})	Communication with formerly known battery is no longer possible - check communication

Error Type	Extended Error Type	Severity	Alarm Text	Help Text
258	6	N	New battery detected (battery index: {1:d})	A new battery was connected. The battery will be included in the calculation of the total capacity and the charge parameters.
258	7	MD	Wrong battery configuration (battery index: {1:d})	Different battery types connected. Only batteries of the same type can be operated together.
258	8	MD	Battery parameters corrupt (battery index: {1:d}).	Battery defective - replace battery Remark: Alarm is deactivated.
258	9	MR	Battery replacement started (battery index: {1:d})	Battery replacement started by user
258	10	MR	Battery replacement finished (battery index: {1:d})	Battery replacement finished - counters have been reset
258	11	MD	Battery replacement canceled (battery index: {1:d})	Battery replacement canceled - battery parameters are not reset
258	12	MD	Fuse is defective (battery index: {1:d})	Fuse is defective.
258	13	MD	Battery test negative	The battery test ended with a negative result.
258	14	N	Battery replacement recommended (battery index: {1:d})	End of lifetime approaching
258	15	MR	Battery replacement recommended (battery index: {1:d})	End of lifetime reached
258	16	MR	Incompatible module detected (battery index: {1:d})	Incompatible module detected
258	17	MR	Module with reduced power detected (battery index: {1:d})	A module with reduced power was detected. Deviating system behavior may be possible.
258	18		Battery module with excessive power detected (battery index: {1:d})	A module with excessive power was detected. Normal operation of the system is possible.
258	19		Unexpected module type detected (battery index: {1:d})	Unexpected module type detected

Note

Separated according to priority levels, the number of active alarms can be called using the PN data sets listed below.

F: 0x800B

MD: 0x8013

MR: 0x8012

4.1 Hardware fault

For an internally identified software or hardware fault/error, the following response occurs:

- LED 1 (O.K./BAT.) lights up red
- LED 2/3/4 are dark
- Alarm 256 / 26 (device fault) is sent
- SITOP UPS1600 shuts down

V2.0.4 or V2.1:

The output is only shut down for a software error (internal software error, software update not completed, software checksum is incorrect).

Mounting/removing

5.1 SITOP UPS1600

 WARNING**Installing the device in a housing or a control cabinet**


The SITOP UPS1600s are built-in units. They must be installed in a housing or control cabinet where only qualified personnel have access.

The device can be mounted in a control cabinet on DIN rails (see Chapter Mechanical system (Page 246))

 WARNING**Use in hazardous zones**

If the device is to be used in a hazardous zone (II 3G Ex nA nC IIC T4 Gc) it must be installed in a distribution box with degree of protection IP54 or higher. This distribution box must comply with the requirements of EN 60079-15.

Mounting

To mount the device, position it with the DIN rail guide at the upper edge of the standard mounting rail and press down to lock it into place. If this is too difficult, press slider  at the same time, as described under "Removal".

Removal

To remove, carefully open the slider ⑩ using a screwdriver or by hand (see Figure 5-1 Removal (example 6EP4136-3AB00-2AY0) (Page 188)) and disengage the device at the bottom edge of the DIN rail. Then you can remove the device from the upper edge of the DIN rail.

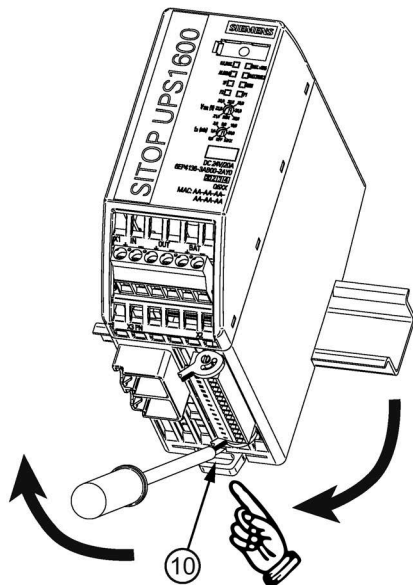


Figure 5-1 Removal (example 6EP4136-3AB00-2AY0)

5.1.1 Signal connector

Mounting

Push connector on socket ④ in the housing.

Removal

To remove the signal connector, press the release lever (4b) (see Figure 5-2 Mounting/removal: Signal connector (Page 188)) and then remove the connector.

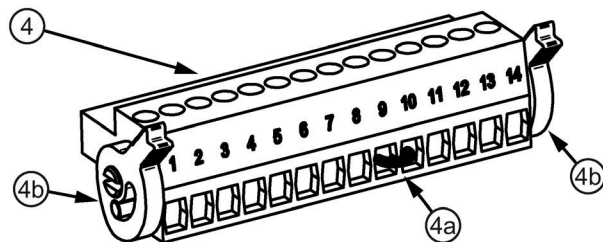


Figure 5-2 Mounting/removal: Signal connector

5.1.2 USB connector

When a SITOP UPS1600 is used in a hazardous zone, a USB connector with strain relief must be used.

Mounting

Push the connector onto the socket in the housing until the strain relief (6b) snaps into the housing (6a).

Removal

To remove the USB connector, press to release the strain relief (6b) (see Figure 5-3 Mounting/removal: USB connector (Page 189)) and then remove the connector.

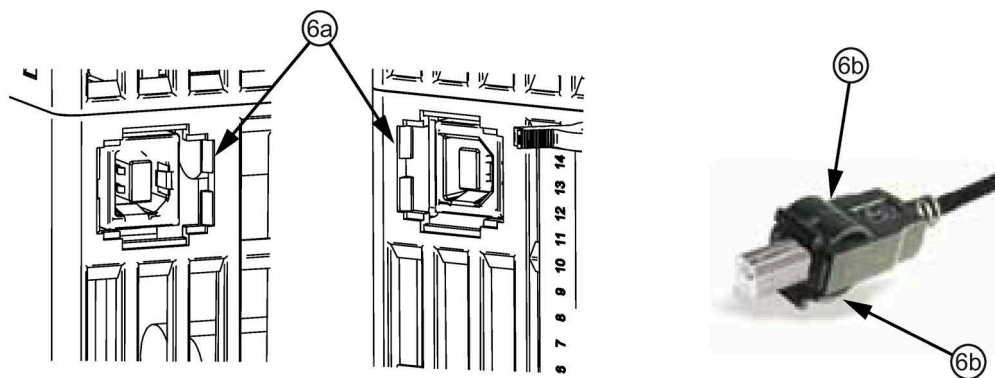


Figure 5-3 Mounting/removal: USB connector

5.1.3 PROFINET/Ethernet connector

When a SITOP UPS1600 is used in a hazardous zone, a PROFINET/Ethernet connector with strain relief must be used.

Mounting

Push the connector onto the socket in the housing until the strain relief (5b) snaps into the housing (5a).

Removal

To remove the PROFINET/Ethernet connector, press to release the strain relief (5b) (see Figure 5-4 Mounting/removal: Ethernet (Page 190)) and then remove the connector.

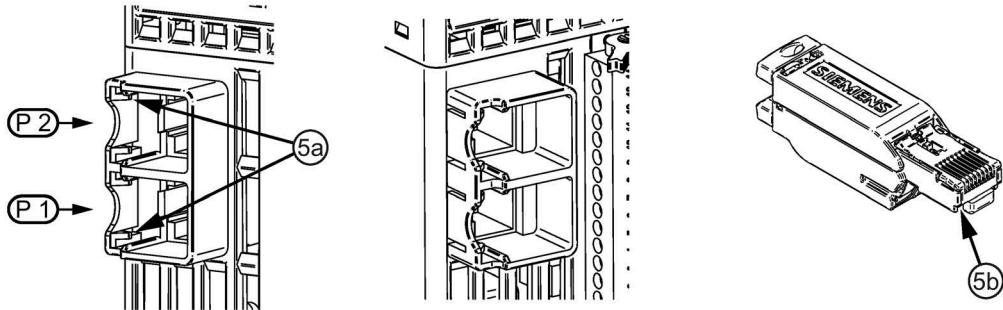


Figure 5-4 Mounting/removal: Ethernet

5.2 SITOP BAT1600

 WARNING**Installing the device in a housing or a control cabinet**

The SITOP BAT1600 battery modules are built-in devices. They must be installed in a housing or control cabinet where only qualified personnel have access.

Note

Install battery modules at the coolest location in the control cabinet (e.g. in the lower section of the control cabinet).

For 2.5 Ah, 3.2 Ah and 7.5 Ah devices

Devices 6EP4132-0JA00-0AY0 (2.5 Ah), 6EP4133-0GA00-0AY0 (3.2 Ah) and 6EP4134-0JA00-0AY0 (7.5 Ah) can be snapped onto a DIN rail (see Chapter Mechanical system (Page 246)). Using a wall adapter, these modules are also suitable for wall mounting


For 12 Ah device

Device 6EP4135-0GE00-0AY0 (12 Ah) is designed for being directly mounted on a wall. 4 x M5 screws should be used for the purpose.

Note

To improve the fire protection class, for the 3.2 Ah and 12 Ah battery modules, the accessory pack includes a transparent fire protection cover for the fuse.

Mounting

To mount the device on a DIN rail, place the device with the DIN rail guide at the upper edge of the rail and snap it in downwards. If this is too difficult, press slider  at the same time, as described under "Removal".

4 x M5 screws should be used for wall mounting. The clearances for the holes are shown in the following diagrams.

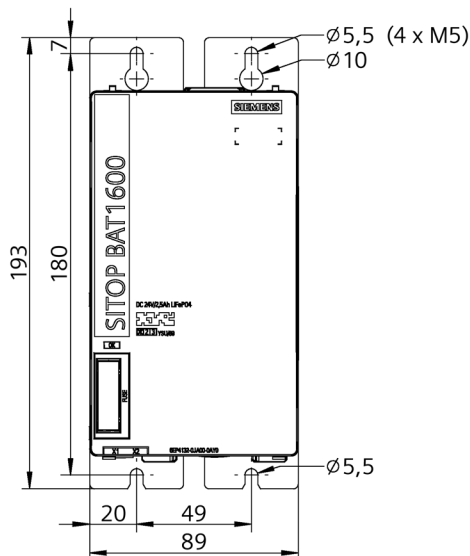


Figure 5-5 Installation example 6EP4132-0JA00-0AY0 (2.5 Ah LiFePO4)

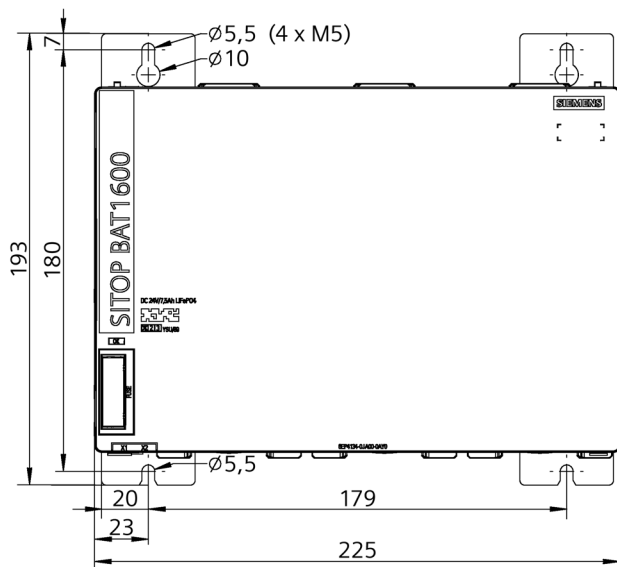


Figure 5-6 Installation example 6EP4134-0JA00-0AY0 (7.5 Ah LiFePO4)

Note

The fuses should be inserted in the fuse holder only when commissioning the device (charged batteries).

Note

When shipped by air, as a result of transport regulations for hazardous goods, when requested, SITOP BAT1600 LiFePO₄ battery modules are only charged up to 30 % in the factory. Always fully charge the batteries before storing for a long period of time. When supplied, LiFePO₄ batteries are internally disconnected, and therefore must first be connected before charging.

Removal

To remove, carefully pull up the slider ⑩ using a screwdriver (see the subsequent diagram) and disengage the device at the bottom edge of the DIN rail. Then you can remove the device from the upper edge of the DIN rail.

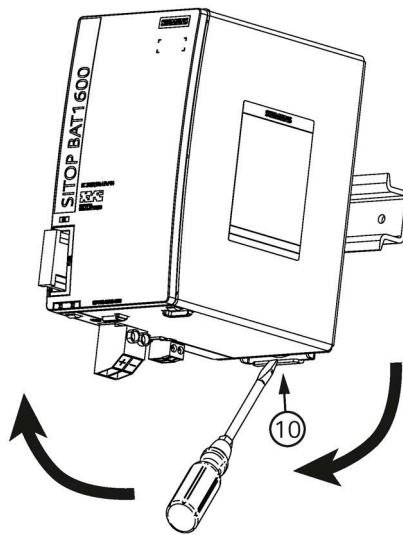


Figure 5-7 Removal example 6EP4132-0JA00-0AY0 (2.5 Ah LiFePO₄)

For a 38 Ah device

The device 6EP4137-0GE00-0AX0 (38 Ah) is only designed for floor mounting. The batteries must be mounted horizontally and secured so that they cannot slide.

The fastening material is not included in the scope of delivery.

Minimum specifications for the tensioning belt: Length: 1.5 m; belt width: 25 mm; tensile strength: 250 kg lashing force LC: 250 daN

Freestanding batteries in a control cabinet must comply with flammability Class UL94-V0.

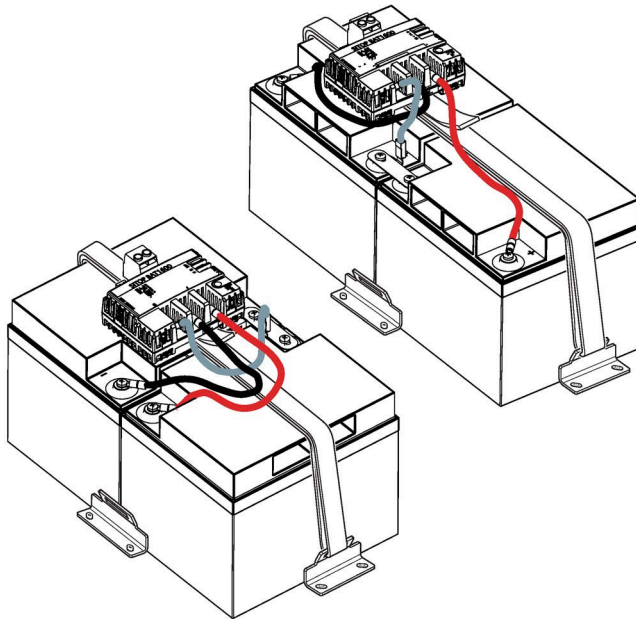


Figure 5-8 Installation 6EP4137-0GE00-0AY0 (38 Ah Pb)

Mounting:

1. Fasten the batteries
2. Connect the Battery Monitor to the batteries
3. Connect the mid-point connector to the batteries
4. Connect the Battery Monitor to the batteries and the mid-point connector

5.3 SITOP UPS1100

WARNING

Installing the device in a housing or a control cabinet

The SITOP UPS1100 battery modules are built-in units. They must be installed in a housing or control cabinet where only qualified personnel have access.

All devices are suitable for direct wall mounting.

Devices 6EP4131-0GB00-0AY0 (1.2 Ah), 6EP4132-0GB00-0AY0 (2.5 Ah), 6EP4133-0GB00-0AY0 (3.2 Ah) and 6EP4133-0JB00-0AY0 (5 Ah) can also be snapped onto a DIN rail TH35×15 (EN 60715), and device 6EP4131-0GB00-0AY0 (1.2 Ah) also onto a DIN rail TH35×7.5 (EN 60715).

The lower part of the control cabinet or the coolest location in the control cabinet should be chosen as mounting location.

WARNING

Use in hazardous zones

When the device is installed in a hazardous zone (II 3G nA IIC T4 Gc), **not permissible for 6EP4133-0JB00-0AY0 (5 Ah)**, then this must be installed in a distribution box with degree of protection IP54 or higher. This distribution box must comply with the requirements of EN 60079-15.

WARNING

In hazardous zones, it is not permissible that UPS1100 battery modules are connected in parallel!

Mounting

See Chapter Dimensions and weight for the holes for wall mounting SITOP UPS1100 (Page 54).

To mount the device on a standard mounting rail, place it with the standard mounting rail guide at the upper edge of the DIN rail and snap it in downwards. If this is too difficult, push the device downwards while pressing on the rail as described for "Removal".

Note

The fuses should be inserted in the fuse holder only when commissioning the device (charged batteries).

Note

When shipped by air, as a result of transport regulations for hazardous goods, when requested, SITOP BAT1600LiFePO4 battery modules are only charged up to 30 % in the factory. Always fully charge the batteries before storing for a long period of time. When supplied, LiFePO4 batteries are internally disconnected, and therefore must first be connected before charging.

Removal

To remove the device, pull it downwards while removing it from the lower edge of the DIN rail (see Figure 5-9 Removal (example 6EP4133-0GB00-0AY0 (3,2 Ah)) (Page 196)). Then you can remove the device from the upper edge of the DIN rail.

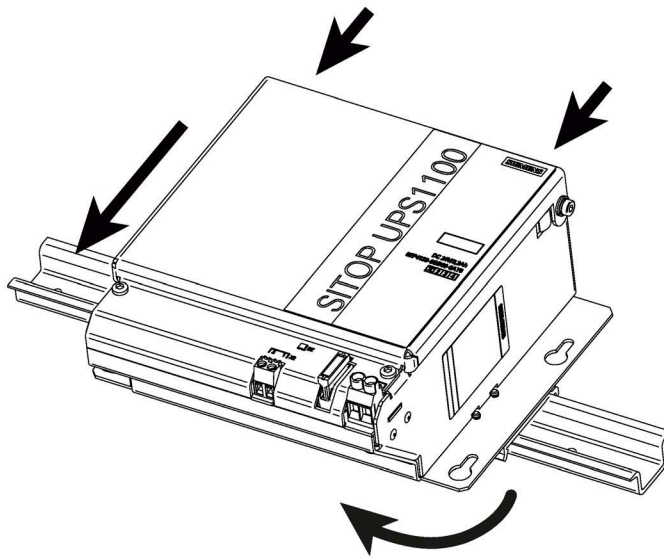


Figure 5-9 Removal (example 6EP4133-0GB00-0AY0 (3,2 Ah))

Mounting position, mounting clearances

6.1 SITOP UPS1600

6.1.1 Standard mounting position

The device is mounted on DIN rails. The device must be mounted vertically in such a way that the input terminals and the output terminals are at the bottom to ensure correct cooling.

A clearance of at least 50 mm should be maintained above and below the device.

No clearance is required at the side.

Output current as a function of the ambient temperature

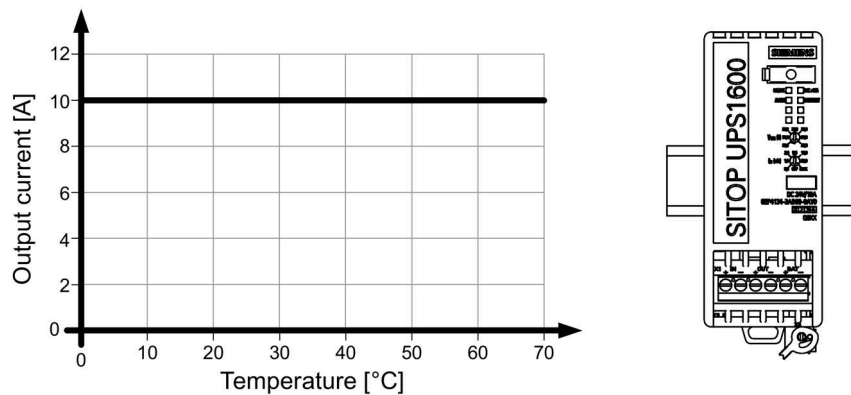


Figure 6-1 6EP4134-3AB00-... Output current in the standard mounting position

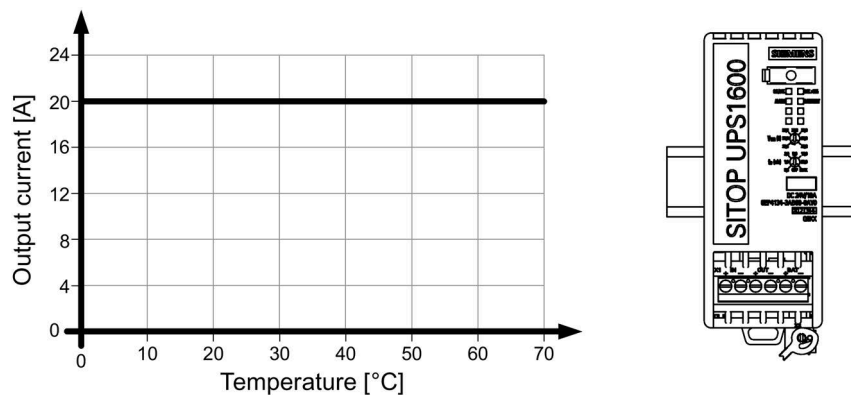


Figure 6-2 6EP4136-3AB00-... Output current in the standard mounting position

6.1 SITOP UPS1600

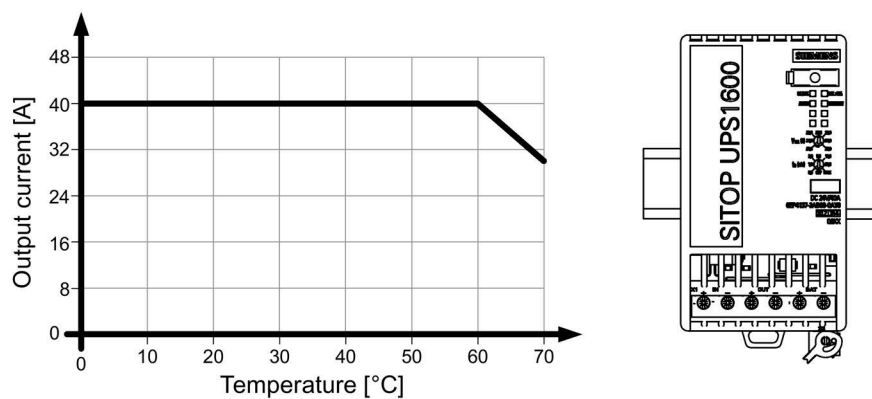


Figure 6-3 6EP4137-3AB00-... Output current in the standard mounting position

6.1.2 Other mounting positions

For mounting positions that deviate from the standard mounting position, derating factors (reduction of the output power or the permissible ambient temperature) must be observed in accordance with the following diagrams.

Note

In the case of mounting positions that deviate from the standard mounting position, reduced mechanical resistance of the devices against vibration and shock must be expected.

Particularly when installing on a vertically fastened standard mounting rail, additional measures may be required, e.g. to prevent the device from slipping on the standard mounting rail.

6.1.2.1 6EP4134-3AB00-...

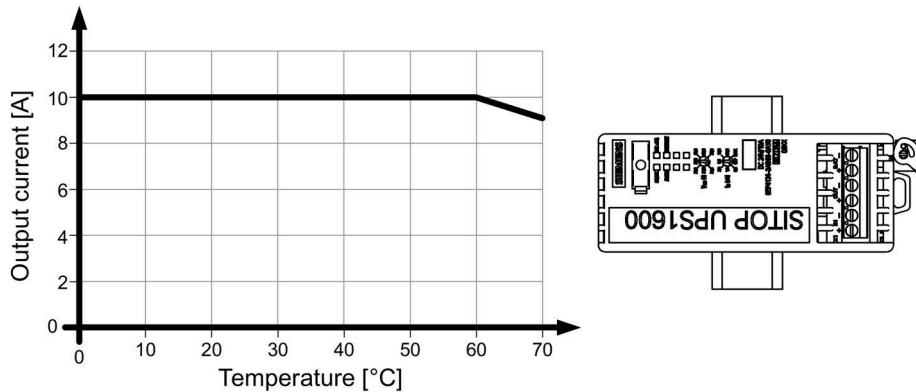


Figure 6-4 6EP4134-3AB00-... Mounting position 1

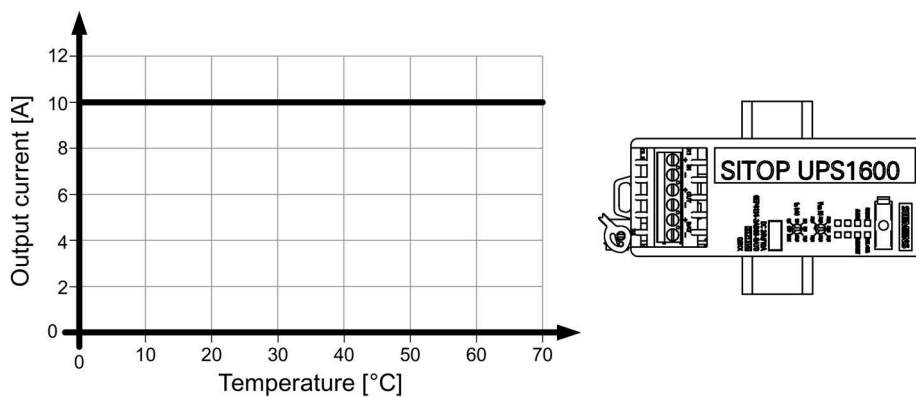


Figure 6-5 6EP4134-3AB00-... Mounting position 2

6.1 SITOP UPS1600

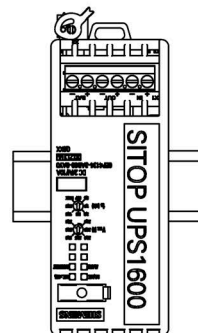
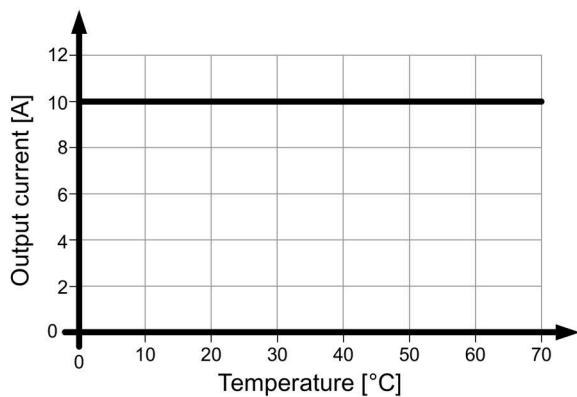


Figure 6-6 6EP4134-3AB00-... Mounting position 3

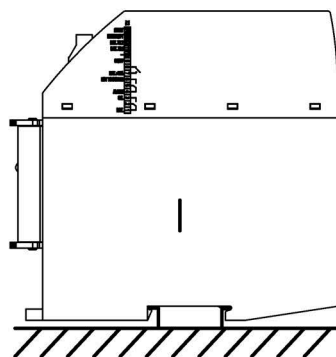
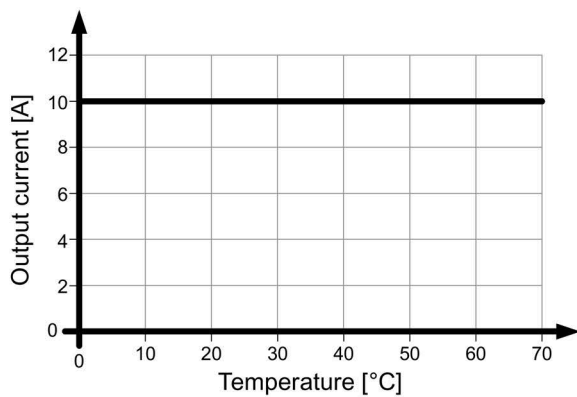


Figure 6-7 6EP4134-3AB00-... Mounting position 4

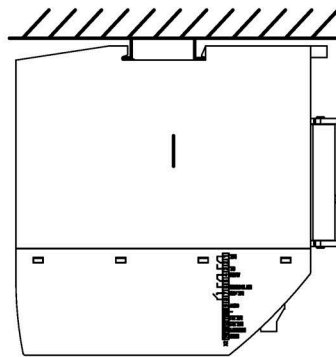
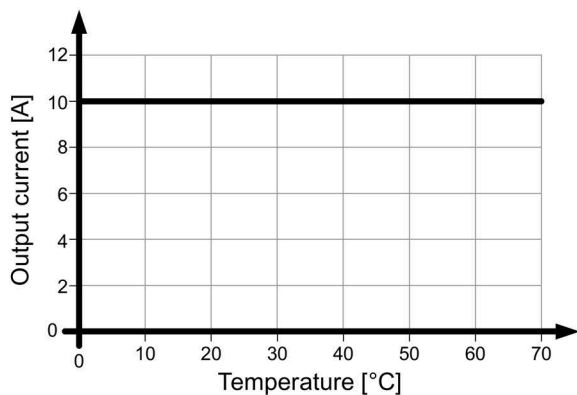


Figure 6-8 6EP4134-3AB00-... Mounting position 5

6.1.2.2 6EP4136-3AB00-...

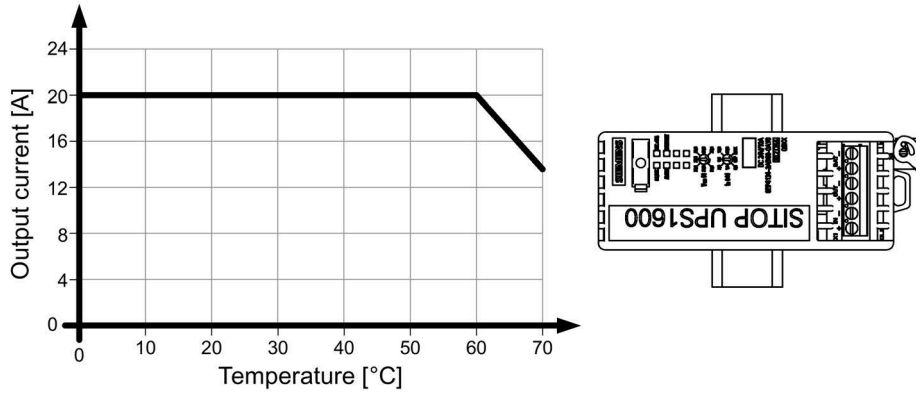


Figure 6-9 6EP4136-3AB00-... Mounting position 1

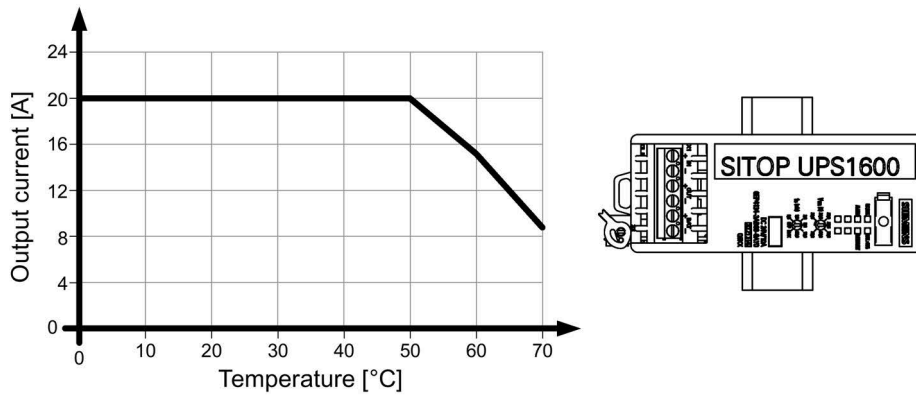


Figure 6-10 6EP4136-3AB00-... Mounting position 2

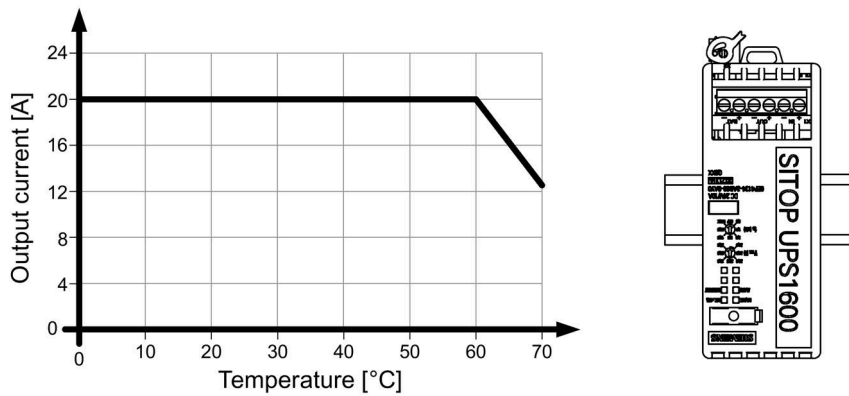


Figure 6-11 6EP4136-3AB00-... Mounting position 3

6.1 SITOP UPS1600

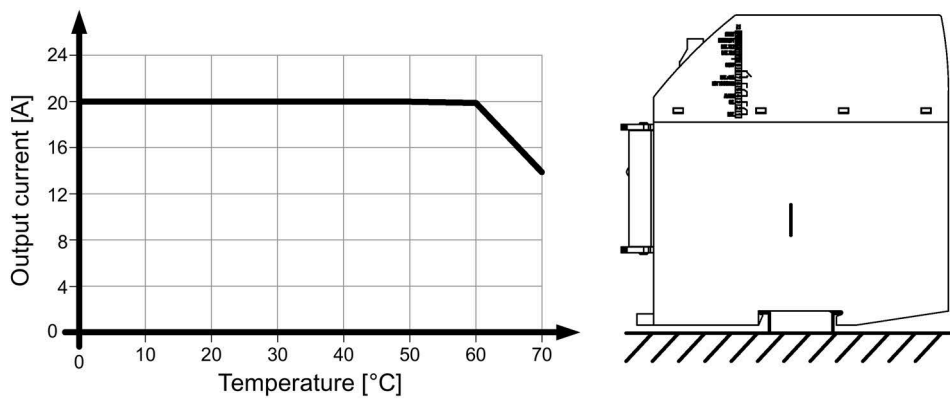


Figure 6-12 6EP4136-3AB00-... Mounting position 4

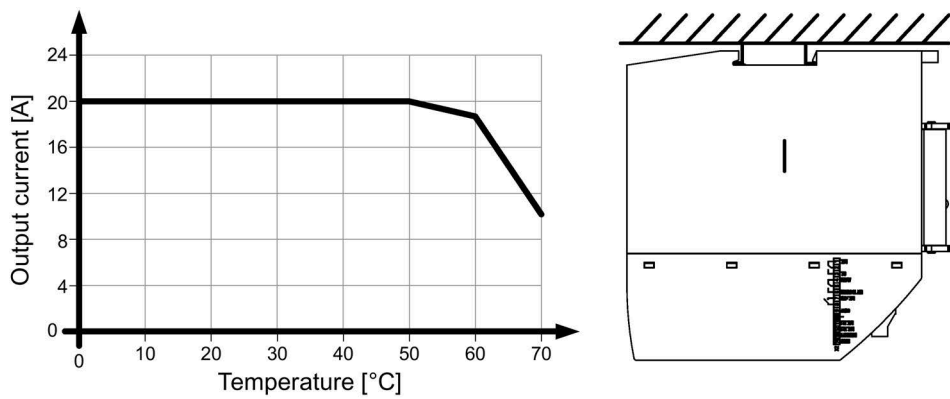


Figure 6-13 6EP4136-3AB00-... Mounting position 5

6.1.2.3 6EP4137-3AB00-...

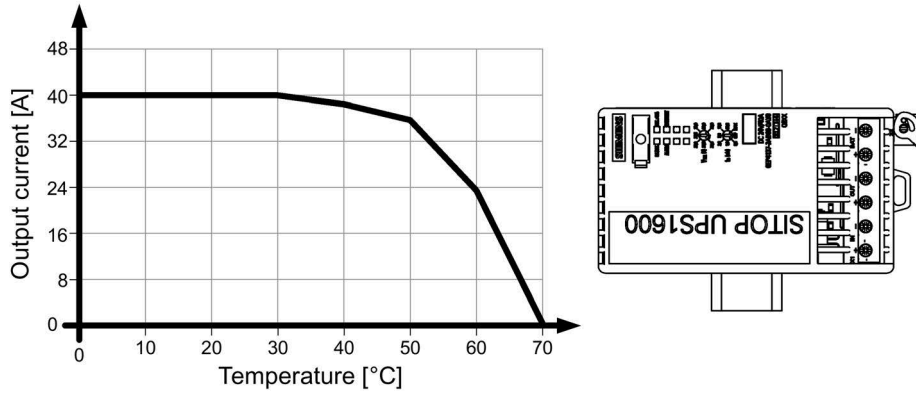


Figure 6-14 6EP4137-3AB00-... Mounting position 1

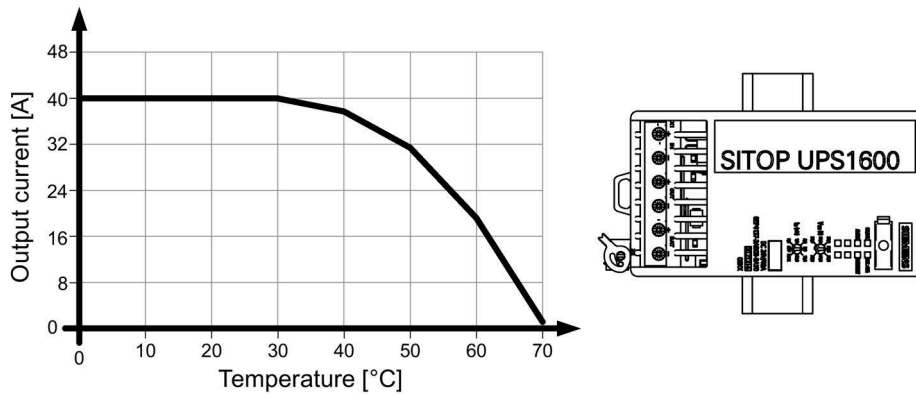


Figure 6-15 6EP4137-3AB00-... Mounting position 2

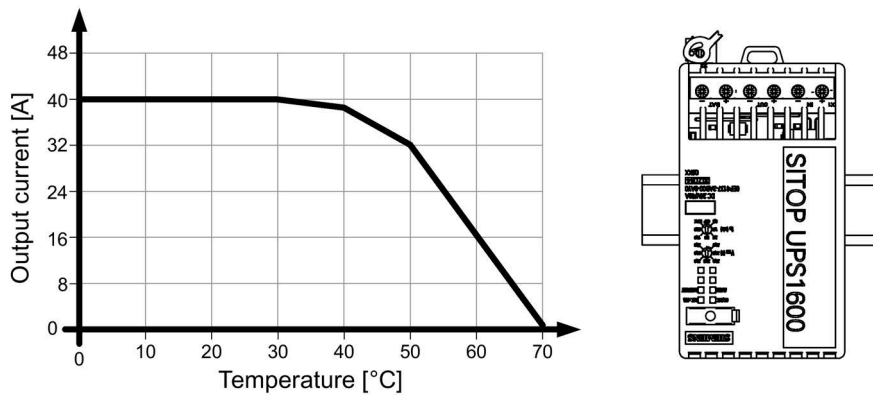


Figure 6-16 6EP4137-3AB00-... Mounting position 3

6.1 SITOP UPS1600

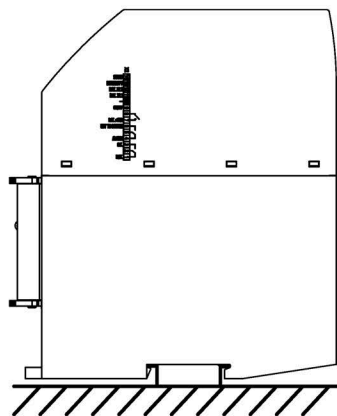
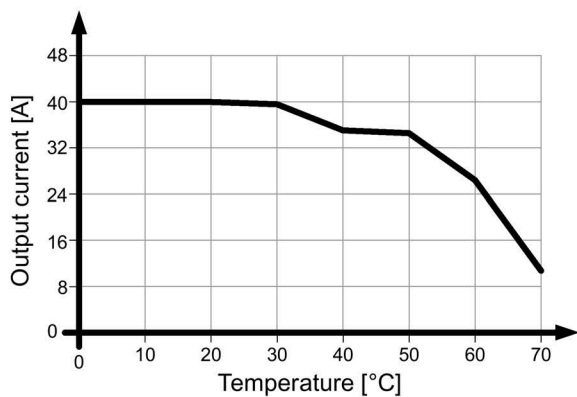


Figure 6-17 6EP4137-3AB00-... Mounting position 4

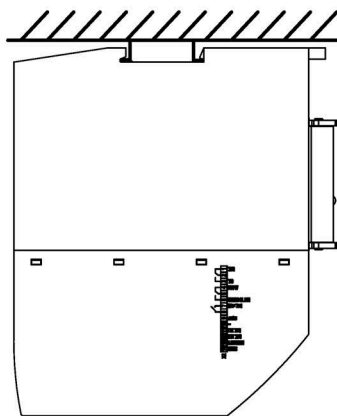
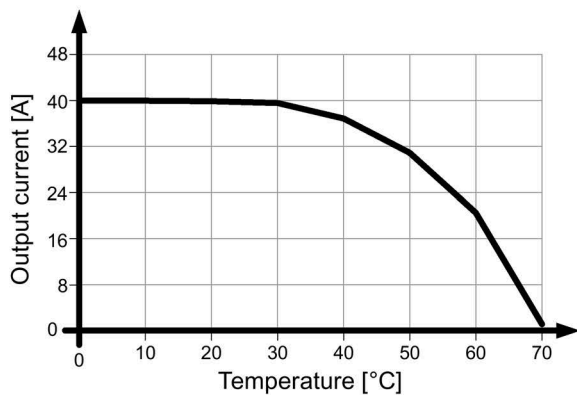


Figure 6-18 6EP4137-3AB00-... Mounting position 5

6.2 SITOP BAT1600

6.2.1 Standard mounting position

The unit should be mounted so that the terminals are at the bottom. A clearance of at least 50 mm must be maintained above and below the device (max. cable duct depth 50 mm). No clearance is required at the side. However, an additional clearance prevents any thermal coupling to other sources of heat, and therefore increases the service life of the batteries (by reducing the ambient temperature).

For 2.5 Ah, 3.2 Ah and 7.5 Ah devices

Devices 6EP4132-OJA00-OAY0 (2.5 Ah), 6EP4133-OGA00-OAY0 (3.2 Ah) and 6EP4134-OJA00-OAY0 (7.5 Ah) can be snapped onto a TH35×15 (EN 60715) DIN rail. Batteries should always be installed at the coolest location in the control cabinet (e.g. in the lower section of the control cabinet). Using a wall adapter, these modules are also suitable for wall mounting

For 12 Ah device

Device 6EP4135-0GE00-OAY0 (12 Ah) is designed for being directly mounted on a wall. 4 x M5 screws should be used for the purpose.

Note

To improve the fire protection class, for the 3.2 Ah and 12 Ah battery modules, the accessory pack includes a transparent fire protection cover for the fuse.

For a 38 Ah device

The device 6EP4137-0GE00-OAX0 (38 Ah) is only designed for floor mounting.

Note

Install battery modules at the coolest location in the control cabinet (e.g. in the lower section of the control cabinet).

6.2.2 Other mounting positions

Note

In the case of mounting positions that deviate from the standard mounting position, reduced mechanical resistance of the devices against vibration and shock must be expected.

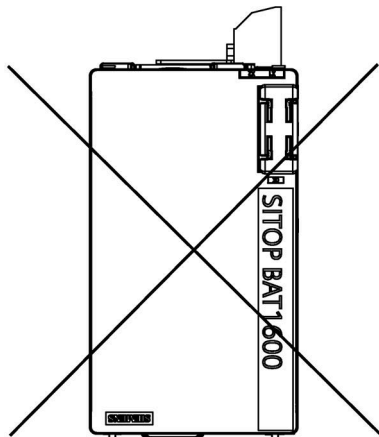
Particularly when installing on a vertically fastened DIN rail, additional measures may be required, e.g. to prevent the device from slipping on the DIN rail.

LFP can be installed in any position.

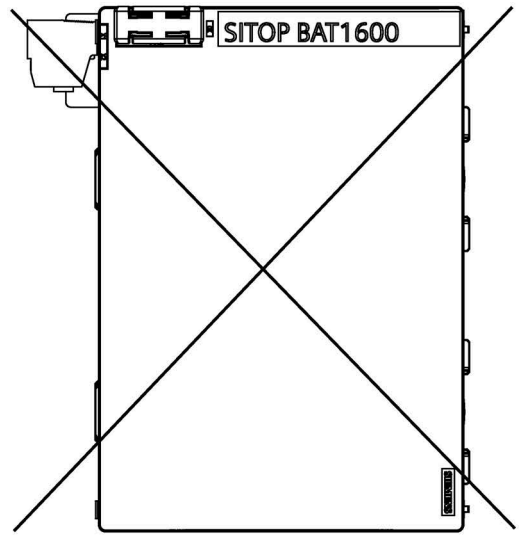
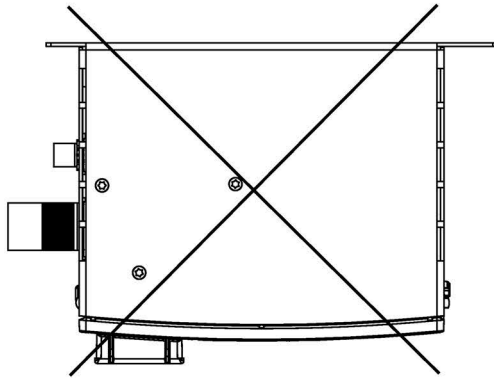
Lead-gel batteries must not be installed upside down.

The 38 Ah device may only be mounted in the horizontal position, (see Figure 5-8 Installation 6EP4137-0GE00-0AY0 (38 Ah Pb) (Page 194))

The subsequent mounting position is forbidden for the SITOP BAT1600 3.2 Ah:



The subsequent mounting positions are forbidden for the SITOP BAT1600 12 Ah:



due to flammability
(Air ventilation slots at the top not OK!)

6.3 SITOP UPS1100

6.3.1 Standard mounting position

The device is suitable for the direct wall mounting. Devices 6EP4131-0GB00-0AY0 (1.2 Ah), 6EP4132-0GB00-0AY0 (2.5 Ah), 6EP4133-0GB00-0AY0 (3.2 Ah) and 6EP4133-0JB00-0AY0 (5 Ah) can also be snapped onto a TH35×15 DIN rail (EN 60715), and device 6EP4131-0GB00-0AY0 (1.2 Ah) also onto a TH35×7.5 DIN rail (EN 60715). It should also be mounted at the coolest point in the control cabinet (e.g. in the lower part of the control cabinet). The device must be mounted vertically in such a way that the terminals are at the bottom. There should be a minimum clearance of 15 mm above the device.

No clearance is required at the side.

6.3.2 Other mounting positions

Note

In the case of mounting positions that deviate from the standard mounting position, reduced mechanical resistance of the devices against vibration and shock must be expected.

Particularly when installing on a vertically fastened standard mounting rail, additional measures may be required, e.g. to prevent the device from slipping on the rail.

All mounting positions have been released, except the following:
For UPS1100 1.2 Ah: Mounting position (2) (see the following diagram)
all other UPS1100: Mounting position (5) (see the following diagram)

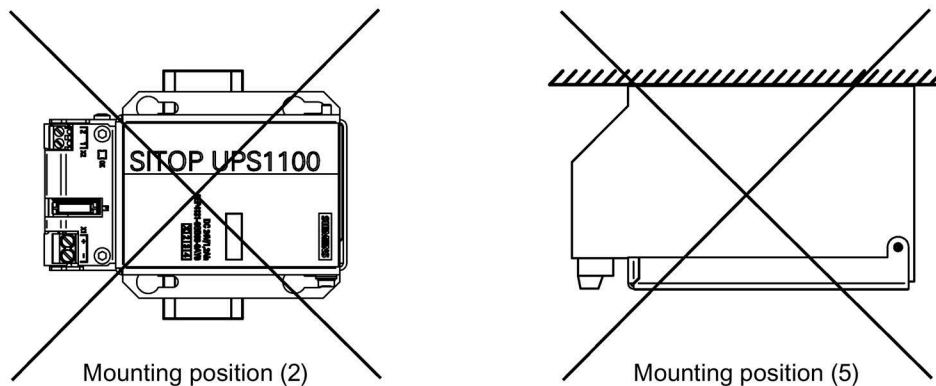


Figure 6-19 Mounting positions forbidden for the UPS1100

6.4 Altitude derating

Output current as a function of the altitude derating

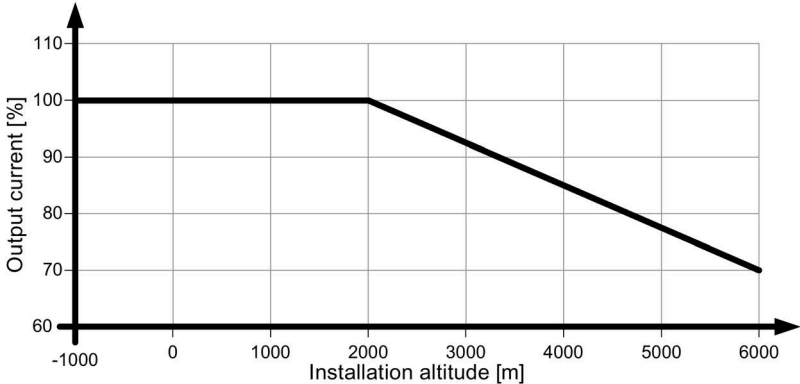


Figure 6-20 Altitude derating

Details see chapter Environmental conditions (Page 257)

Note

Only applies to the UPS1600. For UPS1100 (with the exception of UPS1100 2.5 Ah) operation at altitudes of 4000 m above sea level is not permissible, and for BAT1600, not above 2000 m.

6.4 Altitude derating

Note

When installing the devices, the relevant country-specific regulations must be complied with.

The 24 V supply voltage must comply with SELV (ES1) in accordance with EN62368-1 and EN50178.

Only qualified personnel are allowed to install the device/system and set it into operation.

It is not permissible that the connections are attached or detached in operation.

Note**for SITOP BAT1600 and SITOP UPS1100**

It is recommended that the batteries are only stored fully charged.

The lead acid batteries are fully charged when the device is delivered.

The LiFePO4 battery SITOP UPS1100 (5 Ah) is only supplied, charged up to a maximum of 30 % of the rated charge (to comply with transport regulations).

For air freight, the LiFePO4 battery of the SITOP UPS1600 battery module (2.5 Ah and 7.5 Ah) is only charged up to maximum of 30 %; for other transport types, up to 100 %.

The self-discharge rate of the batteries is approx. 3%/month for a temperature of 20° C. This value is temperature dependent and becomes more unfavorable for an increasing temperature, and more favorable for a decreasing temperature.

The fuse should only be inserted in the fuse holder when commissioning the device.

When storing SITOP BAT1600 / SITOP UPS1100 battery modules in completely wired/cable systems (with SITOP UPS1600 and fuse inserted in the SITOP BAT1600 / SITOP UPS1100) it should be noted that an additional discharge current (leakage current) flows.

SITOP BAT1600 2.5 Ah is only recommended in conjunction with SITOP UPS1600 10 A.

SITOP BAT1600 3.2 Ah is only recommended in conjunction with SITOP UPS1600 20 A or less.

SITOP BAT1600 7.5 Ah, 12 Ah, 38 Ah is only recommended in conjunction with SITOP UPS1600 40 A or less.

SITOP UPS1100 1.2 Ah is only recommended in conjunction with SITOP UPS1600 10 A.

SITOP UPS1100 2.5 Ah, 3.2 Ah and 5 Ah are only recommended in conjunction with SITOP UPS1600 10 A and 20 A.

When using battery modules without Energy Storage Link, it must be ensured that the selected batteries match the data of the SITOP UPS1600 (static and dynamic load current, charge current).

7.1 Connecting the SITOP UPS1600 at its input

The SITOP UPS1600 is designed to be connected to a 24 V DC supply. The 24 V supply voltage must comply with SELV (ES1) in accordance with EN62368-1 and EN50178.

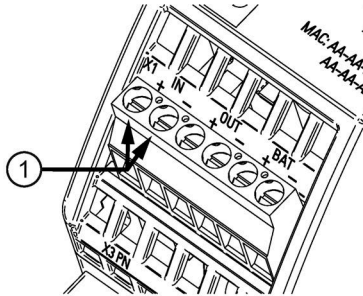


Figure 7-1 Input side connection

The 24 V power supply is connected at the "IN+", and "IN-" ① terminals (see Figure 7-1 Input side connection (Page 212)).

The cables used must be suitable for temperatures of at least 90 °C.

7.2 Connecting the SITOP UPS1600 at its output

The output of the SITOP UPS1600 is no-load, overload and short-circuit proof. If an overload occurs, the electronic current limiting function limits the output current to a maximum value (see Section Technical data (Page 235)).

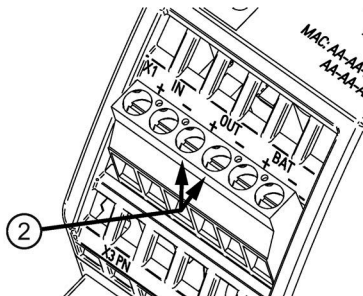


Figure 7-2 Output-side connection

The output voltage is connected at the "OUT+" and "OUT-" ② terminals (see Figure Output-side connection (Page 212)). Ensure that the output cables are dimensioned correctly for the maximum output current rms value and fused accordingly.

The deployed cables must be suitable for temperatures of at least 90° C.

7.3 Connecting SITOP BAT1600 battery modules to the UPS module

Up to 6 SITOP BAT1600 battery modules of the same type can be connected in parallel to a UPS in a star topology.

The maximum permissible cable length between a UPS module and each battery module is 3 m.

The cables and conductors used must be approved for temperatures of at least 60/75 °C.

Note

Use the following minimum cross-sections for the connecting cables/conductors (terminals "+" and "-") between the UPS module and battery module(s):

- for a 10 A / 20 A system, a minimum cross-section of 2.5 mm².
- for a 40 A system, a minimum cross-section of 4 mm².
- when connecting the SITOP BAT1600 38 Ah battery module, the minimum cross-section is 6 mm².

Longer cable lengths or smaller cross-sections can result in nuisance alarms when buffering!

WARNING

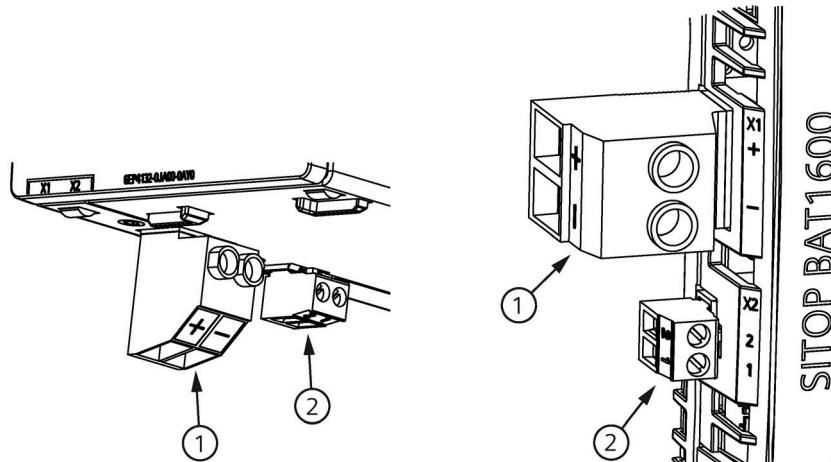
The following precautionary measures should be carefully taken into account when working with the battery module and the batteries:

1. Remove watches, rings and other metal objects.
2. Always used tools with insulated handles.

WARNING

Material damage

It is not permissible that power terminals "+" and "-" are connected to "0V", "GROUND" or the 0V busbar.



- ① Power terminals
- ② Communication terminals

Commissioning the SITOP BAT1600 battery module

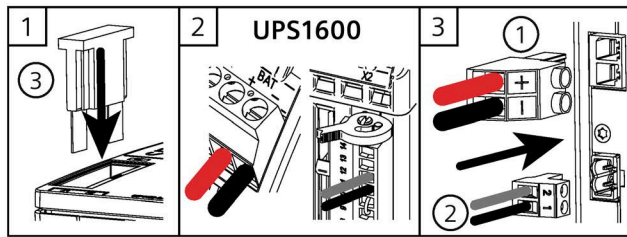


Figure 7-3 Commissioning

1. When supplied, LiFePO4 batteries are internally disconnected and therefore must first be connected.
2. Insert fuse ③.
3. For 3.2 Ah and 12 Ah devices: Move the fuse cover over the fuse until it latches into place.
4. Connect power ① and communication connectors ② to the SITOP UPS1600. **Carefully check that the wiring polarity is correct!**
5. Plug-in the connector at the battery module and commission the system.
After approximately 5 s battery module SITOP BAT1600 is detected by the SITOP UPS1600.

Connecting several SITOP BAT1600 battery modules

To extend the power failure buffering time, up to 6 identical SITOP BAT1600 battery modules can be connected to a SITOP UPS1600.

The connected battery module is automatically detected.

Note

When connecting several battery modules in parallel (max. 6) the following applies:

1. Ensure that the battery modules are the same type and have the same charge state.
2. Battery modules are wired to the UPS in a star configuration with the same cable lengths (ensure that the impedance is the same for all cables).
3. Dimension the cross-section of the star configuration wiring for the total current (if required, reduce all fuse values).

Proceed as follows, to connect several SITOP BAT1600 battery modules:

1. Connect several battery modules in parallel to the power terminals and the communication terminals of the UPS module corresponding to the following wiring schematic.

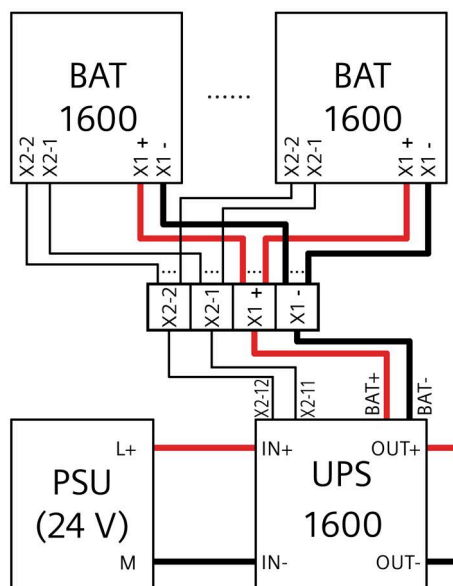



Figure 7-4 Recommended wiring for up to 6 battery modules connected in parallel

2. Check that the wiring is correct.
3. Insert the fuses.

The connected battery modules are automatically identified after several seconds.

 WARNING
Danger due to high short-circuit current
Before inserting the fuses, check the correct polarity of the wiring of all of the connected battery modules.

7.3 Connecting SITOP BAT1600 battery modules to the UPS module

By connecting up to 6 SITOP BAT1600 battery modules of the same type in parallel, battery modules with a low rating can be connected to a SITOP UPS1600 with a higher power rating. The following table lists the recommended combinations of SITOP UPS1600 and SITOP BAT1600 battery modules.

Battery modules	SITOP UPS1600 10 A	SITOP UPS1600 20 A	SITOP UPS1600 40 A
SITOP BAT1600 2.5 Ah Li	X	-1	O
SITOP BAT1600 3.2 Ah Pb	X	X	-2
SITOP BAT1600 7.5 Ah Li	X	X	X
SITOP BAT1600 12 Ah Pb	X	X	X
SITOP BAT1600 38 Ah Pb	X	X	X

X is a recommended combination

O is a combination that is not recommended

⁻¹ By connecting two identical battery modules in parallel, this type can also be used with a SITOP UPS1600 20 A system.

⁻² By connecting two identical battery module types in parallel, this type can also be used with a SITOP UPS1600 40 A system.

Connecting battery modules from third-party manufacturers to the SITOP UPS1600

Batteries from other manufacturers can be used. However, note that without a data interface there is no full BMS functionality. Automatic temperature compensation of the end-of-charging voltage is not possible. When manually configuring the energy storage, carefully observe the data provided by the battery manufacturer and continually monitor the charging parameters! It is only permissible to connect battery modules using "Pb technology" or "pPb technology"!

Note

Connecting third-party battery modules

When connecting third-party battery modules, data connection via the COM connections is not possible.

Note

If third-party battery modules are to be used, then all of the modules connected to a UPS module must be of the same type. The connected modules must have the same technological parameters and the same service life.

Note

When using third-party battery modules, the approval according to IEC62368-1 and UL61010 is no longer valid.

7.4 Connecting SITOP UPS1100 battery modules to the UPS module

A maximum of 6 SITOP UPS1100 battery modules of the same type can be connected to a UPS module.

The maximum permissible cable length between SITOP UPS1600 and battery module(s) is 3 m.

The cables and conductors used must be suitable for temperatures of at least 60/75 °C.

Note

Use the following minimum cross-sections for the connecting cables/conductors (terminals "+" and "-") between the UPS module and battery module(s):

- for SITOP UPS1600 with 10 A or 20 A output current, use a minimum cross-section of 2.5 mm²
- for SITOP UPS1600 with 40 A output current, use a minimum cross-section of 4 mm²

For long cables, we recommend that this cross-section is increased to avoid nuisance alarms when overload conditions occur during buffering.

WARNING

The following precautionary measures should be carefully taken into account when working with the battery module and the batteries:

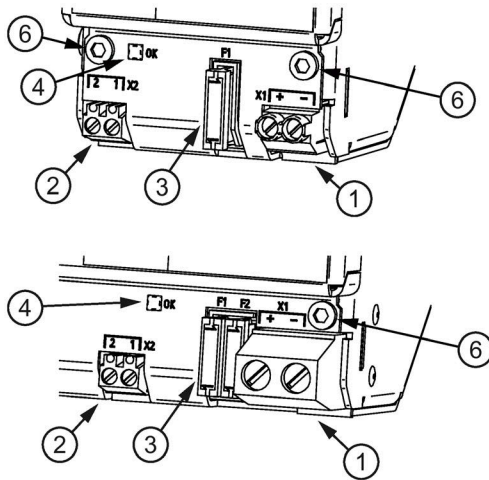
1. Remove watches, rings and other metal objects.
2. Always used tools with insulated handles.

WARNING

Material damage

It is not permissible that power terminals "BAT+" and "BAT-" are connected with "IN-", "OUT-" or the 0V busbar.

7.4 Connecting SITOP UPS1100 battery modules to the UPS module



①	DC input X1
②	Signal terminal X2
③	Fuses F1/F2 (F2 only for 7/12 Ah)
④	Signaling (LED)
⑤	Reset button
⑥	Screw to replace the battery (Torx T10)

Connecting a SITOP UPS1100 battery module


1. Connect the SITOP UPS1600 with the battery module at power terminal ① and at signal terminal ②.
2. Insert the fuse ③.

The connected battery module is automatically detected.

Note

Please note that identifying a SITOP UPS1100 battery module at a SITOP UPS1600 after inserting the connecting cables or after inserting the fuse in the SITOP UPS1100 battery module can typically take 20 seconds, but up to 2 minutes.

Connecting several SITOP UPS1100 battery modules

 WARNING
<p>In hazardous zones (ex-applications), it is absolutely prohibited that SITOP UPS1100 battery modules are connected in parallel.</p>

To extend the power failure buffering time, up to 6 identical SITOP UPS1100 battery modules can be connected to a SITOP UPS1600.

The connected battery module is automatically detected.

Note

When connecting several battery modules in parallel (max. 6) the following applies:

1. Ensure that the battery modules are the same type and have the same charge state.
2. Battery modules are wired to the UPS in a star configuration with the same cable lengths (ensure that the impedance is the same for all cables).
3. Dimension the cable cross-section from the neutral point to the UPS for the total current!

Proceed as follows, to connect several SITOP UPS1100 battery modules:

1. Connect several battery modules in parallel to the power terminals and the communication terminals of the SITOP UPS1600.

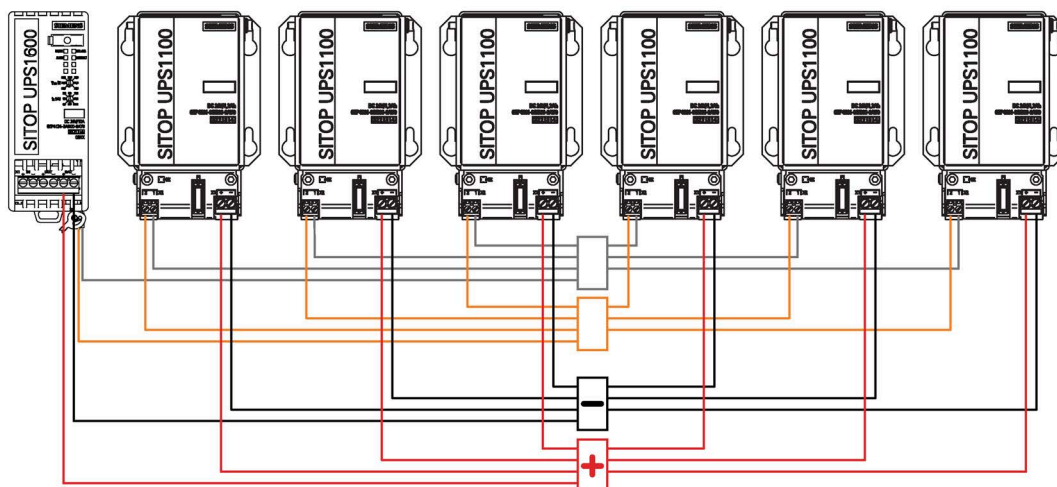


Figure 7-5 Wiring for up to 6 battery modules connected in parallel

2. Check that the wiring is correct.
3. Insert the fuses.

The connected battery modules are automatically identified after several seconds.

WARNING

Danger due to high short-circuit current

Before inserting the fuses, check the correct polarity of the wiring of all of the connected battery modules.

7.4 Connecting SITOP UPS1100 battery modules to the UPS module

By connecting up to 6 SITOP UPS1100 battery modules of the same type in parallel, battery modules with a low rating can be connected to a SITOP UPS1600 with a higher power rating. The following table lists the recommended combinations of SITOP UPS1600 and SITOP UPS1100 battery modules.

Battery modules	SITOP UPS1600 10 A	SITOP UPS1600 20 A	SITOP UPS1600 40 A
SITOP UPS1100 1.2 Ah Pb	X	-1	O
SITOP UPS1100 2.5 Ah Pb	X	X	-2
SITOP UPS1100 3.2 Ah Pb	X	X	-2
SITOP UPS1100 5 Ah Li	X	X	-2
SITOP UPS1100 7 Ah Pb	X	X	X
SITOP UPS1100 12 Ah Pb	X	X	X

X is a recommended combination

O is a combination that is not recommended

⁻¹ By connecting two identical battery modules in parallel, this type can also be used with a SITOP UPS1600 20 A system.

⁻² By connecting two identical battery module types in parallel, this type can also be used with a SITOP UPS1600 40 A system.

Connecting battery modules from third-party manufacturers to the SITOP UPS1600

Batteries from other manufacturers can be used. However, note that without a data interface there is no full BMS functionality. Automatic temperature compensation of the end-of-charging voltage is not possible. When manually configuring the energy storage, carefully observe the data provided by the battery manufacturer and continually monitor the charging parameters! It is only permissible to connect battery modules using "Pb technology" or "pPb technology"!

Third-party battery modules can be parameterized with UPS devices with interface. The parameterization is taken from the saved configuration for the two REMOTE and MANUAL operating modes. The parameters are applicable for all battery modules in a chain.

Note

Connecting third-party battery modules

When connecting third-party battery modules, data connection via the COM connections is not possible.

Note

If third-party battery modules are to be used, then all of the modules connected to a SITOP UPS1600 must be of the same type. The connected modules must have the same technological parameters and the same service life.

7.5 USB interface

Maximum USB cable length 5 m

7.6 PROFINET/Ethernet connection

Maximum length of the PROFINET/Ethernet cable 100 m (90 m BASIC link plus 2 × 5 m CHANNEL link)

7.7 SITOP battery module connections

7.7.1 Connections SITOP BAT1600

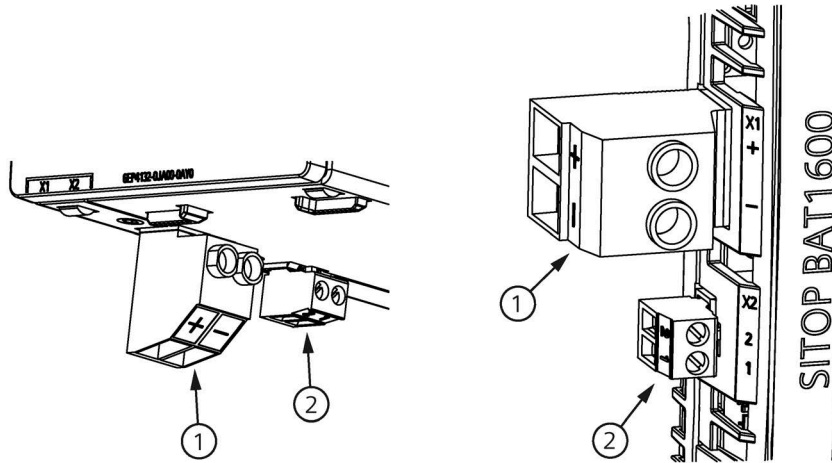


Figure 7-6 Power terminals (1) communication terminals (2)

Use the following minimum cross-sections for the connecting cables/conductors (terminals "+" and "-") between the UPS module and battery module(s):

- for a 10 A / 20 A system, a minimum cross-section of 2.5 mm².
- for a 40 A system, a minimum cross-section of 4 mm².
- when connecting the SITOP BAT1600 38 Ah battery module, the minimum cross-section is 6 mm².

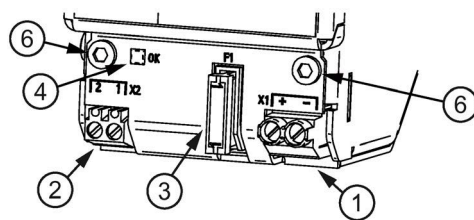
Longer cable lengths or smaller cross-sections can result in nuisance alarms when buffering!

When several battery modules are used, note the following:

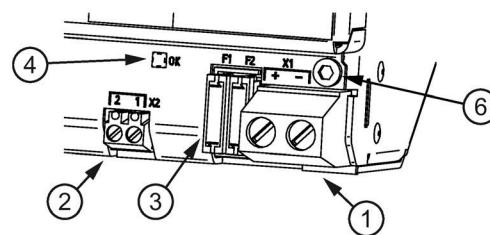
When connecting several battery modules in parallel (max. 6) the following applies:

1. Ensure that the battery modules are the same type and have the same charge state.
2. Battery modules are wired to the UPS in a star configuration with the same cable lengths (ensure that the impedance is the same for all cables).
3. Dimension the cross-section of the star configuration wiring for the total current (if required, reduce all fuse values).

7.7.2 SITOP UPS1100 connections



Connections 1.2 Ah/2.5 Ah/3.2 Ah/5 Ah



Connections 7/12 Ah

Connection X1 ①

The connections "X1+" and "X1-" are used to transfer power between the SITOP UPS1600 and the SITOP UPS1100.

1. Ensure that the cables are dimensioned corresponding to the fuses in the SITOP UPS1100 and the impedances between SITOP UPS1600 and SITOP UPS1100 are the same.
2. Only connect charged batteries with one another.

Connection X2 ②

Connections "X2-1" and "X2-2" serve to transfer data between SITOP UPS1600 and SITOP UPS1100 (see Installation (Page 211)).

When several battery modules are used, note the following:

- Up to 6 battery modules of the same type can be connected together in parallel.
- If different battery modules are connected in parallel, relay REL2 is energized and de-energized at regular intervals (battery defective). No calculations with regard to charge and remaining buffer time are performed. The battery modules are not charged, but buffering is possible.
- If more than 6 battery modules are connected in parallel, relay REL2 is energized and de-energized at regular intervals (battery defective). No calculations with regard to charge and remaining buffer time are performed. Charging and buffering, however, is possible.

7.8 Maintenance

7.8.1 Battery types

SITOP BAT1600 devices contain 1, 2 or 3 x maintenance-free batteries.

Device type	Quantity	Battery type
6EP4132-OJA00-0AY0 (2.5 Ah)	1 unit	LiFePO4 Type: Grepow GRP5970096-25C-25.6V 2800 mAh
6EP4133-OGA00-0AY0 (3.2 Ah)	2 units	Pb type: YUASA NP3,2-12 or Powerkingdom PS3.2-12
6EP4134-OJA00-0AY0 (7.5 Ah)	3 units	LiFePO4 Type: Grepow GRP5970096-25C-25.6V 2800 mAh
6EP4135-OGE00-0AY0 (12 Ah)	2 units	Pb type: YUASA NP12-12 or Powerkingdom PS12-12
6EP4137-OGE00-0AX0 (38 Ah)	2 units	Pb type: YUASA NPL38-12I (FR) or Panasonic P1238APG

SITOP UPS1100 devices include 2 x maintenance-free batteries

Device type	Battery type
6EP4131-0GB00-0AY0 (1.2 Ah)	2 x YUASA NP1,2-12
6EP4132-0GB00-0AY0 (2.5 Ah)	Hawker Energy CYCLON 0810-0075 2.5-12
6EP4133-0GB00-0AY0 (3.2 Ah)	YUASA NP3,2-12 or B.B.Battery BP3,6-12 or Fiamm FG20341 or Powerkingdom PS3.2-12
6EP4133-0JB00-0AY0 (5 Ah)	NEC ALM12V7s
6EP4134-0GB00-0AY0 (7 Ah)	YUASA NP7-12 or B.B.Battery BP7-12 or Fiamm FG20721 or Powerkingdom PS7-12
6EP4135-0GB00-0AY0 (12 Ah)	YUASA NP12-12 or B.B.Battery BP12-12 or Fiamm FG21202 or Powerkingdom PS12-12

When replacing the batteries, always use batteries with the same batch number (approximately the same charge state).

The rechargeable batteries must be disposed of, discharged according to the applicable regulations.

When storing, installing and operating the buffer batteries, the regulations of VDE 0510 Part 2 / EN 50272-2 or the applicable national regulations must be observed.

The self-discharge rate of the batteries is approx. 3%/month for a temperature of 20° C. This value is temperature dependent and becomes more unfavorable for an increasing temperature, and more favorable for a decreasing temperature.

7.8.2 Battery replacement SITOP BAT1600

See Figure 2-2 Design SITOP BAT1600 (example 6EP4133-0GA00-0AY0 (3.5 Ah)) (Page 23) and Figure 2-3 Design SITOP BAT1600 38 Ah (Page 24)

1. Remove fuse ③; LED ④ continuously red
2. Press both enclosure cover releases ⑦ and open the enclosure cover ⑥ (is not applicable for SITOP BAT1600 38 Ah)
3. Press reset button ⑤ min. 2 s; LED flashes green (2 Hz)
4. Disconnect the batteries
5. Remove the batteries and dispose of them professionally
6. Install new batteries (ensure that they have the same charge state) → immediately continue with Point 7 (to reset the counter)
7. Press the reset button for at least 2 s; the LED flashes 5 s green (0.5 Hz) as confirmation. It then changes to continuous red.
8. Close the enclosure cover, the enclosure cover release latches (is not applicable for SITOP BAT1600 38 Ah)
9. Insert fuse
After approximately 5 s, the SITOP BAT1600 battery module is identified by the SITOP UPS1600.
10. Charge the battery for at least 24 h (SOC is calibrated for 100 %)

Pressing the button resets the following functions:

- Operating hours counter
- Buffer time counter
- Summed charge current
- Summed load current
- Calculated capacity
- Calculated battery status
- Service life counter (required for SoH)
- Calculated charge status (SoC)

Note

Replace the battery only in normal operation, not in backup operation.

Note

Note that it can typically take up to 5 seconds to identify a SITOP BAT1600 battery module at a UPS module after inserting the connecting cables or after inserting the fuse in the SITOP BAT1600 battery module.

Note

When battery modules are connected in parallel, only the fuse of the battery module where the battery is replaced must be removed. Before recommissioning the battery module in the parallel circuit, all battery modules must be charged to the same level (to avoid very high recharging currents).

Note

Dispose of old batteries in the discharged state according to the applicable regulations.

Note

After the battery has been correctly replaced, the calculated battery health is reset to 100 %.

7.8.3 Battery replacement SITOP UPS1100

See Figure 7-7 Maintenance (Page 227) and Figure 7-8 Wiring schematic (Page 227)

1. Release screws ⑨ using a Torx T10 screwdriver.
2. Open the cover.
3. Press button ⑧ for at least 2 s.
LED ④ flashes
4. Remove fuse ③
5. Replace the batteries.
6. Press the button for at least 2 s
LED ④ stops flashing and lights continuously.
7. Insert the fuse.
8. Close the cover (screw).

Pressing the button resets the following functions:

- Operating hours counter
- Buffer time counter
- Summed charge current
- Summed load current
- Calculated capacity
- Calculated battery status

Note

Replace the battery only in normal operation, not in backup operation.

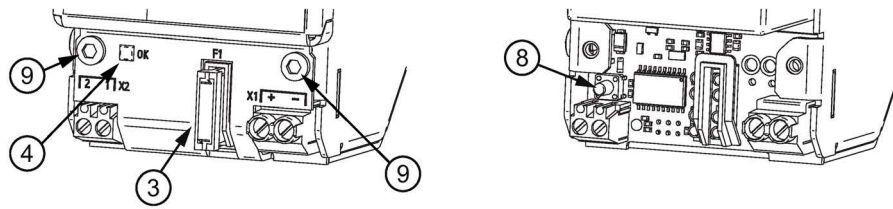


Figure 7-7 Maintenance

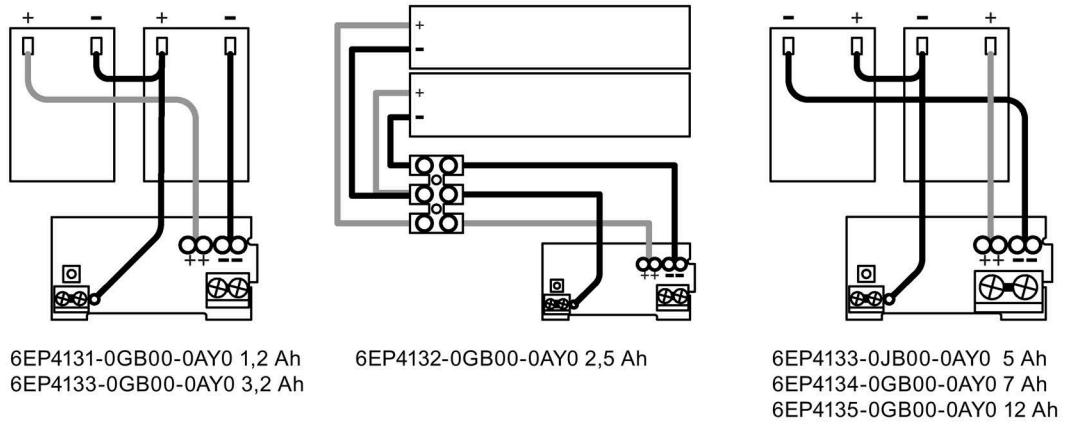


Figure 7-8 Wiring schematic

7.9 Service life of the batteries and handling

7.9.1 Service life of the batteries

Physical-chemical effects are responsible for the aging process of rechargeable batteries. These effects result in decomposition of the battery materials. This aging process depends on many influencing factors. A distinction is made between time-based and cyclic aging.

Time-based aging takes into account the fact that even when it is not used, a battery loses its storage capacity over time. This particular aging process essentially depends on the time and the ambient temperature.

On the other hand, cyclic aging especially depends on the number of cycles and the depth of discharge. The loss of battery capacity is given by the "State of Health" (SoH), which represents a measure for the maximum residual capacity that can be used that is specified as a percentage of the rated capacity.

Generally, the term service life is used to define the aging process. A new battery has a maximum usable capacity, which corresponds to its rated capacity (Begin of Life). As it ages, when a battery reaches a defined maximum residual capacity value that can be used (e.g. according to the EUROBAT definition, 80 % of its rated capacity), then this point in time is frequently called End of Life.

Note

To positively influence the aging process of batteries, do not store them for an unnecessarily long time before using them, do not subject them to unnecessarily high ambient temperatures, and in the application, do not discharge these unnecessarily often and unnecessarily deep.

The expected service life

The service life values provided by the battery manufacturer can be used as approximate value for the expected service life. These values were determined under defined laboratory conditions. However, as a result of the many varying influencing factors in real operation, the actual service life can deviate from the service life determined under laboratory conditions.

The SITOP Selection Tool can also be used to select a suitable battery module. This tool helps you find the most suitable module for your specific application: TIA Selection Tool (<http://www.siemens.com/tst-powersupply>)

SITOP BAT1600 Pb battery module

Article number: 6EP4133-0GA00-0AY0, 6EP4135-0GE00-0AY0 and 6EP4137-0GE00-0AY0

The service life of the 3.2 Ah and the 12 Ah lead-gel batteries is specified by the manufacturer to be 3 - 5 years corresponding to the EUROBAT Class, for 38 Ah batteries, 10 - 12 years.

EUROBAT assumes a constant operating temperature of 20 °C. When the operating temperature is exceeded, for each 10 °C, it can be assumed that the service life is halved.

SITOP BAT1600 LiFePO4 battery module

Article number: 6EP4132-OJA00-OAY0 and 6EP4134-OJA00-OAY0

The service life of LiFePO4 is specified by the manufacturer to be between 10 and 12 years at 10 - 30 °C. Above 30 °C and below 10 °C, the service life decreases by approximately 2 years per 10 °C.

Calculated battery health

For batteries installed in BAT1600 battery modules, the maximum usable residual capacity is permanently evaluated as "calculated battery health" (SoH) based on selected influencing factors and data sheet values. A value of 80 % of the rated capacity is generally used as limit value for the usable maximum residual capacity. Parameter "calculated battery health" has a value range from 100 % (Begin of Life) to 0 % (End of Life). If, based on an internal calculation, it reaches a value of 0 % (i.e. the calculated maximum usable residual capacity corresponds to 80 % of the rated capacity), then this is signaled.

The following signals indicate that the End of Life of the batteries has been reached:

- Yellow flashing LED "BAT" at the UPS module
- Yellow flashing LED "O.K." at the battery module
- Signaling contact "O.K." at the UPS module

Note

If battery End of Life is signaled, this does not necessarily mean that the batteries no longer function, only that the defined 80 % of the maximum usable residual capacity has been reached. Depending on the buffer time required for the application, even as the batteries continue to age, there can still be sufficient time to plan replacement of the batteries or the battery module within the scope of a pending system maintenance procedure.

More information about parameter "calculated battery health" is available in Chapter Data sets (Page 109).

7.9.2 Monitoring the batteries

Various tests are performed during operation to evaluate the buffer capability of the connected battery module and the calculated maximum available residual capacity of the batteries used in the BAT1600 battery module.

Cyclic battery test

The cyclic battery test is used to check the usability of the connected battery module.

The test is automatically performed when the system is not in the buffer mode, and the battery module has an adequate charge state.

The starting point for the time interval is set when the system runs up. An interval that has already been started is reset if in the meantime, buffer mode has occurred or the system has been restarted.

The voltage of the battery module and the individual batteries is evaluated while the test is being performed. The test is evaluated as negative if an excessively high voltage dip occurs. The battery module is identified as being unusable after three consecutive negative test results.

The following signals indicate a battery module that has been identified as unusable:

- Red LED "BAT" at the UPS module
- Red LED "O.K." at the battery module
- Signaling contact "O.K." at the UPS module

Replace a battery module or the batteries in the battery module that has/have been identified as unusable (see Chapter Replacing batteries in a battery module (Page 231)) to restore the system buffer readiness.

See also

Engineering and remote access (Page 59)

7.9.3 Replacing batteries in a battery module

WARNING

The following precautionary measures should be carefully taken into account when working with the battery module and the batteries:

1. Remove watches, rings and other metal objects.
2. Always use tools with insulated handles.

Note

The batteries cannot be replaced for battery modules with LiFePO4 batteries.

The following battery type is used in battery module SITOP BAT1600:

Battery module	Battery types
2.5 Ah device	1 unit LiFePO4 type: Grepow GRP5970096-25C-25.6V 2800 mAh
7.5 Ah device	3 units LiFePO4 type: Grepow GRP5970096-25C-25.6V 2800 mAh
3.2 Ah device:	2 units Pb type: YUASA NP3,2-12 or Powerkingdom PS3.2-12
12 Ah device:	2 units: Pb type: YUASA NP12-12 or Powerkingdom PS12-12
38 Ah device:	2 units: Pb type: YUASA NPL38-12I (FR) or Panasonic P1238APG

Note

In a battery module, **always** replace all batteries.

Always use the same battery type in a battery module. Before installing new batteries in the battery module, ensure that all of the batteries have the same charging status.

7.9.4 Correct storage and transport

SITOP BAT1600 Pb battery module

Article number: 6EP4133-0GA00-0AY0, 6EP4135-0GE00-0AY0 and 6EP4137-0GE00-0AY0

To achieve an optimum lifetime of the battery module, this should be stored for the shortest possible time in a dry and cool environment that is frost-free.

Never store Pb batteries in completely enclosed containers. During long-term storage, always ensure that air is circulated as a result of the low levels of gas that are discharged. For long-term standalone storage, it should be noted that SITOP BAT1600 Pb battery modules are fully charged cyclically in order to avoid deep discharge of the installed lead batteries. When stored at room temperature at 25 °C, the recommended recharge interval is approximately every 6 months; when stored at higher ambient temperatures, the recharge interval must be shortened to 3 months. At room temperature, the recommended charge parameters for a full charge are:

- Charge voltage 27.3 V, current limited to max. 0.4 CA (e.g.: 3.2 Ah Pb ... charge current = 1.3 A); charge duration min. 12 hours.

For long-term storage in a system that is not being used – i.e. in a completely wired but deactivated state – then the application should be cyclically commissioned (depending on the battery size, every 1 - 4 months) in order to avoid deep discharge of the installed lead batteries. The recharge interval can be extended to approximately 6 months if the fuse in the battery module is removed. When stored at increased ambient temperatures, then the reduced recharge intervals listed above must always be applied.

Before transporting and shipping the SITOP BAT1600 Pb battery module, the prewired plug-in terminals should be withdrawn and the fuse removed. In international transport legislation, lead batteries are classified as "hazardous goods" according to UN 2800. The applicable national and international hazardous goods regulations must be carefully complied with corresponding to the type of transport selected!

SITOP BAT1600 LiFePO4 battery module

Article number: 6EP4132-OJA00-OAY0 and 6EP4134-OJA00-OAY0

To achieve an optimum lifetime of the battery module, this should be stored for the shortest possible time in a dry and cool environment that is frost-free.

For long-term, standalone storage it should be noted that SITOP BAT1600 LiFePO4 battery modules are fully charged cyclically in order to avoid deep discharge of the installed lithium iron phosphate batteries. When stored at room temperature, the recommended recharge interval is approximately every 6 months; when stored at higher ambient temperatures, the recharge interval must be shortened to 3 months. At room temperature, the recommended charge parameters for a full charge are:

- Charge voltage 28.8 V, current limited to max. 0.2 CA (e.g.: 2.5 A LFP ... charge current = 0.5 A); charge duration min. 12 hours.

For long-term storage in an unused system - i.e. in a completely wired but deactivated state - then the application should be cyclically commissioned (approximately every 4 months) in order to avoid deep discharge of the installed lithium iron phosphate batteries. The recharge interval can be extended to approximately 6 months if the fuse in the battery module is removed. When stored at increased ambient temperatures, then the reduced recharge intervals listed above must always be applied.

Note

For transport by air, it is legally stipulated that lithium iron phosphate batteries may only be charged to a maximum of 30 % of their nominal capacity. This is the reason that when transported by air, the maximum energy content of the SITOP BAT1600 LiFePO4 battery module is presently 30 % of the nominal capacity. As a consequence, we recommend that the SITOP BAT1600 LiFePO4 battery module is fully charged after a long period of standalone storage.

Before transporting and shipping the SITOP BAT1600 LiFePO4 battery module, the prewired plug-in terminals should be withdrawn and the fuse removed. **In addition, the internal minus conductors must be withdrawn from the batteries and the appropriate measures taken so that no short-circuit can occur between the battery poles!** In international transport legislation, lithium iron phosphate batteries are classified as "hazardous goods" according to UN 3480. The applicable national and international hazardous goods regulations must be carefully complied with corresponding to the type of transport selected!

Technical data

Note

Technical data apply for a rated input voltage, rated load and 25 °C ambient temperature if nothing else is specified.

8.1 Input data

8.1.1 SITOP UPS1600

	6EP4134-3AB00- ... (10 A)	6EP4136-3AB00- ... (20 A)	6EP4137-3AB00- ... (40 A)
Input voltage $U_{in \text{ rated}}/\text{range}$	24 V DC/21 - 29 V		
Connection threshold for buffering	21.5 V DC \pm 3 % (factory setting), setting range: 21 V DC, 21.5 V DC, 22 V DC, 22.5 V DC, 23 V DC, 24 V DC, 25 V DC or via software.		
• Remark	The connection (switch-in) threshold must be at least 0.5 V lower than the input voltage (measured at the input terminal under load). After reaching the minimum input voltage at the DC UPS module, the module cannot buffer for a maximum of 1.5 seconds.		
Input current $I_{in \text{ rated}}$	Approx. 14 A at the maximum charge current (3 A)	Approx. 25 A at the maximum charge current (4 A)	Approx. 46 A at the maximum charge current (5 A)
Reverse polarity protection	Yes		

8.1.2 SITOP BAT1600

Charge current

- The charge current is limited by the maximum permissible charge current of the SITOP UPS1600 (see Chapter SITOP UPS1600 (Page 235))
- the charge current is adapted to the ambient temperature
- When a battery module is connected, the max. charge current: LFP 2 CA or Pb 0.25 CA
- For several battery modules connected in parallel, the charge current is multiplied by the number of batteries connected in parallel (max. 3 to 5 A).

Recommended end-of-charge voltage (standby use), dependent on the battery temperature

	6EP4133-0GA00-0AY0 (3.2 Ah) 6EP4135-0GE00-0AY0 (12 Ah) 6EP4137-0GE00-0AY0 (38 Ah)	6EP4132-0JA00-0AY0 (2.5 Ah) 6EP4134-0JA00-0AY0 (7.5 Ah)
At -10 °C	28.0 V	28.8 V
At 0 °C	28.0 V	28.8 V
At 10 °C	27.8 V	28.8 V
At 20 °C	27.3 V	28.8 V
At 30 °C	26.8 V	28.8 V
At 40 °C	26.6 V	28.8 V
At 50 °C	26.3 V	28.8 V
At 60 °C	-	-

8.1.3 SITOP UPS1100

Charge current

- The charge current is limited by the maximum permissible charge current of the SITOP UPS1600 (see Chapter SITOP UPS1600 (Page 238))
- When a battery module is connected, the charge current is max. 0.3 CA.
- For several battery modules connected in parallel, the charge current is max. 0.3 CA multiplied by the number of batteries connected in parallel.

Recommended end-of-charge voltage (standby use), dependent on the battery temperature

	6EP4131-0GB00-0AY0 (1.2 Ah) 6EP4133-0GB00-0AY0 (3.2 Ah) 6EP4134-0GB00-0AY0 (7 Ah) 6EP4135-0GB00-0AY0 (12 Ah)	6EP4132-0GB00-0AY0 (2.5 Ah)	6EP4133-0JB00-0AY0 (5 Ah)
At -10 °C	28.0 V	28.0 V	28.8 V
At 0 °C	28.0 V	28.0 V	28.8 V
At 10 °C	27.8 V	27.8 V	28.8 V
At 20 °C	27.3 V	27.3 V	28.8 V
At 30 °C	26.8 V	26.8 V	28.8 V
At 40 °C	26.6 V	26.6 V	28.8 V
At 50 °C	26.3 V	26.3 V	28.8 V
At 60 °C	-	26.0 V	-

Note

The 5 Ah SITOP UPS1100 battery module with LiFePO4 batteries can only be used in conjunction with SITOP UPS1600 from software version V2.1.

8.2 Output data

8.2.1 SITOP UPS1600

	6EP4134-3AB00- ... (10 A)	6EP4136-3AB00- ... (20 A)	6EP4137-3AB00- ... (40 A)
Output voltage for normal operation	Input voltage U_{in} approx. - 0.2 V		
Output voltage for buffer mode	28.8 V (full) - 18.5 V (empty)		
• Remark	Dependent on the charge status of the battery module and load		
Deep discharge protection	18.5 V (for lead batteries) or 20.5 V (for LiFePO4 batteries)		
Power-up characteristics	Start delay < 1 s Typical voltage increase: < 60 ms		
Output +BAT/-BAT for normal operation	I-U charging characteristic (initially fast charge current, then charge retention).		
• Remark	For a connected SITOP UPS1100 battery module max. 0.3 CA, for a SITOP BAT1600 PB max. 0.25 CA, and a SITOP BAT1600 LFP max. 2 CA, for several battery modules connected in parallel, the charge current should be multiplied by the number of batteries connected in parallel, but limited by the maximum permissible charge current of the SITOP UPS1600.		
End-of-charge voltage	Automatic temperature-controlled setting with SITOP BAT1600 or SITOP UPS1100 battery modules		
Output current – rated value	10 A	20 A	40 A
Power boost for 30 ms	30 A	60 A	120 A
Extra power for 5 s/min	15 A	30 A	60 A
• Remark	When using the 5 Ah SITOP UPS1100, Extra Power is permissible for 1 s/min.		
Charge current	Max. 3 A Automatic setting for SITOP BAT1600 / SITOP UPS1100; otherwise 0.3 A, 0.8 A or 3 A can be selected (by software or jumper (see Table 2-5 Charge current for SITOP UPS1600 without communication or SITOP UPS1600 USB/PN in the manual mode (VTHR ≠ REN) (Page 38)))	Max. 4 A Automatic setting for SITOP BAT1600 / SITOP UPS1100; otherwise 0.8 A, 1.75 A or 4 A can be selected (by software or jumper (see Table 2-5 Charge current for SITOP UPS1600 without communication or SITOP UPS1600 USB/PN in the manual mode (VTHR ≠ REN) (Page 38)))	Max. 5 A Automatic setting for SITOP BAT1600 / SITOP UPS1100; otherwise 0.8 A, 1.75 A or 4 A can be selected (by software or jumper (see Table 2-5 Charge current for SITOP UPS1600 without communication or SITOP UPS1600 USB/PN in the manual mode (VTHR ≠ REN) (Page 38)))
• Remark	The charge current can be automatically reduced if the charge current plus the load current at the SITOP UPS1600 results in an overload of the feeding power supply. The charge current can also be reduced if the ambient temperature of the SITOP UPS1600 is higher than 40 °C - or if the input voltage at the SITOP UPS1600 is less than 24 V. Derating: 10 A: 3 A → 2 A 20 A: 4 A → 3 A 40 A: 5 A → 3 A		

8.2.2 SITOP BAT1600

Battery modules

	6EP4132-0JA00- 0AY0 (2.5 Ah)	6EP4133-0GA00- 0AY0 (3.2 Ah)	6EP4134-0JA00- 0AY0 (7.5 Ah)	6EP4135-0GE00- 0AY0 (12 Ah)	6EP4137- 0GE00-0AY0 (38 Ah)
Rated output voltage $U_{out\ rated}$	24 V DC				
Output voltage range	28.8 - 20.5 V	27.3 - 20.0 V	28.8 - 20.5 V	27.3 - 20.0 V	27.3 - 20.0 V
Rated output current $I_{out\ rated}$	10 A	20 A	40 A	40 A	40 A
Capacity	2.5 Ah	3.2 Ah	7.5 Ah	12 Ah	38 Ah
Battery modules that can be connected in parallel	max. 6				
Power boost for 30 ms	30 A	60 A	120 A	120 A	120 A
Extra power for 5 s/min	15 A	30 A	60 A	60 A	60 A
Fuse	Flat fuse 25 A, 32 V DC, 1000 A (IR), MAXI (Littelfuse 576-0299025.ZXNV)		Flat fuse 50 A, 32 V DC, 1000 A (IR), MAXI (Littelfuse 576- 0299050.ZXNV)		

Remark:

The lead acid batteries are fully charged when the device is delivered. The LiFePO4 battery (2.5 Ah and 7.5 Ah) is only supplied, charged up to a maximum of 30 % of the rated charge (to comply with transport regulations).

8.2.3 SITOP UPS1100

	6EP4131- 0GB00-0AY0 (1.2 Ah)	6EP4132- 0GB00-0AY0 (2.5 Ah)	6EP4133- 0GB00-0AY0 (3.2 Ah)	6EP4133- 0JB00-0AY0 (5 Ah)	6EP4134- 0GB00-0AY0 (7 Ah)	6EP4135- 0GB00-0AY0 (12 Ah)
Output voltage rated value	24 V DC					
Rated voltage range	22 - 27 V DC	22 - 27 V DC	22 - 27 V DC	22 - 28.8 V DC	22 - 27 V DC	22 - 27 V DC
Output current rated value	10 A	20 A	20 A	20 A	40 A	40 A
Power boost for 30 ms	30 A	60 A	60 A	60 A	120 A	120 A
Extra Power for 5 s/min	15 A	30 A	30 A	-	60 A	60 A
Extra Power for 1 s/min	-	-	-	30 A	-	-
Battery fuse (pluggable)	15 A / 32 V	25 A / 32 V	25 A / 32 V	25 A / 32 V	2 × 25 A/32 V	2 × 25 A/32 V

Remark:

The lead acid batteries are fully charged when the device is delivered. The LiFePO4 battery (5 Ah) is only supplied, charged up to a maximum of 30 % of the nominal charge (to comply with transport regulations).

8.3 Buffer times

8.3.1 SITOP BAT1600

Type of power supply	6EP4132-0JA00-0AY0 24 V/2.5 Ah LiFePO4	6EP4133-0GA00-0AY0 24 V/3.2 Ah	6EP4134-0JA00-0AY0 24 V/7.5 Ah LiFePO4	6EP4135-0GE00-0AY0 24 V/12 Ah	6EP4137-0GE00-0AY0 24 V/38 Ah
Load current	Buffer times*	Buffer times*	Buffer times*	Buffer times*	Buffer times*
1 A	1 h 40 min	2 h 9 min	8 h 30 min	6 h 28 min	30 h
2 A	50 min	1 h 13 min	4 h 20 min	3 h 39 min	16 h 40 min
3 A	30 min	51 min	2 h 40 min	2 h 33 min	11 h 20 min
4 A	20 min	39 minutes	1 h 50 min	1 h 57 min	8 h
6 A	10 min	27 minutes	1 h 20 min	1 h 20 min	5 h
8 A	6 min	20 min	50 min	61 min	3 h 40 min
10 A	4 minutes	16 min	40 min	49 min	2 h 50 min
12 A	2 minutes	14 min	30 min	41 minutes	2 h 00 min
14 A	1 minute	12 minutes	25 min	35 min	1 h 50 min
16 A	< 1 min	-	20 min	31 min	1 h 40 min
20 A	-	-	15 minutes	25 min	1 h 15 min
30 A	-	-	6 min	17 minutes	45 min
40 A	-	-	3 min	13 min	30 min

* When determining buffer times, the discharge duration of new and completely charged battery modules at a battery temperature of 25 °C down to shutdown of the DC UPS (min. 20 V) was used as basis. Buffer times for additional values can be determined using the SITOP Selection Tool: TIA Selection Tool (<http://www.siemens.com/tst-powersupply>)

8.3.2 SITOP UPS1100

Type of power supply	6EP4131-0GB00-0AY0 24 V/1.2 Ah	6EP4132-0GB00-0AY0 24 V/2.5 Ah High temperature	6EP4133-0GB00-0AY0 24 V/3.2 Ah	6EP4133-0JB00-0AY0 24 V/5 Ah LiFePO4	6EP4134-0GB00-0AY0 24 V/7 Ah	6EP4135-0GB00-0AY0 24 V/12 Ah
Load current	Buffer times*	Buffer times*	Buffer times*	Buffer times*	Buffer times*	Buffer times*
1 A	25 min	1 h 30 min	1 hr 20 min	4 h	4 h 30 min	8 h 30 min
2 A	10 min	50 min	50 min	2 h 10 min	2 h 10 min	4 h 20 min
3 A	6 min	35 min	30 min	1 h 30 min	1 h 30 min	2 h 40 min
4 A	3 min	25 min	20 min	1 h 10 min	1 h 5 min	1 h 50 min
6 A	< 1 min	15 minutes	10 min	48 min	35 min	1 h 20 min
8 A	-	10 min	6 min	37 min	25 min	50 min
10 A	-	6 min	4 minutes	26 minutes	15 minutes	40 min
12 A	-	5 minutes	2 minutes	23 min	12 minutes	30 min
14 A	-	4 minutes	1 minute	21 min	10 min	25 min
16 A	-	3 min	< 1 min	18 min	8 min	20 min
20 A	-	1 minute	-	13 min	5 minutes	15 minutes
30 A	-	3 min, x2 ¹⁾	-	17 min, x2 ¹⁾	1 minute	6 min
40 A	-	3 min, x3 ²⁾	-	13 min, x2 ¹⁾	< 1 min	3 min

* When determining buffer times, the discharge duration of new and completely charged battery modules at a battery temperature of 25 °C down to shutdown of the DC UPS (min. 20 V) was used as basis. Buffer times for additional values can be determined using the SITOP Selection Tool: TIA Selection Tool (<http://www.siemens.com/tst-powersupply>)

¹⁾ With two SITOP UPS1100 battery modules connected in parallel and one DC UPS module SITOP UPS1600 40 A.

²⁾ With three SITOP UPS1100 battery modules connected in parallel and one DC UPS module SITOP UPS1600 40 A.

8.4 Efficiency

	6EP4134-3AB00-0AY0 (10 A) 6EP4134-3AB00-1AY0 (10 A)	6EP4134-3AB00-2AY0 (10 A)
Efficiency at $U_{in \text{ rated}}$, $I_{out \text{ rated}}$, approx.	97.5 %	97.3 %
Power loss at $U_{in \text{ rated}}$, $I_{out \text{ rated}}$, approx.	6 W	7 W

	6EP4136-3AB00-0AY0 (20 A) 6EP4136-3AB00-1AY0 (20 A)	6EP4136-3AB00-2AY0 (20 A)
Efficiency at $U_{in \text{ rated}}$, $I_{out \text{ rated}}$, approx.	97.7 %	97.5 %
Power loss at $U_{in \text{ rated}}$, $I_{out \text{ rated}}$, approx.	10 W	11 W

	6EP4137-3AB00-0AY0 (40 A) 6EP4137-3AB00-1AY0 (40 A)	6EP4137-3AB00-2AY0 (40 A)
Efficiency at $U_{in \text{ rated}}$, $I_{out \text{ rated}}$, approx.	98.5 %	98.3 %
Power loss at $U_{in \text{ rated}}$, $I_{out \text{ rated}}$, approx.	15 W	17 W

8.5 Protection and monitoring

	6EP4134-3AB00- ... (10 A)	6EP4136-3AB00- ... (20 A)	6EP4137-3AB00- ... (40 A)
Current limitation	30 A	60 A	120 A
Typ.			
• Remark	Power boost with 300 % $I_{out\ rated}$ for typ. 30 ms	Power boost with 300 % $I_{out\ rated}$ for typ. 30 ms	Power boost with 300 % $I_{out\ rated}$ for typ. 30 ms
Short-circuit protection	Shutdown after 30 ms		
Reverse polarity protection	With respect to the input voltage U_{in} and with respect to batteries		
Overload/short-circuit indicator	Yes, restart in normal operation		

	6EP4131-0GB00-0AY0 (1.2 Ah)	6EP4132-0GB00-0AY0 (2.5 Ah)	6EP4133-0GB00-0AY0 (3.2 Ah)	6EP4133-0JB00-0AY0 (5 Ah)	6EP4134-0GB00-0AY0 (7 Ah)	6EP4135-0GB00-0AY0 (12 Ah)
Short-circuit protection	Yes, fuse					
Reverse polarity protection	Yes					

	6EP4132-0JA00-0AY0 (2.5 Ah)	6EP4133-0GA00-0AY0 (3.2 Ah)	6EP4134-0JA00-0AY0 (7.5 Ah)	6EP4135-0GE00-0AY0 (12 Ah)	6EP4137-0GE00-0AY0 (38 Ah)
Short-circuit protection	Yes, fuse				
Reverse polarity protection	Yes				

8.6 MTBF

	6EP4134-3AB00- ... (10 A)
	6EP4136-3AB00- ... (20 A)
	6EP4137-3AB00- ... (40 A)
Mean Time Between Failures	SN29500:> 320000 h at 40 °C, rated load, 24 h operation

8.7 Mechanical system

8.7.1 SITOP UPS1600

	6EP4134-3AB00- ... (10 A)			6EP4136-3AB00- ... (20 A)		
	... -0AY0	... -1AY0	... -2AY0	... -0AY0	... -1AY0	... -2AY0
Connection system	Screw-type terminal					
Connections: DC input	IN+, IN-: 1 screw terminal each for 0.2 - 6 (4) mm ² solid (finely stranded)					
Connections: DC output	OUT+, OUT-: 1 screw terminal each for 0.2 - 6 (4) mm ² solid (finely stranded)					
Connections: Battery connection	BAT+, BAT-: 1 screw terminal each for 0.2 - 6 (4) mm ² solid (finely stranded)					
Connections: Signal connector	X2 (1 - 14): 1 screw terminal each for 0.2 - 1.5 mm ² solid/finely stranded					
Width of the housing	50 mm	50 mm	50 mm	50 mm	50 mm	50 mm
Height of the housing	138.7 mm	138.7 mm	138.7 mm	138.7 mm	138.7 mm	138.7 mm
Depth of the housing	125 mm	125 mm	125 mm	125 mm	125 mm	125 mm
Installation width	50 mm	50 mm	50 mm	50 mm	50 mm	50 mm
Mounting height	238.7 mm	238.7 mm	238.7 mm	238.7 mm	238.7 mm	238.7 mm
Weight, approx.	0.38 kg	0.4 kg	0.44 kg	0.39 kg	0.41 kg	0.45 kg
Product feature of the housing: housing that can be lined up next to one another	Yes					
Type of mounting: wall mounting	No					
Type of mounting: rail mounting	Yes					
Type of mounting: S7-300 standard rail mounting	No					
Mounting	Can be snapped onto standard TH35x7,5/15 mounting rails (EN 60715)					
6EP4137-3AB00- ... (40 A)						
	... -0AY0		... -1AY0		... -2AY0	
Connection system	Screw-type terminal					
Connections: DC input	IN+, IN-: 1 screw terminal each for 0.5 - 16 (4) mm ² solid (finely stranded)					
Connections: DC output	OUT+, OUT-: 1 screw terminal each for 0.5 - 16 (4) mm ² solid (finely stranded)					
Connections: Battery connection	BAT+, BAT-: 1 screw terminal each for 0.5 - 16 (4) mm ² solid (finely stranded)					
Connections: Signal connector	X2 (1 - 14): 1 screw terminal each for 0.2 - 1.5 mm ² solid/finely stranded					
Width of the housing	70 mm		70 mm		70 mm	
Height of the housing	138.7 mm		138.7 mm		138.7 mm	
Depth of the housing	150 mm		150 mm		150 mm	

6EP4137-3AB00- ... (40 A)			
	... -0AY0	... -1AY0	... -2AY0
Installation width	70 mm	70 mm	70 mm
Mounting height	238.7 mm	238.7 mm	238.7 mm
Weight, approx.	0.65 Kg	0.65 Kg	0.7 kg
Product feature of the housing: housing that can be lined up next to one another	Yes		
Type of mounting: wall mounting	No		
Type of mounting: rail mounting	Yes		
Type of mounting: S7-300 standard rail mounting	No		
Mounting	Can be snapped onto standard TH35×7,5/15 mounting rails (EN 60715)		

8.7.2 SITOP BAT1600

	6EP4132-0JA00-0AY0 (2.5 Ah LiFePO4)	6EP4133-0GA00-0AY0 (3.2 Ah Pb)	6EP4134-0JA00-0AY0 (7.5 Ah LiFePO4)	6EP4135-0GE00-0AY0 (12 Ah Pb)	6EP4137-0GE00-0AY0 (38 Ah Pb)
Connection system	Plug-in terminal each with a screw connection				
Connections: DC power terminal	X1-1, X1-2: 1 screw terminal each for 0.2 - 10 mm ² solid (finely stranded)		X1-1, X1-2: 1 screw terminal each for 0.2 - 16 mm ² solid (finely stranded)		
Connections: Signal terminal	X2-1, X2-2: 1 screw terminal each for 0.2 - 2.5 mm ² solid (finely stranded)				
Width of the housing	89 mm	89 mm	225 mm	225 mm	Battery monitor: 105 mm Batteries per unit: 165 mm
Height of the housing	156 mm	156 mm	156 mm	156 mm	Battery monitor: 76 mm Batteries per unit: 170 mm
Depth of the housing	135 mm	178 mm	135 mm	138 mm	Battery monitor: 30 mm Batteries per unit: 197 mm
Installation width	89 mm	89 mm	225 mm	225 mm	Battery monitor: 105 mm Batteries per unit: 165 mm
Mounting height	256 mm	256 mm	256 mm	256 mm	Battery monitor: 76 mm Batteries per unit: 170 mm

8.7 Mechanical system

	6EP4132- 0JA00-0AY0 (2.5 Ah LiFePO4)	6EP4133- 0GA00-0AY0 (3.2 Ah Pb)	6EP4134- 0JA00-0AY0 (7.5 Ah LiFePO4)	6EP4135- 0GE00-0AY0 (12 Ah Pb)	6EP4137- 0GE00-0AY0 (38 Ah Pb)
Weight, approx.	2.1 kg	4.0 kg	4.7 kg	10.2 kg	Battery monitor: 0.5 kg Batteries per unit: 13.7 kg
Product feature of the housing: housing that can be lined up next to one another	Yes				
Type of mounting: wall mounting	optional (with accessory SITOP BAT1600 wall mounting plate 6EP4990-0MK00-0XU0)			Yes	No
Type of mounting: rail mounting	Yes			No	No
Type of mounting: S7-300 standard rail mounting	No				
Mounting	Can be snapped onto TH35×15 DIN rails (EN 60715), optional wall mounting (see SITOP BAT1600 (Page 191))			Wall mounting (see SITOP BAT1600 (Page 191))	Floor mounting (see SITOP BAT1600 (Page 191))

8.7.3 SITOP UPS1100

	6EP4131-0GB00- ... (1.2 Ah)	6EP4132-0GB00- ... (2.5 Ah)	6EP4133-0GB00- ... (3.2 Ah)
Connection system	Screw-type terminal		
Connections: DC power terminal	X1-1, X1-2: 1 screw terminal each for 0.2 - 6 (4) mm ² solid (finely stranded)		
Connections: Signal terminal	X2-1, X2-2: 1 screw terminal each for 0.14 - 4 (2.5) mm ² solid (finely stranded)		
Width of the housing	89 mm	265 mm	190 mm
Height of the housing	130.3 mm	115 mm	169.3 mm
Depth of the housing	106.7 mm	76 mm	78.7 mm
Installation width	89 mm	265 mm	190 mm
Mounting height	145.3 mm	130 mm	184.3 mm
Weight, approx.	1.9 kg	3.7 kg	3.8 kg
Product feature of the housing: housing that can be lined up next to one another	Yes		
Type of mounting: wall mounting	Yes		
Type of mounting: rail mounting	Yes		

	6EP4131-0GB00- ... (1.2 Ah)	6EP4132-0GB00- ... (2.5 Ah)	6EP4133-0GB00- ... (3.2 Ah)
Type of mounting: S7-300 standard rail mounting	No		
Mounting	Wall mounting, can be snapped onto standard TH35×7,5/15 mounting rails (EN 60715)	Wall mounting, can be snapped onto standard TH35×15 mounting rails (EN 60715)	
	6EP4133-0JB00- ... (5 Ah)	6EP4134-0GB00- ... (7 Ah)	6EP4135-0GB00- ... (12 Ah)
Connection system	Screw-type terminal		
Connections: DC power terminal	X1-1, X1-2: 1 screw terminal each for 0.2 - 16 mm ² solid/finely stranded		
Connections: Signal terminal	X2-1, X2-2: 1 screw terminal each for 0.14 - 4 (2.5) mm ² solid (finely stranded)		
Width of the housing	189 mm	186 mm	253 mm
Height of the housing	186 mm	186 mm	186 mm
Depth of the housing	112.7 mm	110.3 mm	110 mm
Installation width	189 mm	186 mm	253 mm
Mounting height	201 mm	201 mm	201 mm
Weight, approx.	3.4 kg	6.1 kg	9.3 kg
Product feature of the housing: housing that can be lined up next to one another	Yes		
Type of mounting: wall mounting	Yes		
Type of mounting: rail mounting	Yes		
Type of mounting: S7-300 standard rail mounting	No		
Mounting	Wall mounting, can be snapped onto standard TH35×15 mounting rails (EN 60715)	Wall/panel mounting	Wall/panel mounting

8.8 Dimension drawing

see Section Dimensions and weight (Page 49)

CAD data that can be downloaded from the Internet:

6EP4134-3AB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00813)

6EP4134-3AB00-1AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00816)

6EP4134-3AB00-2AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00819)

6EP4136-3AB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00810)

6EP4136-3AB00-1AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00807)

6EP4136-3AB00-2AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00804)

6EP4137-3AB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01019)

6EP4137-3AB00-1AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01022)

6EP4137-3AB00-2AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01025)

6EP4131-0GB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00829)

6EP4132-0GB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01013)

6EP4133-0GB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00832)

6EP4134-0GB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00835)

6EP4135-0GB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01016)

6EP4133-0JB00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01105)

6EP4132-0JA00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01730)

6EP4133-0GA00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01736)

6EP4134-0JA00-0AY0
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01733)

6EP4135-0GE00-0AY0

(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01739)

6EP4137-0GE00-0AY0

(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_01742)

Safety, approvals, EMC

9.1 Safety

6EP4134-3AB00- ... (10 A), 6EP4136-3AB00- ... (20 A), 6EP4137-3AB00- ... (40 A)
 6EP4131-0GB00-0AY0 (1.2 Ah), 6EP4132-0GB00-0AY0 (2.5 Ah),
 6EP4133-0GB00-0AY0 (3.2 Ah), 6EP4133-0JB00-0AY0 (5 Ah),
 6EP4134-0GB00-0AY0 (7 Ah), 6EP4135-0GB00-0AY0 (12 Ah)
 6EP4132-0JA00-0AY0 (2.5 Ah), 6EP4133-0GA00-0AY0 (3.2 Ah),
 6EP4134-0JA00-0AY0 (7.5 Ah), 6EP4135-0GE00-0AY0 (12 Ah)
 6EP4137-0GE00-0AY0 (38 Ah)

Protection class Class III

Degree of protection
(EN 60529) IP20

Test voltage See Table 9-1 Test voltage (Page 254)

9.2 Test voltage

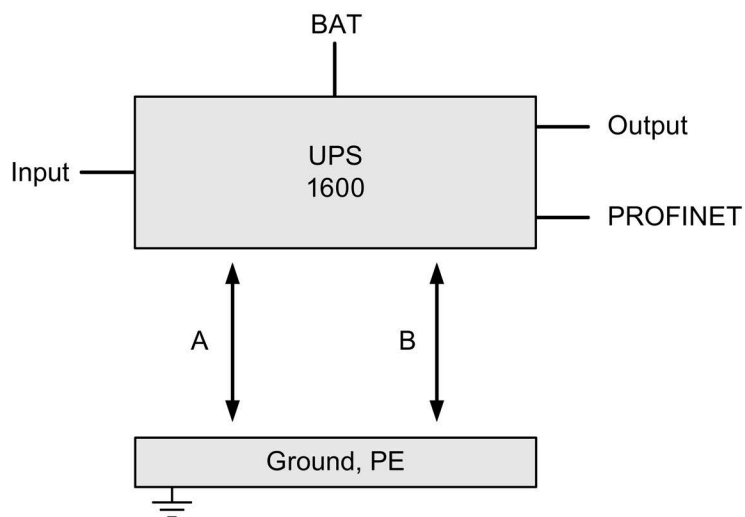


Figure 9-1 Test voltage diagram

Only applicable for UPS1600 with PROFINET (-2AY0).

Only the manufacturer can perform the type test and production test; users can also perform the field test.

Preconditions for performing the field test:

Test (A)

- Connect the input, output, battery connection BAT and signaling contact with one another and measure with respect to PE.

Test (B)

- Connect all PROFINET cables and measure with respect to PE (input, output, battery connection BAT signal connector and PE are connected with each other)

Table 9- 1 Test voltage

	Test time	Input, output, BAT ↔ PE (A)	PROFINET ↔ PE (B)
Type test	60 s	700 V DC	2200 V DC
	60 s	500 V AC	1500 V AC
Production test	1 s	200 V DC	
	1 s	140 V AC	
Field test	1 s	200 V DC	2200 V DC
	1 s	140 V AC	1500 V AC

Remark:

Tripping current for DC measurement: 0 mA

Tripping current for AC measurement: < 100 mA

9.3 Approvals

	6EP4134-3AB00- ... (10 A)	6EP4131-0GB00-0AY0 (1.2 Ah)	6EP4133-0JB00-0AY0 (5 Ah)	6EP4132-0JA00-0AY0 (2.5 Ah)
	6EP4136-3AB00- ... (20 A)	6EP4132-0GB00-0AY0 (2.5 Ah)		6EP4133-0GA00-0AY0 (3.2 Ah)
	6EP4137-3AB00- ... (40 A)	6EP4133-0GB00-0AY0 (3.2 Ah)		6EP4134-0JA00-0AY0 (7.5 Ah)
		6EP4134-0GB00-0AY0 (7 Ah)		6EP4135-0GE00-0AY0 (12 Ah)
		6EP4135-0GB00-0AY0 (12 Ah)		6EP4137-0GE00-0AY0 (38 Ah)
CE marking	yes, (2014/30/EU, 2011/65/EU and 2014/34/EU)	yes, (2014/30/EU, 2011/65/EU and 2014/34/EU)	yes, (2014/30/EU and 2011/65/EU)	yes, (2014/30/EU and 2011/65/EU)
CB certificate	Yes	Yes	Yes	Yes
UL/cUL approval	cULus-listed (UL 508, CSA 22.2 No. 107.1), File E197259	cURus-Recognized (UL 1778, CSA C22.2 No. 107.1), File E219627		cULus listed (UL 61010-1, CSA C22.2 No. 61010-1), File E143289
cCSAus approval	CSA C22.2 No. 62368-1	-	-	CSA C22.2 No. 62368-1
Explosion protection	Yes	Yes	No	being prepared (3.2 Ah, 12 Ah)
ATEX approval	II 3G Ex nA nC IIC T4 Gc (EPS 13 ATEX 1 607 X)	II 3G Ex nA IIC T4 Gc (EPS 13 ATEX 1 607 X)	-	being prepared (3.2 Ah, 12 Ah)
IECEx approval	Yes (IECEx EPS 14.0063X)	Yes (IECEx EPS 14.0063X)	-	being prepared (3.2 Ah, 12 Ah)
cCAus HazLoc approval	cCSAus HazLoc Class I, Div 2, Group A,B,C,D T4	cCSAus HazLoc Class I, Div 2, Group A,B,C,D T4	-	-
cULus HazLoc approval	cULus HazLoc Class I, Div 2, Group A,B,C,D T4	cURus HazLoc Class I, Div 2, Group A,B,C,D T4	-	being prepared (3.2 Ah, 12 Ah)
Marine approvals	DNV GL; ABS	DNV GL; ABS	DNV GL; ABS	Available soon
RCM approval	Yes			
EAC approval	Yes			
SONCAP certificate	Yes			

9.4 EMC

		6EP4134-3AB00- ... (10 A) 6EP4136-3AB00- ... (20 A) 6EP4137-3AB00- ... (40 A) 6EP4131-0GB00-0AY0 (1.2 Ah) 6EP4132-0GB00-0AY0 (2.5 Ah) 6EP4133-0GB00-0AY0 (3.2 Ah) 6EP4134-0GB00-0AY0 (7 Ah) 6EP4135-0GB00-0AY0 (12 Ah) 6EP4132-0JA00-0AY0 (2.5 Ah) 6EP4133-0GA00-0AY0 (3.2 Ah) 6EP4134-0JA00-0AY0 (7.5 Ah) 6EP4135-0GE00-0AY0 (12 Ah) 6EP4137-0GE00-0AY0 (38 Ah)	6EP4133-0JB00-0AY0 (5 Ah)
Electrostatic discharge	EN 61000-4-2	6 kV contact, 8 kV air	5 kV contact, 8 kV air
Electromagnetic fields	EN 61000-4-3	80 - 1000 MHz 10 V/m 1400 - 2000 MHz 10 V/m 2000 - 2700 MHz 10 V/m 895 - 905 MHz and 1.89 GHz 10 V/m	
High-speed transient disturbance variables (burst)	EN 61000-4-4	2 kV at the DC input/output/ BAT power terminals 1 kV at Energy storage link (ESL)	
Surge voltages	EN 61000-4-5	500 V symmetrical/unsymmetrical at the DC input/output and BAT power, 1 kV unsymmetrical at signal connections 0.5 kV at ESL	
High-frequency fields	EN 61000-4-6	10 V; 0.15 - 80 MHz	
Magnetic fields	EN 61000-4-8	Not applicable	
Emitted interference	EN 55022	Class B	
Generic standards	EN 61000-6-2	Immunity for industrial environments	
	EN 61000-6-3	Emission for residential areas	

Environmental conditions

	6EP4134-3AB00- ... (10 A)	6EP4136-3AB00- ... (20 A)	6EP4137-3AB00- ... (40 A)
Ambient temperature	-25 ... 70 °C for natural convection (self convection)	-25 ... 60 °C for natural convection (self convection) 15 A (derating) at 60° ... 70° C	-25 ... 60 °C for natural convection (self convection) 30 A (derating) at 60° ... 70° C
	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-1 Cold • EN 60068-2-2 Dry heat • EN 60068-2-78 Humid heat, constant • EN 60068-2-14 Temperature change 		
	Remark: The service life of the UPS1100 battery modules (decrease to 50 % of the original capacity) depends on the battery temperature, at approximately 20 °C: 4 years, 30 °C: 2 years, 40 °C: 1 year		
Transport and storage temperature	-40 ... 85 °C		
	Tests (packed for shipping) according to: <ul style="list-style-type: none"> • EN 60068-2-1 Cold • EN 60068-2-2 Dry heat • EN 60068-2-30 Humid heat, cyclic 		
Humidity class	Climatic class 3K3 according to EN 60721, 5 - 95 % no condensation		
Degree of pollution	2		
Mechanical stress in operation	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-6 vibration, test Fc: 3.5 mm deflection in the range 5 - 9 Hz 1 g acceleration in the range 9 - 150 Hz • EN 60068-2-27 shock, test Ea: acceleration 150 m/s², test duration 11 ms 		
Damaging gases	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-42 sulfur dioxide • EN 60068-2-43 hydrogen sulfide 		
Atmospheric pressure	Operation: <ul style="list-style-type: none"> • 1080 - 795 hPa (-1000 - 2000 m) • For operation at altitudes of 2000 m up to 6000 m above sea level: output must be derated by -7.5 % / 1000 m or the ambient temperature must be reduced by 5 K / 1000 m see Figure 6-20 Altitude derating (Page 209) Storage: <ul style="list-style-type: none"> • 1080 - 660 hPa (-1000 - 3500 m) 		

	6EP4132-OJA00-0AY0 (2.5 Ah)	6EP4133-OGA00-0AY0 (3.2 Ah)	6EP4137-0GE00-0AY0 (38 Ah)
	6EP4134-OJA00-0AY0 (7.5 Ah)	6EP4135-0GE00-0AY0 (12 Ah)	
Ambient temperature	-20 ... 60 °C for natural convection (self convection)		-15 ... 50 °C for natural convection (self convection)
	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-1 Cold • EN 60068-2-2 Dry heat • EN 60068-2-78 Humid heat, constant • EN 60068-2-14 Temperature change 		
	Remark: The service life of the SITOP BAT1600 battery modules (decreases to 80 % of the original capacity) depends on the battery temperature. For a temperature increase of 10 °C, referred to 20 °C, the service life is halved		
Transport and storage temperature	-20 ... 35 °C (transport -30 ... -20 ... 50 °C 70 °C)		
	Tests (packed for shipping) according to: <ul style="list-style-type: none"> • EN 60068-2-1 Cold • EN 60068-2-2 Dry heat • EN 60068-2-30 Humid heat, cyclic 		
Humidity class	Climatic class 3K3 acc. to EN 60721, 5 - 85 % without condensation		
Degree of pollution	2		
Mechanical stress in operation	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-6 vibration, test Fc: <ul style="list-style-type: none"> 3.5 mm deflection in the range 5 - 9 Hz 1 g acceleration in the range 9 - 150 Hz • EN 60068-2-27 shock, test Ea: <ul style="list-style-type: none"> acceleration 150 m/s², test duration 11 ms 		
Damaging gases	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-42 sulfur dioxide • EN 60068-2-43 hydrogen sulfide 		
Atmospheric pressure	Operation: <ul style="list-style-type: none"> • 1080 - 795 hPa (-1000 - 2000 m) • Operation at altitudes exceeding 2000 m above sea level is not permissible. Storage: <ul style="list-style-type: none"> • 1080 - 660 hPa (-1000 - 3500 m) 		

	6EP4131-OGB00-0AY0 (1.2 Ah)	6EP4132-OGB00-0AY0 (2.5 Ah)	6EP4133-OJB00-0AY0 (5 Ah)
	6EP4133-OGB00-0AY0 (3.2 Ah)		
	6EP4134-OGB00-0AY0 (7 Ah)		
	6EP4135-OGB00-0AY0 (12 Ah)		
Ambient temperature	0 ... 40 °C for natural convection (self convection) 1.2 / 3.2 / 7 Ah: From product version 3: -15 ... 50 °C for natural convection (self convection) 12 Ah: From product version 2: -15 ... 50 °C for natural convection (self convection)	-20 ... 60 °C for natural convection (self convection)	-20 ... 50 °C for natural convection (self convection)
	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-1 Cold • EN 60068-2-2 Dry heat • EN 60068-2-78 Humid heat, constant • EN 60068-2-14 Temperature change 		
	Remark: The service life of the UPS1100 battery modules (decrease to 50 % of the original capacity) depends on the battery temperature, at approximately 20 °C: 4 years, 30 °C: 2 years, 40 °C: 1 year		
Transport and storage temperature	-20 ... 50 °C	-40 ... 60 °C	-40 ... 60 °C
	Tests (packed for shipping) according to: <ul style="list-style-type: none"> • EN 60068-2-1 Cold • EN 60068-2-2 Dry heat • EN 60068-2-30 Humid heat, cyclic 		
Humidity class	Climatic class 3K3 according to EN 60721, 5 - 95 % no condensation		
Degree of pollution	2		
Mechanical stress in operation	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-6 vibration, test Fc: 3.5 mm deflection in the range 5 - 9 Hz 1 g acceleration in the range 9 - 150 Hz • EN 60068-2-27 shock, test Ea: acceleration 150 m/s², test duration 11 ms 		

	6EP4131-0GB00-0AY0 (1.2 Ah)	6EP4132-0GB00-0AY0 (2.5 Ah)	6EP4133-0JB00-0AY0 (5 Ah)
	6EP4133-0GB00-0AY0 (3.2 Ah)		
	6EP4134-0GB00-0AY0 (7 Ah)		
	6EP4135-0GB00-0AY0 (12 Ah)		
Damaging gases	Tested according to: <ul style="list-style-type: none"> • EN 60068-2-42 sulfur dioxide • EN 60068-2-43 hydrogen sulfide 		
Atmospheric pressure	Operation: <ul style="list-style-type: none"> • 1080 - 795 hPa (-1000 - 2000 m) • Operation at altitudes of 4000 m above sea level and higher is not permissible (exception, 2.5 Ah). • Operation at installation altitudes of 2000 - 6000 m above sea level: <ul style="list-style-type: none"> output power derating of -7.5 % / 1000 m - or reduction of the ambient temperature by 5 K / 1000 m see Figure 6-20 Altitude derating (Page 209) Storage: <ul style="list-style-type: none"> • 1080 - 660 hPa (-1000 - 3500 m) 		

Environment

The devices are in conformance with RoHS.

Only substances in conformance with PWIS are used (paint-wetting impairment substances).

Disposal guidelines



Packaging and packaging aids can and should always be recycled. The product itself may not be disposed of as domestic refuse.

Note

The rechargeable batteries must be disposed of, discharged according to the applicable regulations.

Service & Support

Service & Support Portal

On the main support page, you can find a wealth of useful information about the range of services we offer, documents, downloads and much more:
Industry Online Support (<https://support.industry.siemens.com>)

Technical support

You can access technical support through the following communication channels:

- Internet:
Web form for support request (<http://www.siemens.com/SupportRequest>)
- Smartphone:
Siemens Industry Online Support App
(<https://new.siemens.com/global/en/products/software/mobile-apps/industry-online-support.html>)

Technical documentation on the Internet

Operating instructions and manuals for SITOP are available in the Internet:
Operating instructions/manuals (<https://www.siemens.com/sitop-manuals>)

SITOP power supply homepage

Current information about our power supplies is available in the Internet at the SITOP home page:
SITOP (<http://www.siemens.com/sitop>)

Texts for invitation to tender

You can find invitation to tender texts for SITOP power supplies here:
Link to the portal (<http://www.siemens.de/ausschreibungstexte>)

CAX data

You can find 2D-/3D data, devices circuit diagrams according to IEC and ANSI as well as EPLAN macros as download in the Internet:
Siemens image database (<http://www.siemens.com/sitop-cax>)

Request all CAX data via the CAX download manager:
CAX shopping cart (<http://www.siemens.com/cax>)

TIA Selection Tool

Simply and quickly select the optimum power supply, add-on modules and DC-UPS:
TIA Selection Tool cloud (<http://www.siemens.com/tst-powersupply>)

In addition, the 24 V load view in the TIA Selection Tool allows you to simply select the power supply for your particular project as the current demand of the automation products being

supplied is automatically calculated.

Download the TIA Selection Tool (<http://www.siemens.de/tia-selection-tool-standalone>)

Online catalog and ordering system

The online catalog and the online ordering system are available through the Industry Mall homepage:

Industry Mall (<http://www.siemens.com/industrymall/de>)

Contact persons

If you have any questions regarding the use of our products, then contact the Siemens contact person in your regional Siemens sales office.

You can find these addresses as follows:

- Internet (<http://www.automation.siemens.com/partner>)
- Industry Mall (<http://www.siemens.com/industrymall/de>)