MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6EP4134-3AB00-0AY0

DC UNINTERRUPTIBLE POWER SUPPLY

Used with the applicable SITOP UPS1600 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens SITOP UPS1600 / BAT1600 / UPS1100 Equipment Manual A5E37775406-11-76, July 2021

SIEMENS

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)

07.2021
A5E37775406-11-76

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Safety and security

1

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.

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)

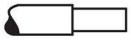
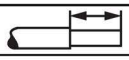
	① + ② + ③	④	⑦ + ⑧
	0,8 x 4,0 / PZ1	0,4 x 2,5	0,4 x 2,5
	1 x 0,2 - 6 mm²	1 x 0,2 - 1,5 mm²	-
	1 x 0,2 - 4 mm²	1 x 0,2 - 1,5 mm²	-
	1 x 0,25 - 4 mm²	1 x 0,2 - 1,5 mm²	-
AWG	24 - 10	28 - 14	-
Nm	0,5 - 0,6 Nm	0,2 - 0,25 Nm	-
	8 mm	6 mm	-

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

2.3 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.

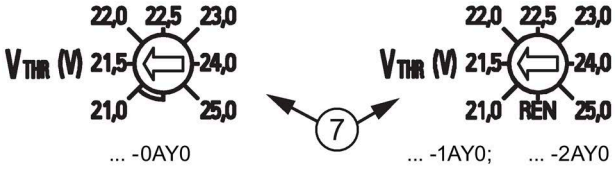


Figure 2-16 Rotary coding switch, switch-in threshold

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.

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 voltage
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

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

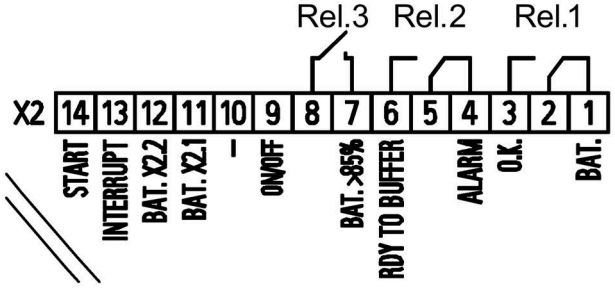


Figure 2-21 Signal connector connection schematic

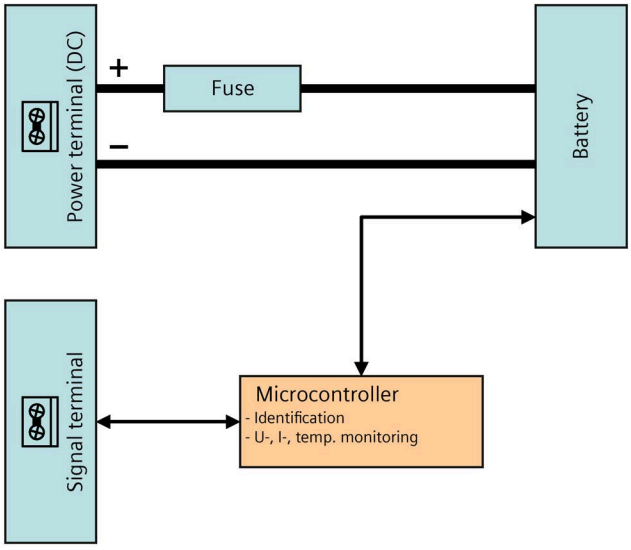
Rel.1 (changeover contact):
Energized state: Normal operation (X2.2 - X2.3)
Deenergized state: Buffer mode or off

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.

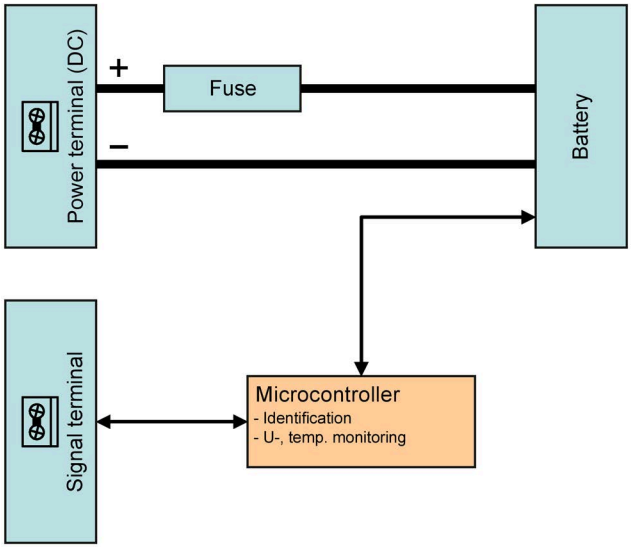
In buffer mode, signal "alarm" signifies that the battery voltage has dropped to < 20.5 V and a forced shutdown is immediately pending to protect the battery. After the battery has been shut down as a result of overload, short-circuit, deep discharge protection or expired buffer time, the red LED (alarm)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

2.5.2 SITOP BAT1600



2.5.3 SITOP UPS1100



2.6 Dimensions and weight

2.6.1 SITOP UPS1600

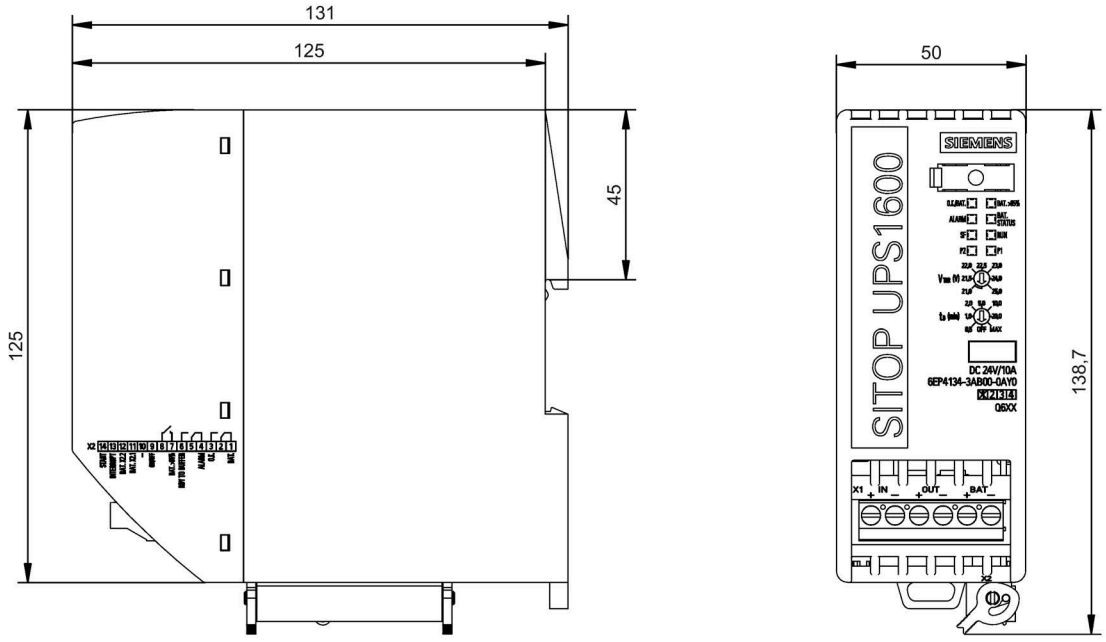


Figure 2-23 Dimension drawing 6EP4134-3AB00-0AY0, 6EP4134-3AB00-1AY0, 6EP4136-3AB00-0AY0, 6EP4136-3AB00-1AY0

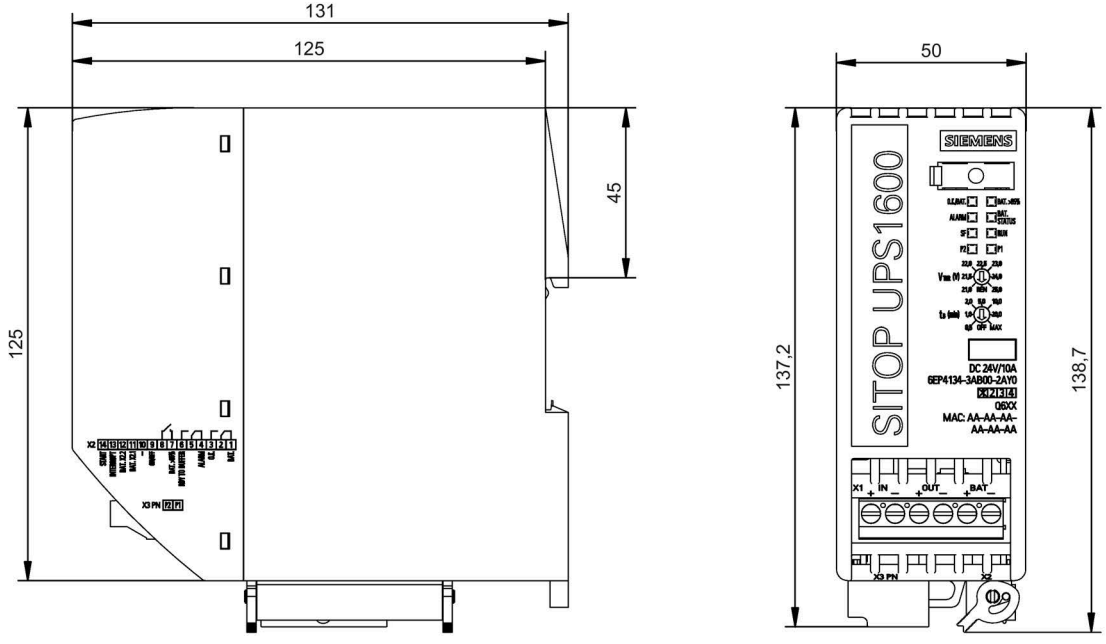


Figure 2-24 Dimension drawing 6EP4134-3AB00-2AY0, 6EP4136-3AB00-2AY0

Technical data

8

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 $U_{in\ rated}$/range	24 V DC/21 - 29 V		
Connection threshold for buffering • Remark	21.5 V DC ± 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. 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 $I_{in\ rated}$	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		

8.2 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		

8.4 Efficiency

	6EP4134-3AB00-0AY0 (10 A) **6EP4134-3AB00-1AY0 (10 A)**	**6EP4134-3AB00-2AY0 (10 A)**
Efficiency at $U_{in\ rated}$, $I_{out\ rated}$, approx.	97.5 %	97.3 %
Power loss at $U_{in\ rated}$, $I_{out\ rated}$, approx.	6 W	7 W

	6EP4136-3AB00-0AY0 (20 A) **6EP4136-3AB00-1AY0 (20 A)**	**6EP4136-3AB00-2AY0 (20 A)**
Efficiency at $U_{in\ rated}$, $I_{out\ rated}$, approx.	97.7 %	97.5 %
Power loss at $U_{in\ rated}$, $I_{out\ rated}$, approx.	10 W	11 W

	6EP4137-3AB00-0AY0 (40 A) **6EP4137-3AB00-1AY0 (40 A)**	**6EP4137-3AB00-2AY0 (40 A)**
Efficiency at $U_{in\ rated}$, $I_{out\ rated}$, approx.	98.5 %	98.3 %
Power loss at $U_{in\ rated}$, $I_{out\ rated}$, 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) mm² solid (finely stranded)					
Connections: DC output	OUT+, OUT-: 1 screw terminal each for 0.2 - 6 (4) mm² solid (finely stranded)					
Connections: Battery connection	BAT+, BAT-: 1 screw terminal each for 0.2 - 6 (4) mm² solid (finely stranded)					
Connections: Signal connector	X2 (1 - 14): 1 screw terminal each for 0.2 - 1.5 mm² 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 TH35×7,5/15 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) mm² solid (finely stranded)		
Connections: DC output	OUT+, OUT-: 1 screw terminal each for 0.5 - 16 (4) mm² solid (finely stranded)		
Connections: Battery connection	BAT+, BAT-: 1 screw terminal each for 0.5 - 16 (4) mm² solid (finely stranded)		
Connections: Signal connector	X2 (1 - 14): 1 screw terminal each for 0.2 - 1.5 mm² 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