

# SIEMENS

## SITOP power supply

### SITOP PSU100C

#### Operating Instructions

SITOP PSU100C 12 V/2 A  
6EP1321-5BA00  
SITOP PSU100C 12 V/6.5 A  
6EP1322-5BA10  
SITOP PSU100C 24 V/0.6 A  
6EP1331-5BA00  
SITOP PSU100C 24 V/1.3 A  
6EP1331-5BA10  
SITOP PSU100C 24 V/2.5 A  
6EP1332-5BA00  
SITOP PSU100C 24 V/3.7 A  
6EP1332-5BA20  
SITOP PSU100C 24 V/4 A  
6EP1332-5BA10

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#### Overview




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## Legal information

### Warning notice system

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

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.
<b>NOTICE</b>
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:

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

### Trademarks

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

### Disclaimer of Liability

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

# Overview



The key benefits of the product include:

- Power supply with wide range input for operation on 1-phase AC line supplies or a DC voltage
- Small mounting footprint as a result of the low-profile design
- Low energy usage as a result of the high efficiency over the complete load range
- Minimum energy losses for no-load operation (<0.75 W)
- Can be snapped onto and removed from mounting rails without requiring any tools
- Connection using plug-in terminals
- Wide operating temperature range from -20 °C up to +70 °C (derating from +50 °C / 55 °C)
- International package of standards

### Ordering data

The following device options are available:


SITOP PSU100C primary-clocked power supply	
Type	Order number
Input 100 - 230 V AC 120 - 230 V DC Output 12 V DC / 2 A	6EP1321-5BA00
Input 100 - 230 V AC 120 - 230 V DC Output 12 V DC / 6.5 A	6EP1322-5BA10
Input 100 - 230 V AC 120 - 230 V DC Output 24 V DC / 0.6 A	6EP1331-5BA00
Input 100 - 230 V AC 120 - 230 V DC Output 24 V DC / 1.3 A	6EP1331-5BA10
Input 100 - 230 V AC 120 - 230 V DC Output 24 V DC / 2.5 A	6EP1332-5BA00
Input 100 - 230 V AC 120 - 230 V DC Output 24 V DC / 3.7 A	6EP1332-5BA20
Input 100 - 230 V AC 120 - 230 V DC Output 24 V DC / 4 A	6EP1332-5BA10

Accessories	
Type	Order number
Pluggable spring-loaded terminal	6EP1971-5BA00 (packing unit): 100 terminals, for 50 SITOP PSU100C power supplies)

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 <b>WARNING</b>
<b>Correct handling of the devices</b>
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.





## Description, device design, dimension drawing

### 2.1 Device description

SITOP PSU100C are primary clocked power supplies for connection to a 1-phase AC line supply or to DC power systems. An electronically regulated DC voltage that can be set via a potentiometer is available at the output of the device (not for the devices: 6EP1331-5BA00, 6EP1332-5BA20). The output of the device is isolated, no-load proof and short-circuit proof. The LED display indicates the operating status.

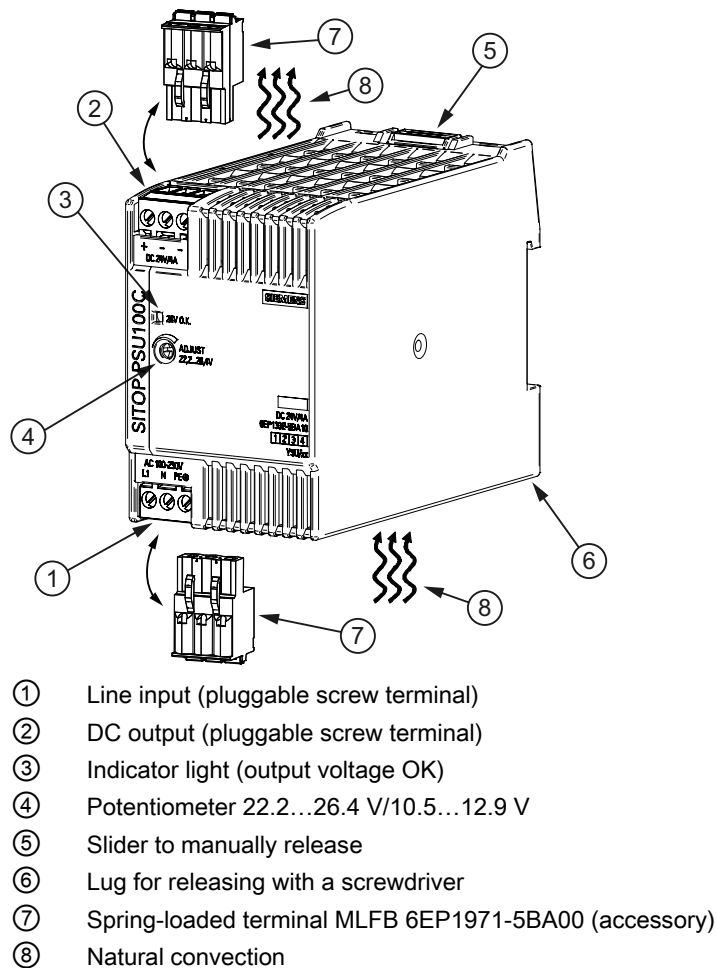


Figure 2-1 Design (example: 6EP1332-5BA10)

## 2.2 Connections and terminal designation

The line input terminals ① can be used to establish the connection to supply voltage. The output terminals ② are used to connect to the loads to be supplied (see also Section Installation (Page 23)).

Connections and terminal designations	
① line input L, N, PE	One screw terminal each for 0.5 to 2.5 mm <sup>2</sup>
② Output +	1 screw terminal for 0.5...2.5 mm <sup>2</sup>
② Output -	2 screw terminals for 0.5...2.5 mm <sup>2</sup>





	① + ②	⑦	④
	SZS 0,6 x 3,5 / PZ1 / PH1	SZS 0,6 x 3,5	SZS 0,6 x 3 / PZ1 / PH1 max. Ø 3,5 mm
	1 x 0,5 - 2,5 mm <sup>2</sup>	1 x 0,5 - 2,5 mm <sup>2</sup>	-
	1 x 0,5 - 2,5 mm <sup>2</sup>	1 x 0,5 - 2,5 mm <sup>2</sup>	-
AWG	28 - 12	26 - 16	-
Nm	0,5 Nm	-	0,04 Nm
	7 - 8 mm	12 - 13 mm	-

Figure 2-2 Terminal data

## 2.3 Potentiometer

The potentiometer ④ on the front of the device is used to adjust the output voltage. The output voltage is set to the rated value at the factory and can be set within certain limits; for example, to compensate voltage drops across long supply lines to the connected load.

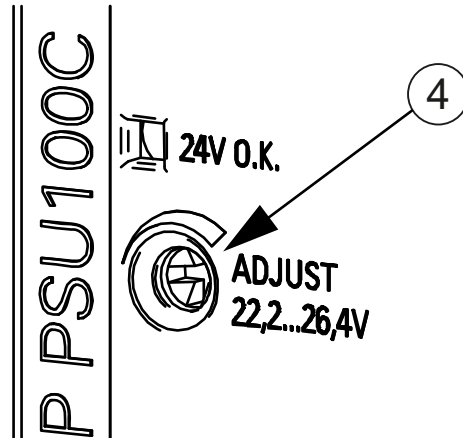


Figure 2-3 Potentiometer (example 6EP1332-5BA10)

Type	Factory setting	Setting range
6EP1321-5BA00 (12 V/2 A)	12 V	10.5...12.9 V
6EP1322-5BA10 (12 V/6.5 A)		
6EP1331-5BA10 (24 V/1.3 A)	24 V	22.2...26.4 V
6EP1332-5BA00 (24 V/2.5 A)		
6EP1332-5BA10 (24 V/4 A)		
6EP1331-5BA00 (24 V/0.6 A)	24 V	-
6EP1332-5BA20 (24 V/3.7 A)		

The following devices do not have a potentiometer: 6EP1331-5BA00 and 6EP1332-5BA20.

### NOTICE

#### Thermal overload possible

When adjusting the output voltage to >24 V or >12 V, the output current must be derated by 4%/V.

### Note

It is only permissible to activate the potentiometer using an insulated screwdriver.

For notes on actuating the potentiometer (screwdriver, torque), see Figure 2-2 Terminal data (Page 10).

## 2.4 Operating displays and signaling

	6EP1321-5BA00 (12 V/2 A)
	6EP1322-5BA10 (12 V/6.5 A)
	6EP1331-5BA00 (24 V/0.6 A)
	6EP1331-5BA10 (24 V/1.3 A)
	6EP1332-5BA00 (24 V/2.5 A)
	6EP1332-5BA20 (24 V/3.7 A)
	6EP1332-5BA10 (24 V/4 A)
Operating display	Green LED for output voltage OK

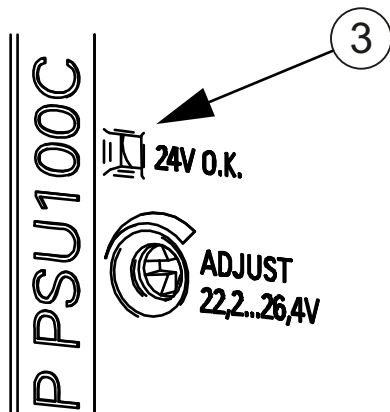


Figure 2-4 Operating displays and signals (example of 6EP1332-5BA10)

Signaling	6EP1321-5BA00 (12 V/2 A)
	6EP1322-5BA10 (12 V/6.5 A)
	6EP1331-5BA00 (24 V/0.6 A)
	6EP1331-5BA10 (24 V/1.3 A)
	6EP1332-5BA00 (24 V/2.5 A)
	6EP1332-5BA20 (24 V/3.7 A)
	6EP1332-5BA10 (24 V/4 A)
LED ③ lights up green	Normal operation, output voltage present
LED ③ off	Output voltage not present

## 2.5 Block diagram

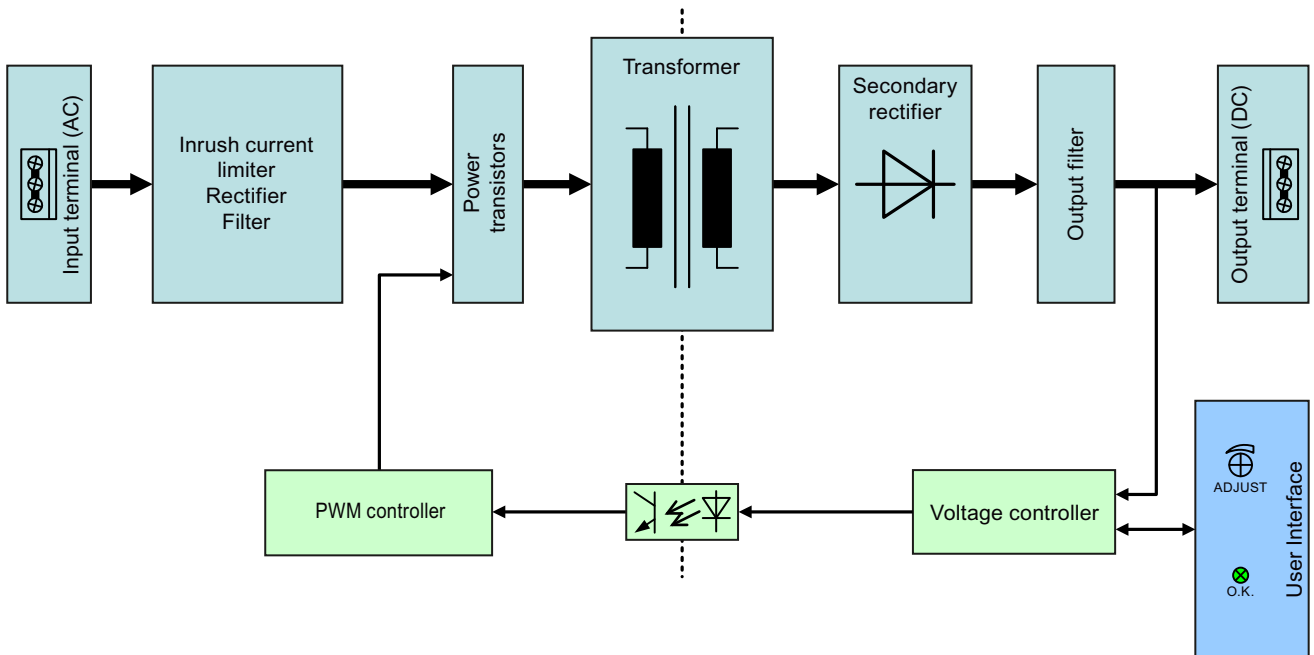


Figure 2-5 Block diagram

## 2.6 Dimensions and weight

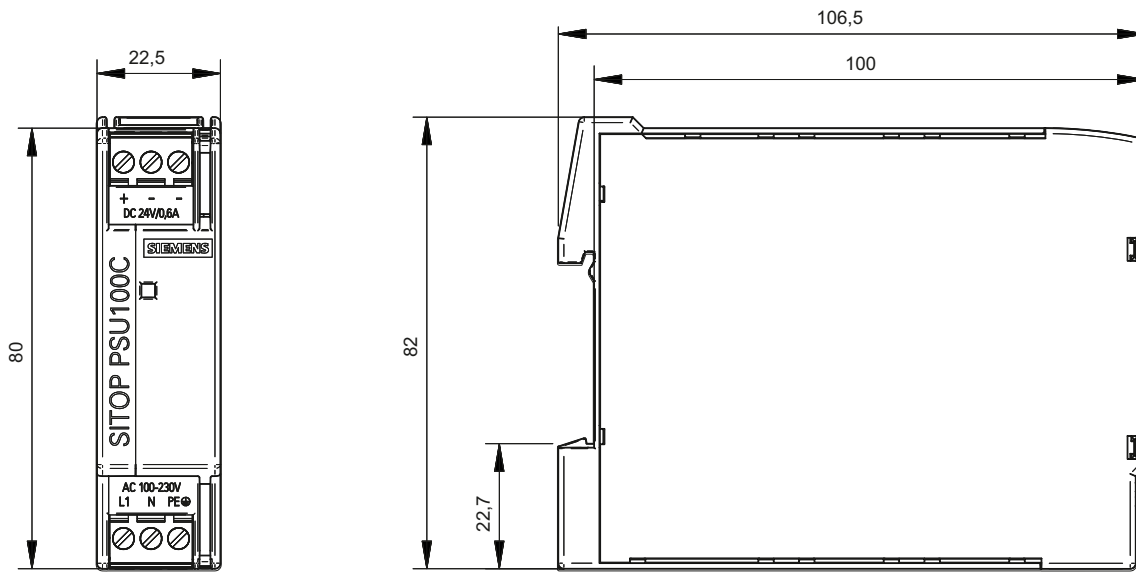


Figure 2-6 Dimension drawing 6EP1331-5BA00

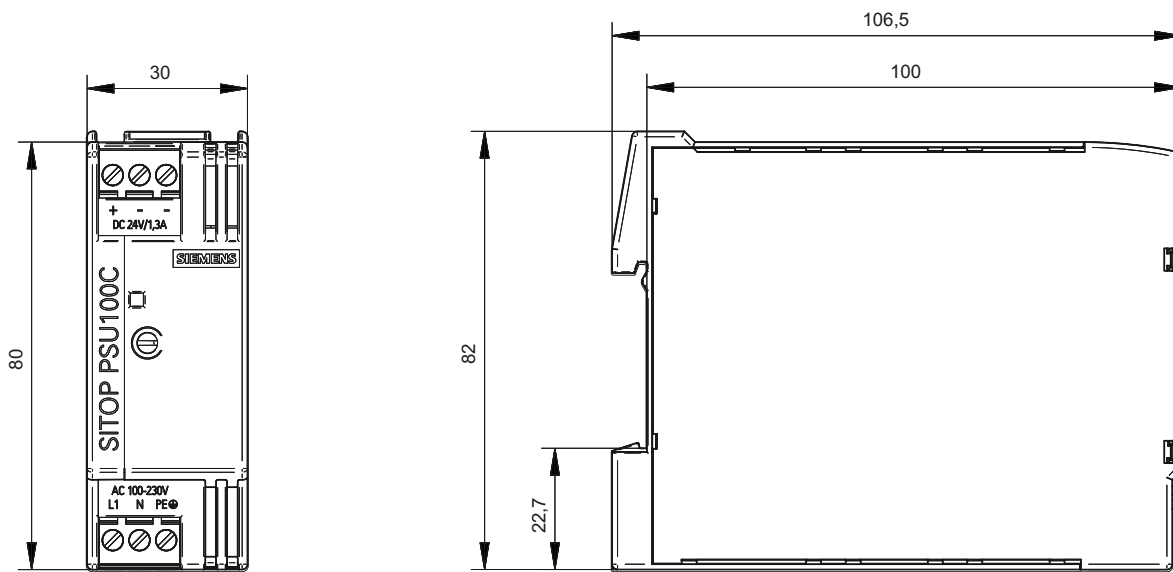


Figure 2-7 Dimension drawing 6EP1331-5BA10, 6EP1321-5BA00

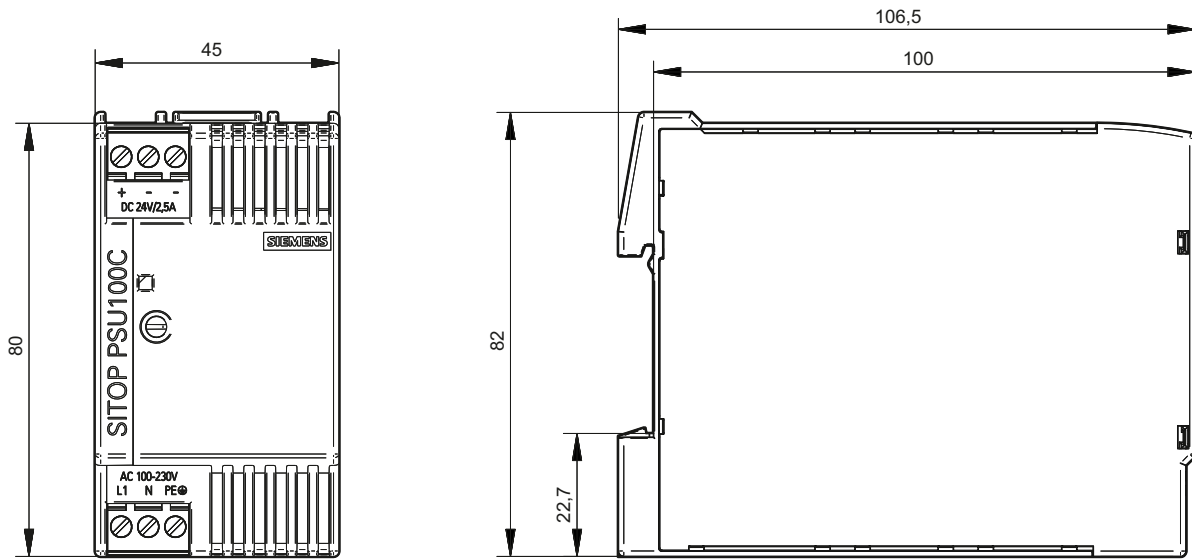


Figure 2-8 Dimension drawing 6EP1332-5BA00

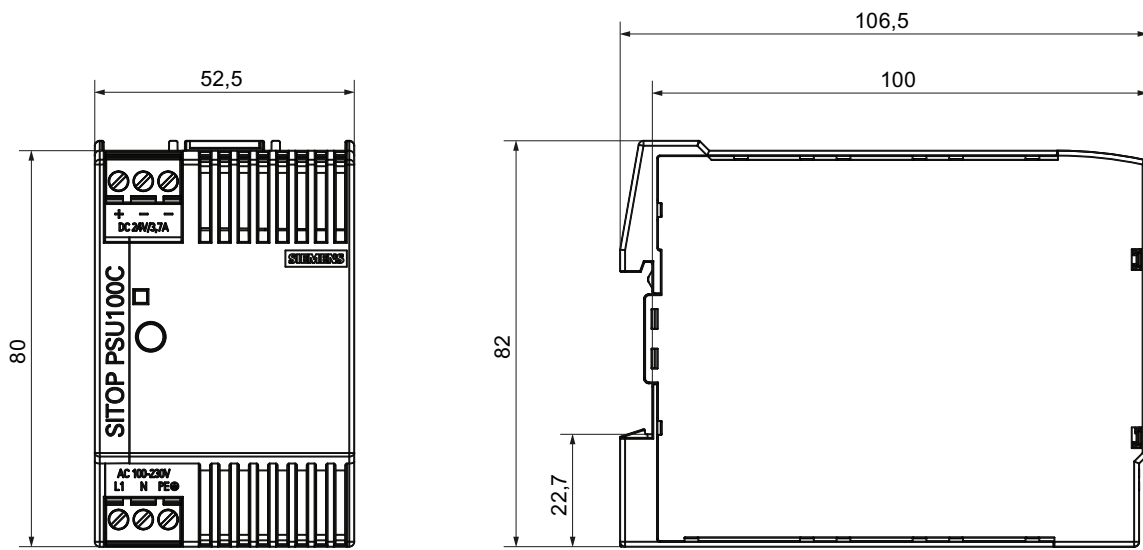


Figure 2-9 Dimension drawing 6EP1332-5BA20, 6EP1332-5BA10, 6EP1322-5BA10

2.6 Dimensions and weight

	<b>6EP1331-5BA00</b> <b>(24 V/0.6 A)</b>	<b>6EP1321-5BA00</b> <b>(12 V/2 A)</b> <b>6EP1331-5BA10</b> <b>(24 V/1.3 A)</b>	<b>6EP1332-5BA00</b> <b>(24 V/2.5 A)</b>	<b>6EP1322-5BA10</b> <b>(12 V/6.5 A)</b> <b>6EP1332-5BA20</b> <b>(24 V/3.7 A)</b> <b>6EP1332-5BA10</b> <b>(24 V/4 A)</b>
Dimensions (W × H × D) in mm	22.5 × 80 × 100	30 × 80 × 100	45 × 80 × 100	52.5 × 80 × 100
Weight	Approx. 0.12 kg	Approx. 0.17 kg	Approx. 0.22 kg	Approx. 0.32 kg



## Mounting/disassembly

### **⚠ WARNING**

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

SITOP PSU100C power supplies are built-in units. They must be installed in a casing or control cabinet to which only qualified personnel have access.

The devices can be mounted in a control cabinet on standard mounting rails according to EN 60715 35x7,5/15.

#### **Mounting**

To mount the device, position it with the mounting 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 ① or lug ② at the same time, as described for "Removing".

#### **Removing**

To remove, press slider ① by hand downwards, or pull the lug ② using a screwdriver ③ – and withdraw the device at the lower edge of the standard mounting rail. Then you can remove the device from the upper edge of the DIN rail.

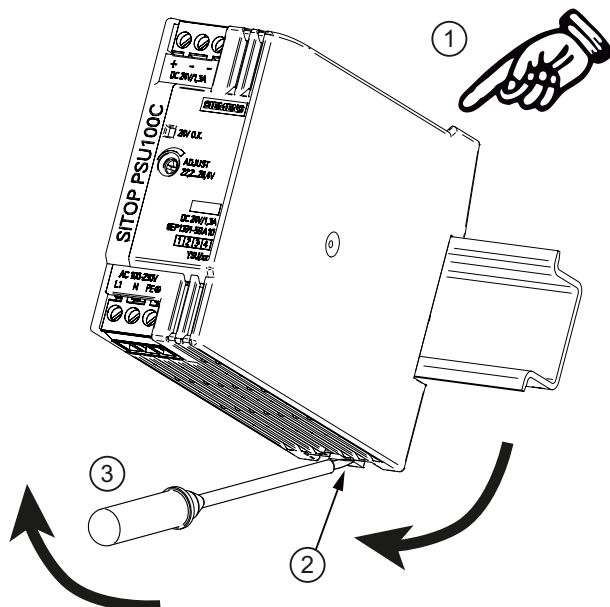


Figure 3-1 Mounting (example: 6EP1331-5BA10)

 **WARNING**

**Use in hazardous zones**

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

## Mounting position, mounting clearances

### 4.1 Standard mounting position

The device is mounted on standard mounting rails according to EN 60715 35x7,5/15. The device must be mounted vertically in such a way that the input terminals are at the bottom and the output terminals are at the top to ensure correct cooling.

A clearance of at least 50 mm must always be maintained above and below the device. In the vicinity of cable ducts it is only permissible to reduce the clearance to a minimum of 25 mm (see Figure 4-1 Mounting (Page 19)).

Lateral clearances do not have to be maintained.

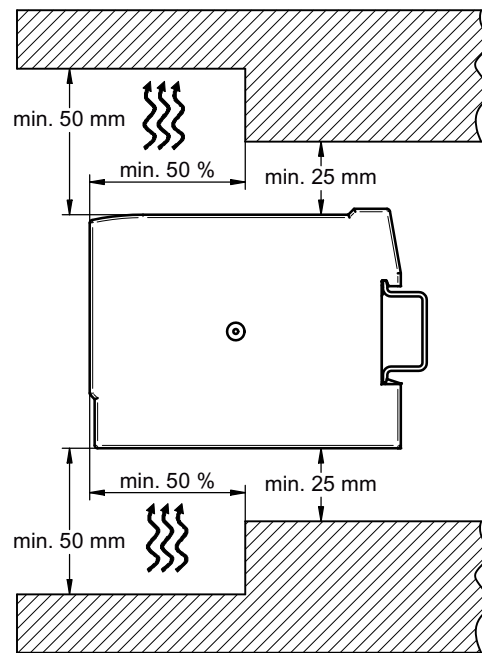


Figure 4-1 Mounting

4.1 Standard mounting position

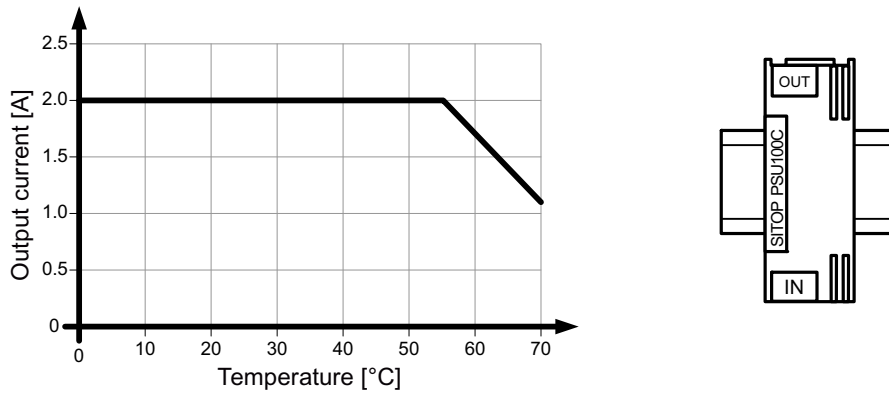


Figure 4-2 6EP1321-5BA00: Output current in the standard mounting position

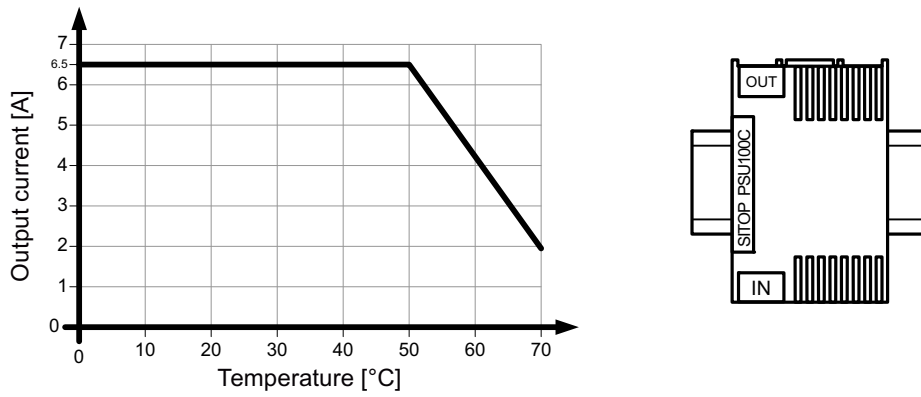


Figure 4-3 6EP1322-5BA10: Output current in the standard mounting position

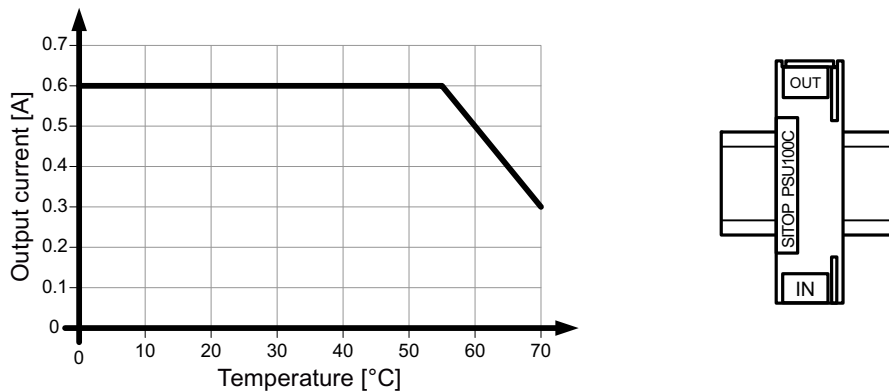


Figure 4-4 6EP1331-5BA00: Output current in the standard mounting position

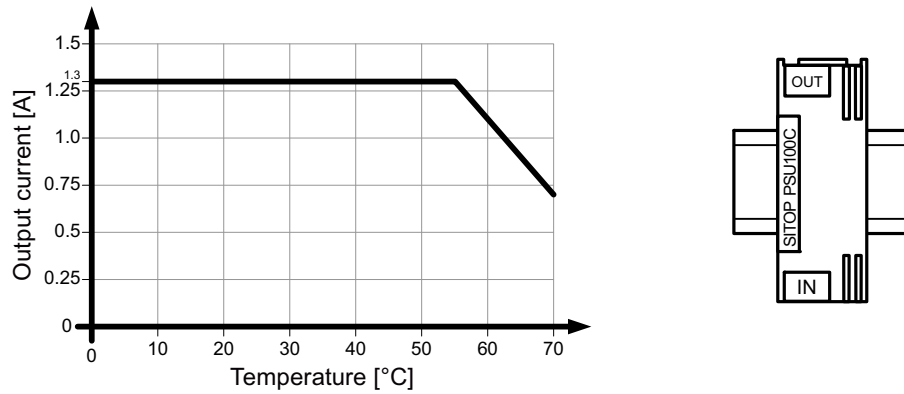


Figure 4-5 6EP1331-5BA10: Output current in the standard mounting position

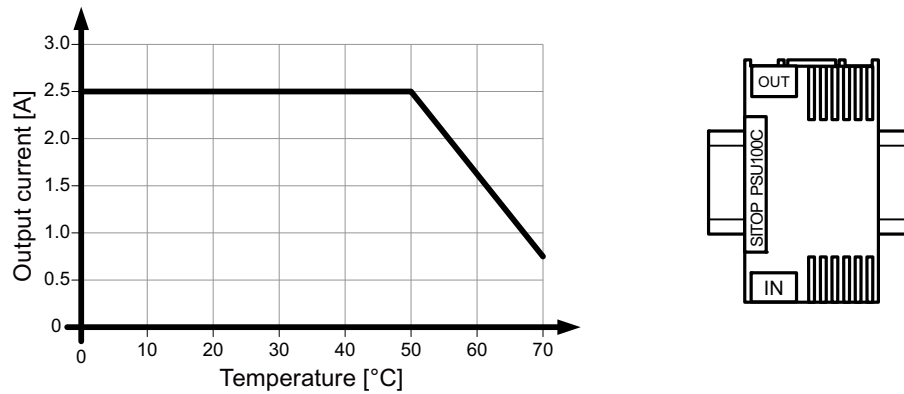


Figure 4-6 6EP1332-5BA00: Output current in the standard mounting position

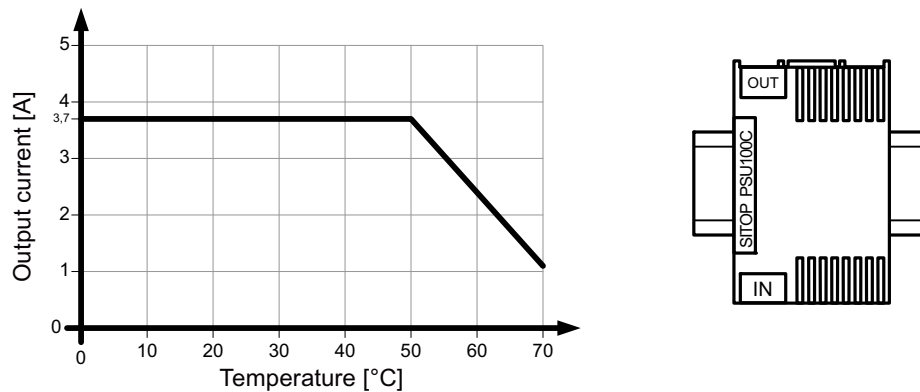


Figure 4-7 6EP1332-5BA20: Output current in the standard mounting position

4.2 Other mounting positions

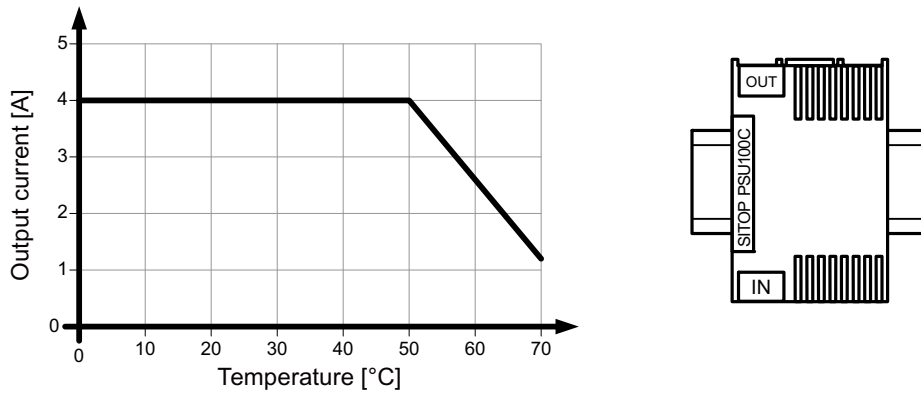


Figure 4-8 6EP1332-5BA10: Output current in the standard mounting position

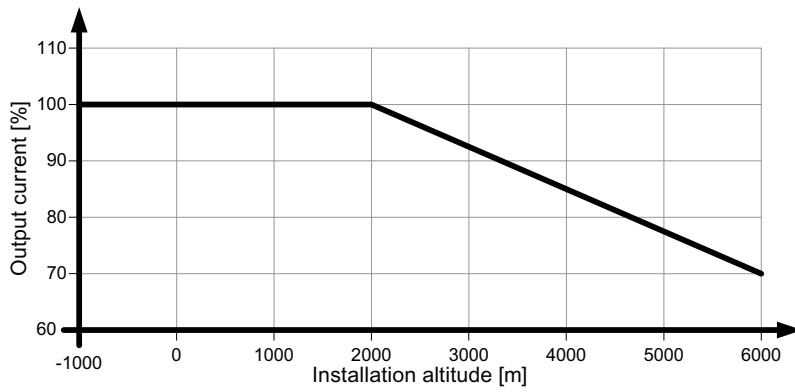


Figure 4-9 Mounting height derating

For details, see Section Ambient conditions (Page 45)

## 4.2 Other mounting positions

Not permitted.

<p><b>⚠ WARNING</b></p> <p><b>Hazard due to electric shock</b></p> <p>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.</p>
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## 5.1 Line-side connection

SITOP PSU100C power supplies are designed for connection to 1-phase AC line supplies (TN or TT system according to VDE 0100 T 300 / IEC 364-3) with a rated voltage of 1-phase 100-230 VAC, 50/60 Hz or to a power supply with 120-230 V DC.

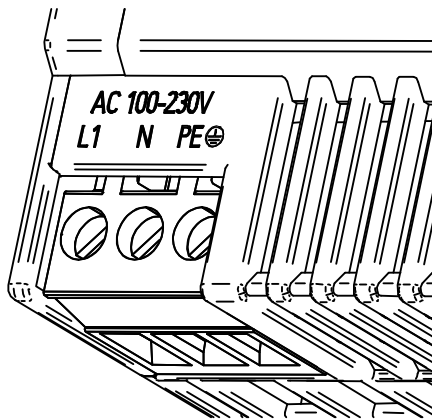


Figure 5-1 Line connection (example 6EP1332-5BA10)

The line supply is connected using terminal L1, N and PE (see Figure 5-1 Line connection (example 6EP1332-5BA10) (Page 23)), and must be implemented according to IEC 60364 and EN 50178. A protective device (miniature circuit-breaker or circuit-breaker) and a disconnection unit for the power supply must be provided. A ground-fault circuit interrupter is not permissible against indirect contact as the only protective measure. This is true for the complete line supply protected by the ground-fault circuit interrupter.

**Protection**

<b>SITOP PSU100C</b>	<b>Recommended line-side protection</b>
6EP1321-5BA00 (12 V/2 A)	Miniature circuit-breaker (IEC 898): Characteristic B from 16 A and higher or characteristic C from 10 A
6EP1322-5BA10 (12 V/6.5 A)	Miniature circuit-breaker (IEC 898): Characteristic B from 16 A and higher or characteristic C from 10 A
6EP1331-5BA00 (24 V/0.6 A)	Miniature circuit-breaker (IEC 898): Characteristic B from 16 A and higher or characteristic C from 10 A
6EP1331-5BA10 (24 V/1.3 A)	Miniature circuit-breaker (IEC 898): Characteristic B from 16 A and higher or characteristic C from 10 A
6EP1332-5BA00 (24 V/2.5 A)	Miniature circuit-breaker (IEC 898): Characteristic B from 16 A and higher or characteristic C from 10 A
6EP1332-5BA20 (24 V/3.7 A)	Miniature circuit-breaker (IEC 898): Characteristic B from 16 A and higher or characteristic C from 10 A
6EP1332-5BA10 (24 V/4 A)	Miniature circuit-breaker (IEC 898): Characteristic B from 16 A and higher or characteristic C from 10 A

The protective conductor of the line supply must be connected at the PE terminal.

Other country-specific regulations may have to be observed when installing the device.

**Note**

For operation on a DC power system (DC), the plus pole (+) must be connected to L1 and the minus pole (-) to N.



## 5.2 Output-side connection

The SITOP PSU100C power supplies provide an isolated (= non-grounded) SELV (Safety Extra Low Voltage) output voltage. The output of the power supplies 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 (refer to Chapter Technical data (Page 27)).

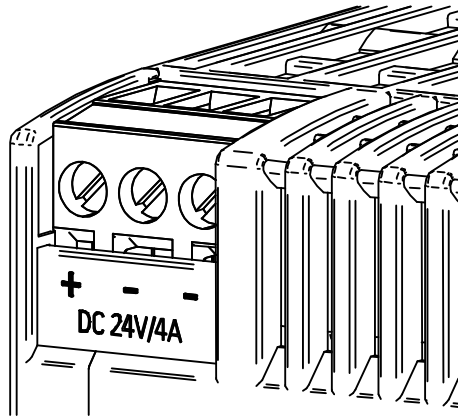


Figure 5-2 Connecting the output voltage (example 6EP1332-5BA10)

The output voltage is connected via the + and - terminals at the output of the power supply (see Figure 5-2 Connecting the output voltage (example 6EP1332-5BA10) (Page 25)). Make sure that the output cables are dimensioned correctly for the maximum output current rms value and fused accordingly.

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### Note

If the safety concept of the plant or system specifies that the DC output circuit should be grounded (PELV), then it is permissible that the output voltage of the SITOP power supply is grounded. In this case, ideally, the grounding at the output should be directly connected from terminal "-" of the power supply to a suitable connection point of the protective conductor system (PE) of the plant or system using a minimum 1.5 mm<sup>2</sup> conductor cross-section.

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## Technical data

### Note

For an AC input voltage, the technical data is applicable for rated input voltage, rated load and +25° C ambient temperature (if nothing else is specified).

### 6.1 Input

	6EP1321-5BA00 (12 V/2 A)	6EP1322-5BA10 (12 V/6.5 A)	6EP1331-5BA00 (24 V/0.6 A)	6EP1331-5BA10 (24 V/1.3 A)
Input	1-phase AC or DC			
Rated voltage $U_e$ rated / for AC	100...230 V			
Voltage range / for AC	85...264 V			
Rated voltage $U_e$ rated / for DC	120...230 V			
Voltage range / for DC	110...300 V			
Wide-range input	Yes			
Overvoltage strength	2.3 x $U_e$ rated, 1.3 ms			
Power failure buffering at $I_a$ rated, min.	20 ms			
Power failure buffering	at $U_e = 230$ V			
Rated line frequency	50/60 Hz			
Line frequency range	47...63 Hz			
Input current / at rated value of input voltage 100 V/rated value	0.63 A	1.6 A	0.28 A	0.63 A
Input current / at rated value of input voltage 230 V	0.31 A	0.8 A	0.18 A	0.31 A
Inrush current limiting (+ 25 °C), max.	33 A	31 A	28 A	34 A
$I^2t$ , max.	1.2 A <sup>2</sup> ·s	3 A <sup>2</sup> ·s	0.7 A <sup>2</sup> ·s	1.2 A <sup>2</sup> ·s
Integrated input fuse	Internal			
Protection in the line feeder cable (IEC 898)	Recommended miniature circuit-breaker: Characteristic B from 16 A or characteristic C from 10 A			

Technical data

6.1 Input

	<b>6EP1332-5BA00</b> <b>(24 V/2.5 A)</b>	<b>6EP1332-5BA20</b> <b>(24 V/3.7 A)</b>	<b>6EP1332-5BA10</b> <b>(24 V/4 A)</b>
Input	1-phase AC or DC		
Rated voltage $U_e$ rated / for AC	100...230 V		
Voltage range / for AC	85...264 V		
Rated voltage $U_e$ rated / for DC	120...230 V		
Voltage range / for DC	110...300 V		
Wide-range input	Yes		
Overvoltage strength	2.3 x $U_e$ rated, 1.3 ms		
Power failure buffering at $I_a$ rated, min.	20 ms		
Power failure buffering	at $U_e = 230$ V		
Rated line frequency	50/60 Hz		
Line frequency range	47...63 Hz		
Input current / at rated value of input voltage 100 V/rated value	1.21 A	1.88 A	2.25 A
Input current / at rated value of input voltage 230 V	0.67 A	0.95 A	1.15 A
Inrush current limiting (+ 25 °C), max.	31 A	30 A	34 A
$I^2t$ , max.	2.4 A <sup>2</sup> ·s	3 A <sup>2</sup> ·s	3 A <sup>2</sup> ·s
Integrated input fuse	Internal		
Protection in the line feeder cable (IEC 898)	Recommended miniature circuit-breaker: Characteristic B from 16 A and higher or characteristic C from 10 A		

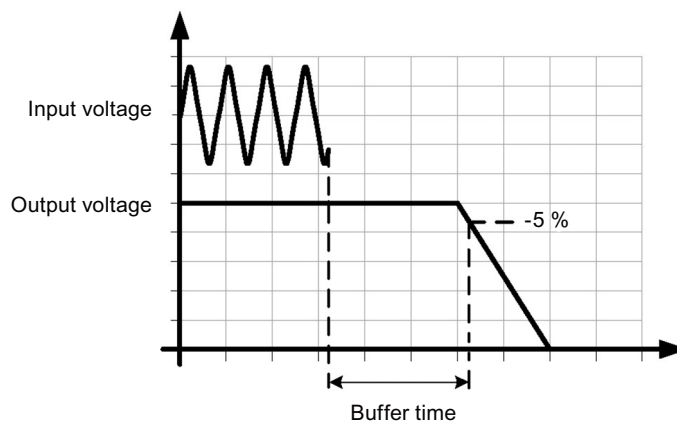


Figure 6-1 Power failure buffering

## 6.2 Output

	<b>6EP1321-5BA00</b> <b>(12 V/2 A)</b>	<b>6EP1322-5BA10</b> <b>(12 V/6.5 A)</b>	<b>6EP1331-5BA00</b> <b>(24 V/0.6 A)</b>	<b>6EP1331-5BA10</b> <b>(24 V/1.3 A)</b>
Output	Regulated, isolated DC voltage			
Rated voltage value U <sub>a</sub> rated DC	12 V	12 V	24 V	24 V
Total tolerance, static ±	3 %	3 %	3 %	3 %
Static line regulation, approx.	0.1 %	0.1 %	0.1 %	0.1 %
Static load regulation, approx.	0.2 %	0.2 %	0.2 %	0.2 %
Residual ripple peak-peak, max.	200 mV	200 mV	200 mV	200 mV
Residual ripple peak-peak, typ.	40 mV	80 mV	40 mV	25 mV
Spikes peak-peak, max. (bandwidth, approx. 20 MHz)	300 mV	300 mV	300 mV	300 mV
Spikes peak-peak, typ. (bandwidth, approx. 20 MHz)	50 mV	80 mV	20 mV	20 mV
Setting range	10.5...12.9 V	10.5...12.9 V	-	22.2...26.4 V
Product function / output voltage can be adjusted	Yes	Yes	No	Yes
Setting the output voltage	using a potentiometer	using a potentiometer	-	using a potentiometer
Operating display	LED green for output voltage OK			
Response when switching on/off	Overshoot of U <sub>a</sub> approx. 5 %	Overshoot of U <sub>a</sub> approx. 1 %	Overshoot of U <sub>a</sub> approx. 5 %	Overshoot of U <sub>a</sub> approx. 5 %
Starting delay, max.	0.6 s	1 s	1 s	0.6 s
Voltage rise, typ.	10 ms	500 ms	25 ms	90 ms
Rated current I <sub>a</sub> rated	2 A	6.5 A	0.6 A	1.3 A
Current range	0...2 A	0...6.5 A	0...0.6 A	0...1.3 A
• Remark	2 A to +55° C, 1.1 A to +70° C	6.5 A to +50° C, 1.95 A to +70° C	0.6 A to +55° C, 0.3 A to +70° C	1.3 A to +55° C, 0.7 A to +70° C
Output active power / typical	24 W	78 W	14 W	30 W
Short-time overload current / for a short circuit in operation / typical	4.8 A	14 A	1 A	3.1 A
Can be connected in parallel to increase the power rating	Yes	Yes	No	Yes
• Remark	Power-up only with single rated load	Power-up only with single rated load		Power-up only with single rated load
Number of devices that can be connected in parallel to increase the power rating, units	2	2	-	2
Output characteristic	See Figure 6-3 12 V output characteristic (Page 31)		See Figure 6-4 24 V output characteristic (Page 31)	

Technical data

6.2 Output

	<b>6EP1332-5BA00</b> <b>(24 V/2.5 A)</b>	<b>6EP1332-5BA20</b> <b>(24 V/3.7 A)</b>	<b>6EP1332-5BA10</b> <b>(24 V/4 A)</b>
Output	Regulated, isolated DC voltage		
Rated voltage value U <sub>a</sub> rated DC	24 V		
Total tolerance, static ±	3 %	3 %	3 %
Static line regulation, approx.	0.1 %	0.1 %	0.1 %
Static load regulation, approx.	0.2 %	0.2 %	0.2 %
Residual ripple peak-peak, max.	200 mV	200 mV	200 mV
Residual ripple peak-peak, typ.	55 mV	90 mV	80 mV
Spikes peak-peak, max. (bandwidth, approx. 20 MHz)	300 mV	300 mV	300 mV
Spikes peak-peak, typ. (bandwidth, approx. 20 MHz)	50 mV	60 mV	80 mV
Setting range	22.2...26.4 V	-	22.2...26.4 V
Product function / output voltage can be adjusted	Yes	No	Yes
Setting the output voltage	using a potentiometer	-	using a potentiometer
Operating display	LED green for output voltage OK		
Response when switching on/off	Overshoot of U <sub>a</sub> approx. 1 %	Overshoot of U <sub>a</sub> approx. 1 %	
Starting delay, max.	0.7 s	1.5 s	1.5 ms
Voltage rise, typ.	100 ms	500 ms	400 ms
Rated current I <sub>a</sub> rated	2.5 A	3.7 A	4 A
Current range	0...2.5 A	0...3.7 A	0...4 A
• Remark	2.5 A to +50° C, 0.75 A to +70° C	3.7 A to +50° C, 1.1 A to +70° C	4 A to +50° C, 1.2 A to +70° C
Output active power / typical	60 W	89 W	96 W
Short-time overload current / for a short circuit in operation / typical	5.5 A	5 A	13 A
Can be connected in parallel to increase the power rating	Yes Power-up only with single rated load	No	Yes Power-up only with single rated load
• Remark			
Number of devices that can be connected in parallel to increase the power rating, units	2	-	2
Output characteristic	See Figure 6-4 24 V output characteristic (Page 31)		

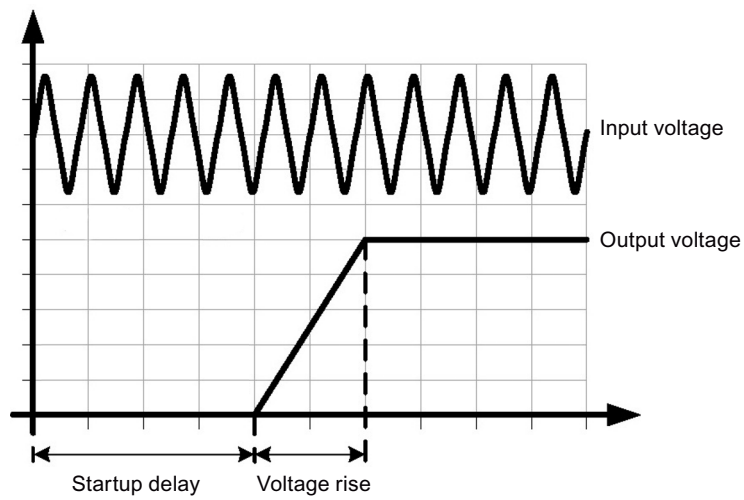


Figure 6-2 Startup delay/voltage rise

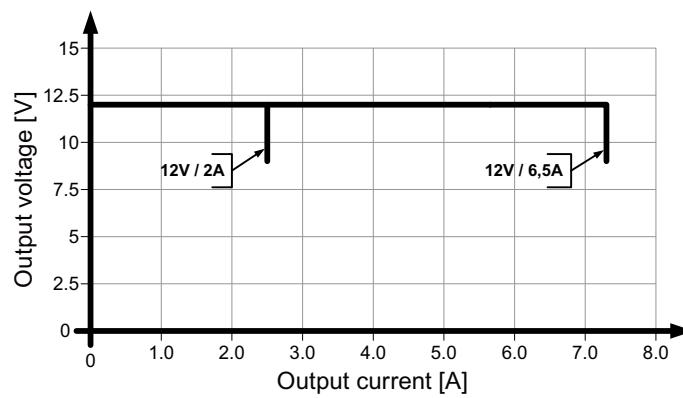


Figure 6-3 12 V output characteristic

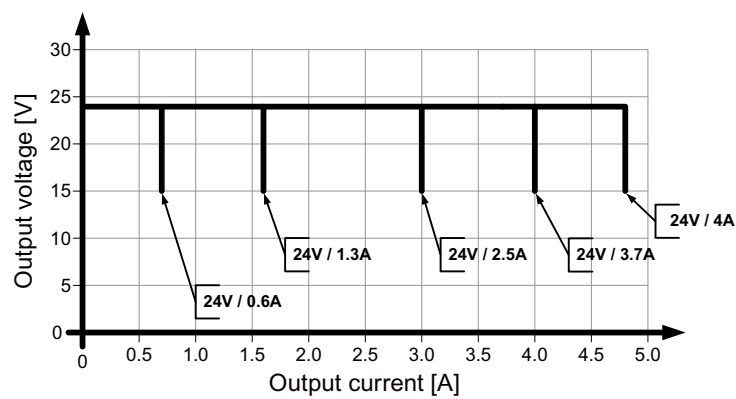


Figure 6-4 24 V output characteristic

6.3 Efficiency and power loss

The device supplies a constant output voltage until the current limit is reached. In the event of an overload, the output current and the output voltage are reduced. When the output voltage falls below approx. 9 V (12 V versions) and 15 V (24 V versions), the device switches off, and automatically restarts. This response is repeated as long as the overload condition is present.

6.3 Efficiency and power loss

	6EP1321-5BA00 (12 V/2 A)	6EP1322-5BA10 (12 V/6.5 A)	6EP1331-5BA00 (24 V/0.6 A)	6EP1331-5BA10 (24 V/1.3 A)
Efficiency at $U_a$ rated, $I_a$ rated, approx.	82 %	86 %	82 %	86 %
Power loss at $U_a$ rated, $I_a$ rated, approx.	5.8 W	12.5 W	2.6 W	4.5 W

	6EP1332-5BA00 (24 V/2.5 A)	6EP1332-5BA20 (24 V/3.7 A)	6EP1332-5BA10 (24 V/4 A)
Efficiency at $U_a$ rated, $I_a$ rated, approx.	87 %	87 %	88 %
Power loss at $U_a$ rated, $I_a$ rated, approx.	9 W	14 W	13 W

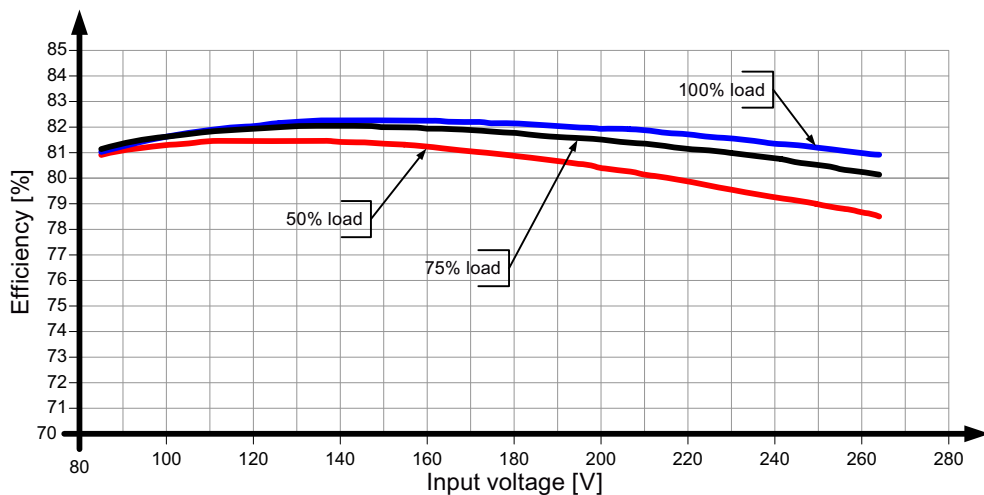


Figure 6-5 Efficiency for AC: 6EP1321-5BA00



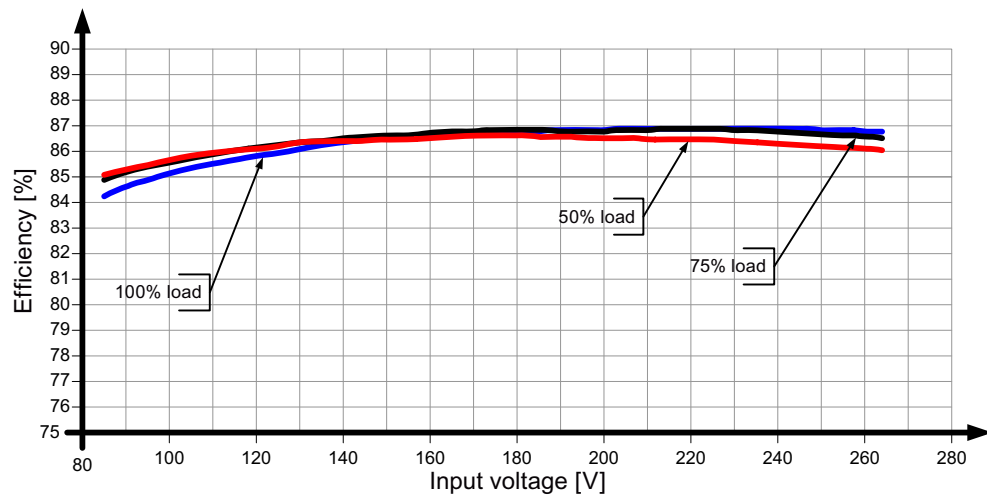


Figure 6-6 Efficiency for AC: 6EP1322-5BA10

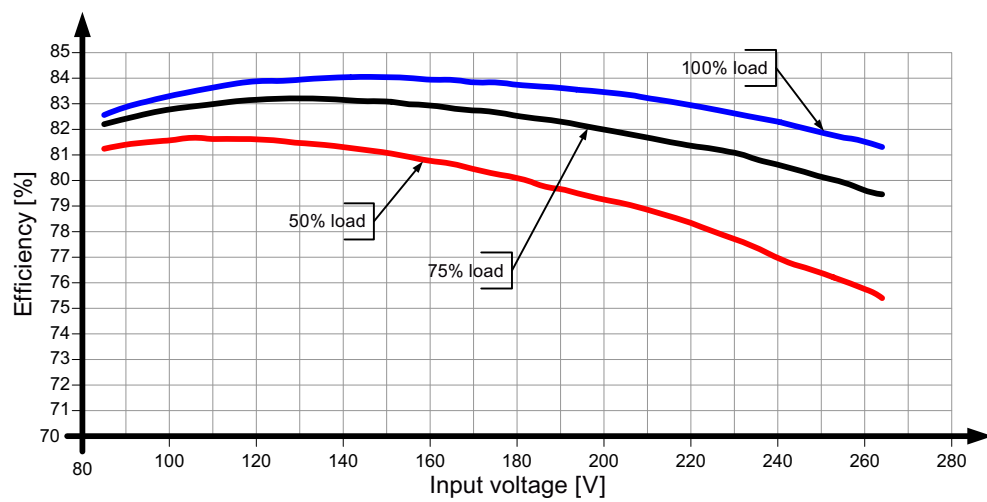


Figure 6-7 Efficiency for AC: 6EP1331-5BA00

6.3 Efficiency and power loss

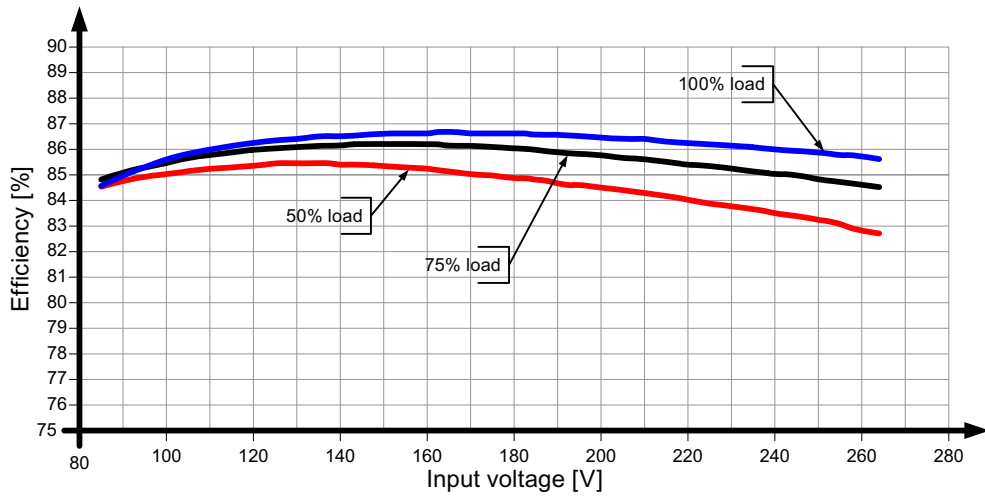


Figure 6-8 Efficiency for AC: 6EP1331-5BA10

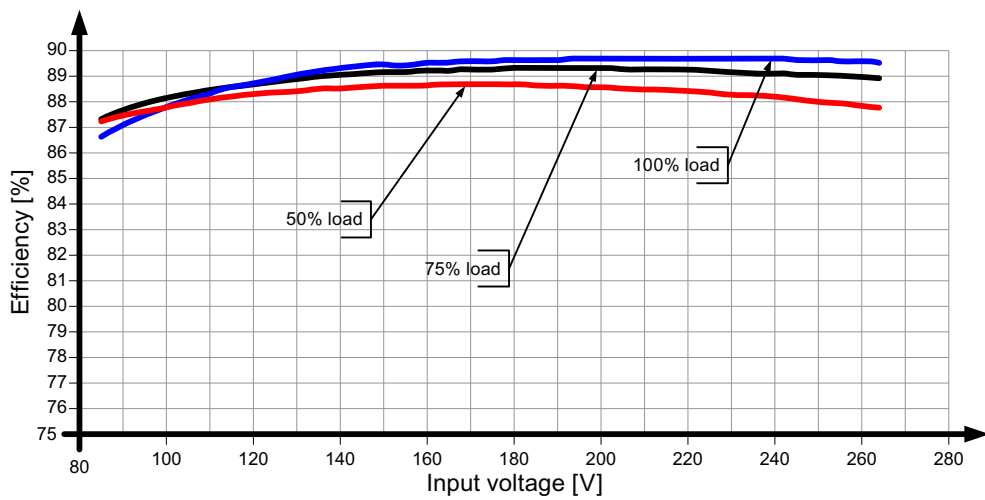


Figure 6-9 Efficiency for AC: 6EP1332-5BA00

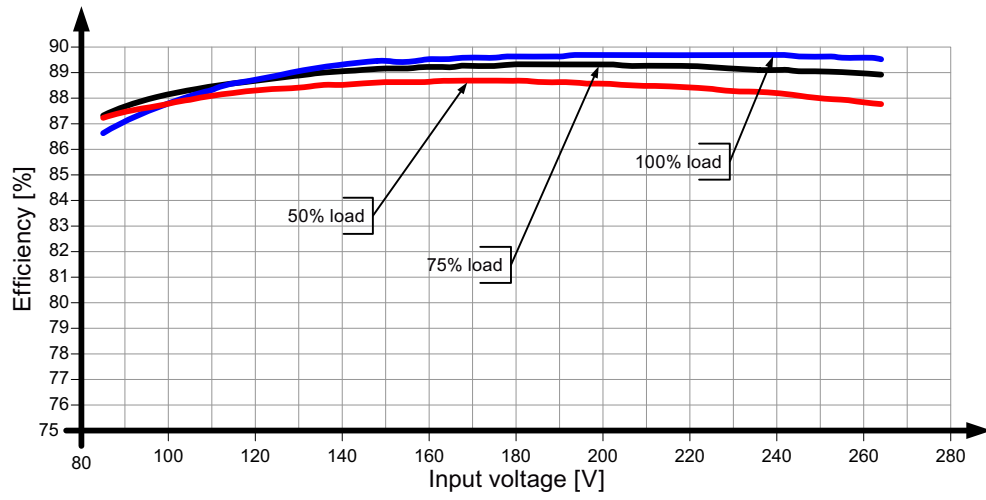


Figure 6-10 Efficiency for AC: 6EP1332-5BA20

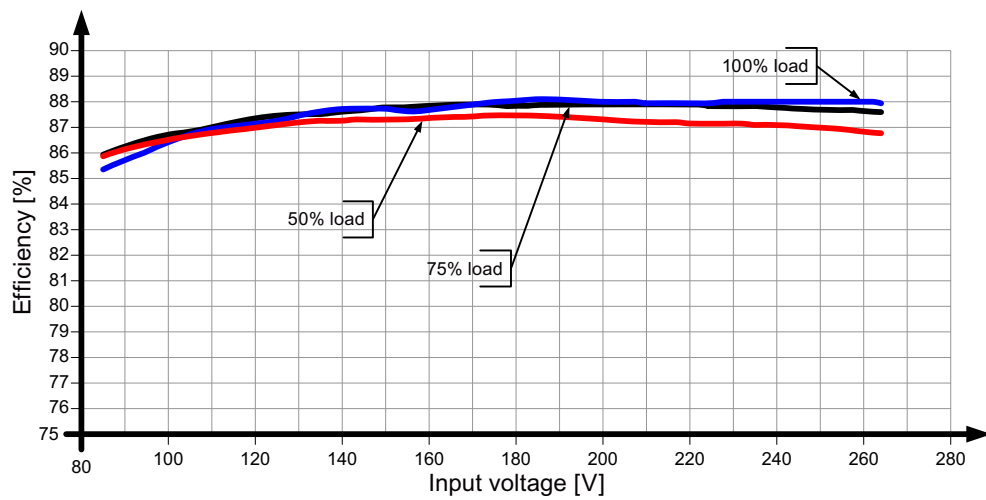


Figure 6-11 Efficiency for AC: 6EP1332-5BA10

## 6.4 Closed-loop control

	<b>6EP1321-5BA00</b> <b>(12 V/2 A)</b>	<b>6EP1322-5BA10</b> <b>(12 V/6.5 A)</b>	<b>6EP1331-5BA00</b> <b>(24 V/0.6 A)</b>	<b>6EP1331-5BA10</b> <b>(24 V/1.3 A)</b>
Dyn. line compensation ( $U_e$ rated $\pm 15\%$ ), max.	0.1 %	0.1 %	0.1 %	0.1 %
Dyn. load compensation ( $I_a$ : 10/90/10 %), $U_a \pm$ , typ.	3 %	3 %	3 %	3 %
Load step compensation time 10 to 90 %, typ.	4 ms	3 ms	3 ms	5 ms
Load step compensation time 90 to 10 %, typ.	3 ms	3 ms	3 ms	5 ms

	<b>6EP1332-5BA00</b> <b>(24 V/2.5 A)</b>	<b>6EP1332-5BA20</b> <b>(24 V/3.7 A)</b>	<b>6EP1332-5BA10</b> <b>(24 V/4 A)</b>
Dyn. line compensation ( $U_e$ rated $\pm 15\%$ ), max.	0.1 %	0.1 %	0.1 %
Dyn. load compensation ( $I_a$ : 10/90/10 %), $U_a \pm$ , typ.	3 %	3 %	3 %
Load step compensation time 10 to 90 %, typ.	4 ms	4 ms	4 ms
Load step compensation time 90 to 10 %, typ.	4 ms	4 ms	4 ms

## 6.5 Protection and monitoring

	6EP1321-5BA00 (12 V/2 A)	6EP1322-5BA10 (12 V/6.5 A)	6EP1331-5BA00 (24 V/0.6 A)	6EP1331-5BA10 (24 V/1.3 A)
Output overvoltage protection	Yes, according to EN 60950-1			
Current limitation, typ.	2.4 A	7.2 A	0.7 A	1.4 A
Property of the output/short-circuit proof	Yes			
Short-circuit protection	Electronic trip, automatic restart			

	6EP1332-5BA00 (24 V/2.5 A)	6EP1332-5BA20 (24 V/3.7 A)	6EP1332-5BA10 (24 V/4 A)
Output overvoltage protection	Yes, according to EN 60950-1		
Current limitation, typ.	3 A	4 A	4.8 A
Property of the output/short-circuit proof	Yes		
Short-circuit protection	Electronic trip, automatic restart		

## 6.6 MTBF

	6EP1321-5BA00 (12 V/2 A)
	6EP1322-5BA10 (12 V/6.5 A)
	6EP1331-5BA00 (24 V/0.6 A)
	6EP1331-5BA10 (24 V/1.3 A)
	6EP1332-5BA00 (24 V/2.5 A)
	6EP1332-5BA20 (24 V/3.7 A)
	6EP1332-5BA10 (24 V/4 A)
Mean Time Between Failures	SN29500: >500000 h at 40 °C, rated load, 24 hour operation

## 6.7 Mechanical system

	6EP1321-5BA00 (12 V/2 A)	6EP1322-5BA10 (12 V/6.5 A)	6EP1331-5BA00 (24 V/0.6 A)	6EP1331-5BA10 (24 V/1.3 A)
Connection system	Screw terminal			
Connections / line supply	L, N, PE: removable screw terminal, for each 1 x 0.5...2.5 mm <sup>2</sup>			
Connections / output	+: 1 screw terminal for 0.5...2.5 mm <sup>2</sup> ; -: 2 screw terminals for 0.5...2.5 mm <sup>2</sup>			

Technical data

6.7 Mechanical system

	<b>6EP1321-5BA00</b> <b>(12 V/2 A)</b>	<b>6EP1322-5BA10</b> <b>(12 V/6.5 A)</b>	<b>6EP1331-5BA00</b> <b>(24 V/0.6 A)</b>	<b>6EP1331-5BA10</b> <b>(24 V/1.3 A)</b>
Width of the housing	30 mm	52.5 mm	22.5 mm	30 mm
Height of the housing	80 mm	80 mm	80 mm	80 mm
Depth of the housing	100 mm	100 mm	100 mm	100 mm
Mounting width	30 mm	52.5 mm	22.5 mm	30 mm
Mounting height	180 mm	180 mm	180 mm	180 mm
Weight, approx.	0.12 kg	0.32 kg	0.12 kg	0.17 kg
Product property / of the housing / housing that can be lined up next to one another	Yes			
Type of mounting / panel mounting	No			
Type of mounting / rail mounting	Yes			
Type of mounting / S7-300 rail mounting	No			
Mounting	Can be snapped onto standard EN 60715 35x7,5/15 mounting rails			

	<b>6EP1332-5BA00</b> <b>(24 V/2.5 A)</b>	<b>6EP1332-5BA20</b> <b>(24 V/3.7 A)</b>	<b>6EP1332-5BA10</b> <b>(24 V/4 A)</b>
Connection system	Screw terminal		
Connections / line supply	L, N, PE: removable screw terminal, for each 1 x 0.5...2.5 mm <sup>2</sup>		
Connections / output	+: 1 screw terminal for 0.5...2.5 mm <sup>2</sup> ; -: 2 screw terminals for 0.5...2.5 mm <sup>2</sup>		
Width of the housing	45 mm	52.5 mm	52.5 mm
Height of the housing	80 mm	80 mm	80 mm
Depth of the housing	100 mm	100 mm	100 mm
Mounting width	45 mm	52.5 mm	52.5 mm
Mounting height	180 mm	180 mm	180 mm
Weight, approx.	0.22 kg	0.32 kg	0.32 kg
Product property / of the housing / housing that can be lined up next to one another	Yes		
Type of mounting / panel mounting	No		
Type of mounting / rail mounting	Yes		
Type of mounting / S7-300 rail mounting	No		
Mounting	Can be snapped onto standard EN 60715 35x7,5/15 mounting rails		

## 6.8 Accessories

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	6EP1321-5BA00 (12 V/2 A)
	6EP1322-5BA10 (12 V/6.5 A)
	6EP1331-5BA00 (24 V/0.6 A)
	6EP1331-5BA10 (24 V/1.3 A)
	6EP1332-5BA00 (24 V/2.5 A)
	6EP1332-5BA20 (24 V/3.7 A)
	6EP1332-5BA10 (24 V/4 A)

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Mechanical accessories	Removable 6EP1971-5BA00 spring-loaded terminal
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## 6.9 Dimension drawing

See Section Dimensions and weight (Page 14)

CAD data that can be downloaded from the Internet:

6EP1321-5BA00

([http://www.automation.siemens.com/bilddb/index.aspx?objKey=G\\_KT01\\_XX\\_00411](http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00411))

6EP1322-5BA10

([http://www.automation.siemens.com/bilddb/index.aspx?objKey=G\\_KT01\\_XX\\_00468](http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00468))

6EP1331-5BA00

([http://www.automation.siemens.com/bilddb/index.aspx?objKey=G\\_KT01\\_XX\\_00415](http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00415))

6EP1331-5BA10

([http://www.automation.siemens.com/bilddb/index.aspx?objKey=G\\_KT01\\_XX\\_00419](http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00419))

6EP1332-5BA00

([http://www.automation.siemens.com/bilddb/index.aspx?objKey=G\\_KT01\\_XX\\_00462](http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00462))

6EP1332-5BA20

([http://www.automation.siemens.com/bilddb/index.aspx?objKey=G\\_KT01\\_XX\\_00717](http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00717))

6EP1332-5BA10

([http://www.automation.siemens.com/bilddb/index.aspx?objKey=G\\_KT01\\_XX\\_00465](http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00465))





## Safety, approvals, EMC

### 7.1 Safety

	6EP1321-5BA00 (12 V/2 A)
	6EP1322-5BA10 (12 V/6.5 A)
	6EP1331-5BA00 (24 V/0.6 A)
	6EP1331-5BA10 (24 V/1.3 A)
	6EP1332-5BA00 (24 V/2.5 A)
	6EP1332-5BA20 (24 V/3.7 A)
	6EP1332-5BA10 (24 V/4 A)
Primary/secondary galvanic isolation	Yes
Galvanic isolation	SELV output voltage U <sub>a</sub> according to EN 60950-1 and EN 50178 Transformer according to EN 61558-2-16
Protection class	Class I
Degree of protection (EN 60529)	IP20
Leakage current, typ.	0.4 mA
Leakage current, max.	3.5 mA
Test voltage	See Table 7-1 Test voltage (Page 42)

## 7.2 Test voltage

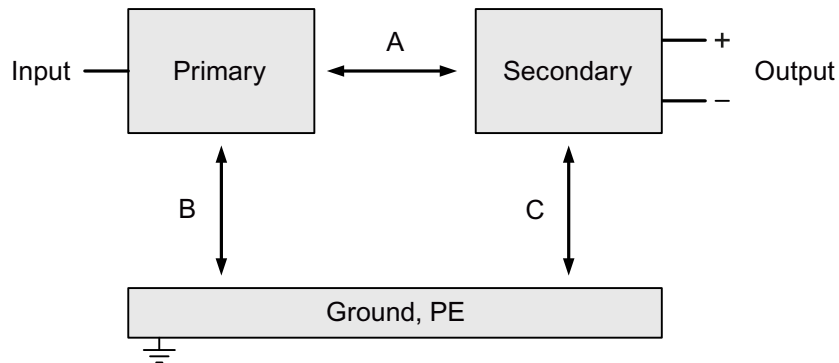


Figure 7-1 Test voltage diagram

Only the manufacturer can perform the type test and production test; users can also perform the field test.

Preconditions for performing the field test:

Tests (A) & (B)

- Connect the input terminals with one another
- Connect the output terminals and PE together

Test (C)

- Connect the output terminals with one another and measure with respect to PE

Table 7- 1 Test voltage

	Test time	Prim ↔ sec (A)	Prim ↔ PE (B)	Sec ↔ PE (C)
Type test	60 s	4200 V DC	2200 V DC	700 V DC
	60 s	3000 VAC	1500 VAC	500 VAC
Production test	1 s	2200 V DC	2200 V DC	500 V DC
	1 s	1500 VAC	1500 VAC	350 VAC
Field test	1 s	2200 V DC	2200 V DC	500 V DC
	1 s	1500 VAC	1500 VAC	350 VAC

Remark:

Tripping current for DC measurement: 0 mA

Tripping current for AC measurement: <100 mA

## 7.3 Certifications

	<b>6EP1321-5BA00</b> <b>(12 V/2 A)</b>	<b>6EP1322-5BA10</b> <b>(12 V/6.5 A)</b>	<b>6EP1331-5BA00</b> <b>(24 V/0.6 A)</b>	<b>6EP1331-5BA10</b> <b>(24 V/1.3 A)</b>
CE marking	Yes			
UL/CSA approval	Yes			
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)			
NEC Class 2	-	-	Yes	Yes
• Remark			Output limited to 100 VA	Output limited to 100 VA
Explosion protection	ATEX (EX) II 3G Ex nA IIC T4; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4			
CB approval	Yes			
Marine approval	GL, ABS			
Degree of protection (EN 60529)	IP20			
	<b>6EP1332-5BA00</b> <b>(24 V/2.5 A)</b>	<b>6EP1332-5BA20</b> <b>(24 V/3.7 A)</b>	<b>6EP1332-5BA10</b> <b>(24 V/4 A)</b>	
CE marking	Yes			
UL/CSA approval	Yes			
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)			
NEC Class 2	Yes	Yes	-	
• Remark	Output limited to 100 VA	Output limited to 100 VA		
Explosion protection	ATEX (EX) II 3G Ex nA IIC T4; cCSAus (CSA C22.2 No. 213-M1987, ANSI/ISA-12.12.01-2007) Class I, Div. 2, Group ABCD, T4			
CB approval	Yes			
Marine approval	GL, ABS			
Degree of protection (EN 60529)	IP20			

## 7.4 EMC

		6EP1321-5BA00 (12 V/2 A)
		6EP1322-5BA10 (12 V/6.5 A)
		6EP1331-5BA00 (24 V/0.6 A)
		6EP1331-5BA10 (24 V/1.3 A)
		6EP1332-5BA00 (24 V/2.5 A)
		6EP1332-5BA20 (24 V/3.7 A)
		6EP1332-5BA10 (24 V/4 A)
Electrostatic discharge	EN 61000-4-2	8 kV contact, 8 kV air
Electromagnetic fields	EN 61000-4-3	0.15...80 MHz 10 V/m, 80...1000 MHz 20 V/m
High-speed transient disturbance variables (burst)	EN 61000-4-4	4 kV at line supply connections, 2 kV at the DC output
Surge voltages	EN 61000-4-5	3 kV symmetrical at the line supply connections 6 kV symmetrical at the line supply connections 500 V symmetrical/asymmetrical on DC output cables
High-frequency fields	EN 61000-4-6	10 V; 0.15...80 MHz
Magnetic fields	EN 61000-4-8	30 A/m; 50 Hz
Voltage dips	EN 61000-4-11	100% for 20 ms, 60% for 200 ms, 30% for 500 ms
Voltage interruptions	EN 61000-4-11	100% for 5000 ms
Emitted interference	EN 55022	Class B
Line harmonics limitation	EN 61000-3-2	Class A
Generic standards	EN61000-6-2	Immunity for industrial environments
	EN61000-6-3	Emission for residential areas

## Ambient conditions

	6EP1322-5BA10 (12 V/6.5 A) 6EP1332-5BA00 (24 V/2.5 A) 6EP1332-5BA20 (24 V/3.7 A) 6EP1332-5BA10 (24 V/4 A)	6EP1321-5BA00 (12 V/2 A) 6EP1331-5BA00 (24 V/0.6 A) 6EP1331-5BA10 (24 V/1.3 A)
Ambient temperature	-20...+70° C with natural convection <ul style="list-style-type: none"> <li>from +50 °C: 3.5 % I<sub>a</sub> rated/K</li> </ul> Tested according to: <ul style="list-style-type: none"> <li>EN 60068-2-1 cold</li> <li>EN 60068-2-2 dry heat</li> <li>EN 60068-2-78 humid heat, constant</li> <li>EN 60068-2-14 temperature change</li> </ul>	-20...+70° C with natural convection <ul style="list-style-type: none"> <li>from +55 °C: 3 % I<sub>a</sub> rated/K</li> </ul> Tested according to: <ul style="list-style-type: none"> <li>EN 60068-2-1 cold</li> <li>EN 60068-2-2 dry heat</li> <li>EN 60068-2-78 humid heat, constant</li> <li>EN 60068-2-14 temperature change</li> </ul>
Transport and storage temperature	-40...+85 °C Tests (packed for shipping) according to: <ul style="list-style-type: none"> <li>EN 60068-2-1 cold</li> <li>EN 60068-2-2 dry heat</li> <li>EN 60068-2-30 humid heat, cyclic</li> </ul>	
Humidity class	Climate class 3K3 according to EN 60721, without condensation	
Mechanical stress in operation	Tested according to: <ul style="list-style-type: none"> <li>EN 60068-2-6 vibration, test Fc:               <ul style="list-style-type: none"> <li>- 7 mm deflection in the range 5...9 Hz</li> <li>- 2 g acceleration in the range 9...150 Hz</li> </ul> </li> <li>EN 60068-2-27 shock, test Ea:               <ul style="list-style-type: none"> <li>- Acceleration 150 m/s<sup>2</sup>, test duration 11 ms</li> </ul> </li> </ul>	

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6EP1322-5BA10 (12 V/6.5 A)	6EP1321-5BA00 (12 V/2 A)
6EP1332-5BA00 (24 V/2.5 A)	6EP1331-5BA00 (24 V/0.6 A)
6EP1332-5BA20 (24 V/3.7 A)	6EP1331-5BA10 (24 V/1.3 A)
6EP1332-5BA10 (24 V/4 A)	

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Damaging gases

Tested according to:

- EN 60068-2-42 Sulfur dioxide: 10cm<sup>3</sup> / m<sup>3</sup>, 4 days
  - EN 60068-2-43 Hydrogen sulfide: 1cm<sup>3</sup> / m<sup>3</sup>, 4 days
- 

Atmospheric pressure

Operation:

- 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 4-9 Mounting height derating (Page 22)
- Overvoltage category:  
III up to 2000 m (EN 50178)  
II from 2000 m up to 6000 m (EN 50178)

Storage:

- 1080 ... 660 hPa (-1000 ... +3500 m)
-

## Applications

### 9.1 Parallel connection to increase the power rating

To increase the power rating, two identical power supplies SITOP PSU100C, with the exception of 6EP1331-5BA00 and 6EP1332-5BA20, can be directly connected with one another galvanically.

The following must be observed:

- The output voltages of the power supplies to be connected in parallel may differ by a maximum of 0.2 % under no load conditions.  
When required, the output voltages must be adjusted with the potentiometer.  
To do this, the "-" terminals should be connected, and under no-load conditions, the voltage difference measured between the "+" terminals that have not been connected together. This voltage difference must not exceed 0.2%.
- The cables connected to each power supply at terminals "+" and "-" must have identical lengths and the same cable cross-sections (or the same impedance) up to a common external network junction (terminal strip) if possible.
- The power supplies connected in parallel must be switched on simultaneously with a common switch in the line feeder cable (e.g. with the main switch available in control cabinets).

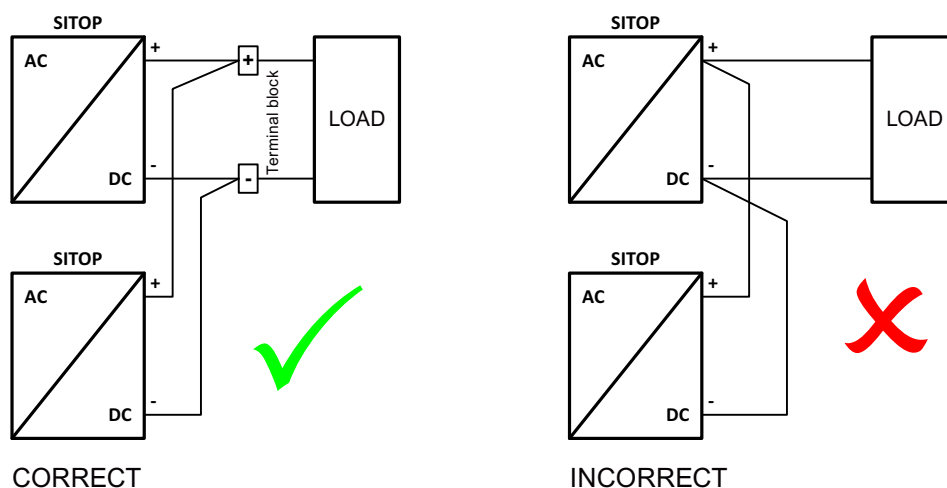


Figure 9-1 Parallel connection

#### Note

The power-up of two SITOP PSU100C ( $2 \times I_{a, \text{rated}}$ ) power supplies is only permissible with the basic rated load ( $I_{a, \text{rated}}$ ).

**NOTICE**

**Protective circuit for the parallel connection of more than two power supplies**

When connecting more than two power supplies in parallel, additional measures must be taken to prevent high reverse currents in the event of a secondary device fault. For this purpose, a suitable protective circuit (e.g. decoupling diode or DC-compatible miniature circuit-breaker) must be installed between each "+" terminal of the power supply and the common connection point.



## 9.2 Parallel connection for redundancy

Connecting several SITOP PSU100C power supplies in parallel for redundancy purposes is required if especially high demands are placed on the availability of a reliable 24 V power supply.

Using the SITOP PSE202U redundancy module, two 24 V power supplies of the same type can be decoupled (Figure 9-2 Redundant configuration (Page 49)). When one of the devices fails, then the other automatically takes over the power supply. If one of the power supplies fails, then this is signaled using an LED on the redundancy module as well as an isolated relay contact.

When dimensioning the system, it must be ensured that  $n+1$  redundant connected power supplies can handle the total power requirement of the remaining  $n$  power supplies.

### Note

For a high reliability of the supply, it is recommended that the redundant switched power supplies are protected separately on the line-side and, if possible, be connected to different power supply networks.

### Note

The SITOP PSE202U NEC Class 2 (6EP1962-2BA00) redundancy module must be used to create a redundant circuit configuration according to NEC Class 2 (Figure 9-3 Parallel connection with redundancy module for NEC Class 2 (Page 50)).

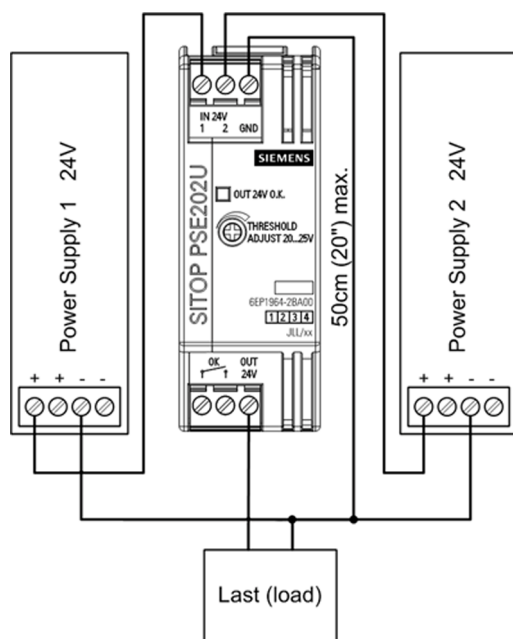


Figure 9-2 Redundant configuration

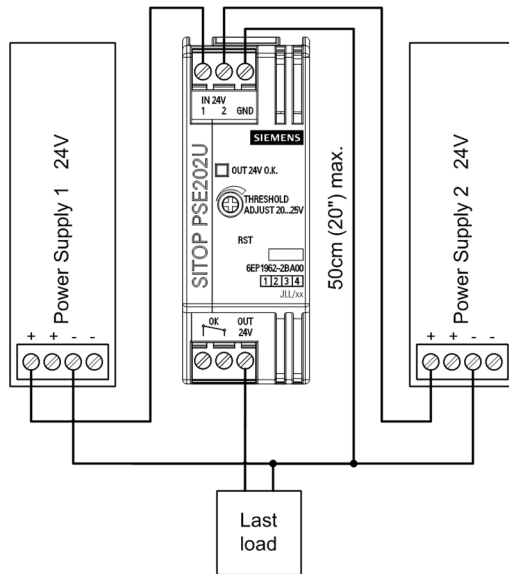


Figure 9-3 Parallel connection with redundancy module for NEC Class 2

You can find additional information at:

SITOP PSE202U manual (<http://support.automation.siemens.com/WW/view/en/42248598>)

## 9.3 Series connection for increased voltage

To achieve an output voltage of 48 V DC, two SITOP PSU100C power supplies of the same type can be connected in series. In this case, connect the "-" terminal of the first power supply to the "+" terminal of the second power supply. The "+" terminal of the first power supply and the "-" terminal of the second power supply are routed to the load.

Depending on the grounding point of the secondary output voltages, voltages of +48 V,  $\pm 24$  V or -48 V can be realized.

In the case of an asymmetric load distribution, it is not possible to guarantee correct functionality.

### WARNING

#### SELV is not guaranteed in the case of a fault

When connecting two power supplies in series, the continuous, permissible SELV voltage of a maximum of 60 V DC according to EN 60950 cannot be guaranteed in the case of a fault.

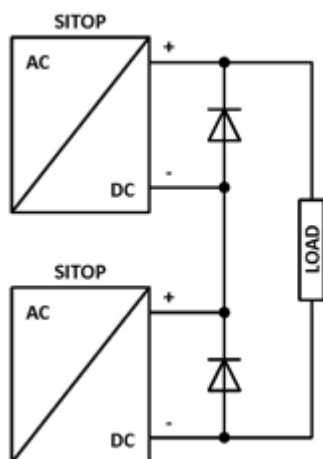


Figure 9-4 Series connection

## **9.4 Protection against short-time voltage dips**

During a drop in the primary-side supply voltage, SITOP PSU100C power supplies still maintain the output voltage over a short millisecond period (see section Technical data, Input (Page 27))

## Environment

The device is in conformance with RoHS.

As a rule, only non-silicon precipitating materials are used.

### Disposal guidelines



Packaging and packaging aids can and should always be recycled. The product itself may not be disposed of as domestic refuse.



## Technical support

Technical support for all IA/DT products can be accessed through the following communication channels:

- Phone: + 49 (0) 911 895 7222
- E-Mail (<mailto:support.automation@siemens.com>)
- Internet:  
Online support request form (<http://www.siemens.de/automation/support-request>)

## Technical documentation on the Internet

Operating instructions and manuals for SITOP are available in the Internet:  
Operating instructions/manuals (<http://www.siemens.de/sitop/manuals>)

## SITOP power supply homepage

General news about our power supplies is available in the Internet at the SITOP homepage:  
SITOP (<http://www.siemens.de/sitop>)

## Information material

SITOP information can be downloaded from the Internet:  
Information and download center (<http://www.siemens.de/sitop-infomaterial>)

## CAX data

2D/3D data and circuit diagram macros can be downloaded from the Internet:  
Siemens image database (<http://www.siemens.de/sitop-cax>)

Request all CAX data via the CAX download manager:  
CAX shopping cart (<http://www.siemens.de/cax>)

## SITOP Selection Tool

Simply and quickly select the optimum the power supply or DC-UPS:  
SITOP Selection Tool (<http://www.siemens.de/sitop-selection-tool>)

## 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:

- On the Internet (<http://www.siemens.de/automation/partner>)
- In Catalog CA 01