SIEMENS

SITOP power supply

Selectivity modules

Manual

SITOP select
6EP1961-2BA00
SITOP PSE200U 3A
6EP1961-2BA11
SITOP PSE200U 10 A
6EP1961-2BA21
SITOP PSE200U 3 A
6EP1961-2BA31
SITOP PSE200U 10 A
6EP1961-2BA41

12.2014
C98130-A7579-A1-1-7629

Legal information

Warning notice system

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

⚠ WARNING

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

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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.

Siemens AG
Division Process Industries and Drives
Postfach 48 48
90026 NÜRNBERG
GERMANY

C98130-A7579-A1-1-7629
℗ 01/2015 Subject to change

Overview

Description

In conjunction with a 24 V power supply, the selectivity module is used to distribute the load current across several branches and to monitor the individual currents in these branches. Faults in the individual branches caused by overload or short-circuit are detected and selectively switched off, so that the fault does not impact the other load circuits. This means fast troubleshooting and minimized downtimes.

The key benefits of the product include:

- A maximum of 4 load branches are monitored for each module
- The response threshold can be continually set for each output using a potentiometer
- Overcurrents are reliably switched off, independent of the cable length and cable cross-section
- The 24 V supply for the other loads is maintained
- Multi-colored LED for each output for faster troubleshooting on-site
- Floating group signal contact for remote diagnostics (for -2BA00, -2BA11, -2BA21)
- Single-channel signal to serially indicate the state of the individual outputs (for -2BA31, -2BA41)

- Evaluation using free-of-charge SIMATIC S7 function blocks (S7-300/400/1200/1500) for modules with single channel signal
- It can be selected that the load branches are sequentially switched on to reduce the total inrush current

Ordering data

The following device options are available:

Selectivity modules	
Type	**Order number**
SITOP select 24 V DC input Number of outputs: 4 Setting range of the response threshold: 2 ... 10 A with group signal contact	6EP1961-2BA00
SITOP PSE200U 24 V DC input Number of outputs: 4 Setting range of the response threshold: 0,5 ... 3 A with group signal contact	6EP1961-2BA11
SITOP PSE200U 24 V DC input Number of outputs: 4 Setting range of the response threshold: 3 ... 10 A with group signal contact	6EP1961-2BA21
SITOP PSE200U 24 V DC input Number of outputs: 4 Setting range of the response threshold: 0,5 ... 3 A with single channel signal	6EP1961-2BA31
SITOP PSE200U 24 V DC input Number of outputs: 4 Setting range of the response threshold: 3 ... 10 A with single channel signal	6EP1961-2BA41

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Safety notes

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⚠ 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.

Description, device design, dimension drawing

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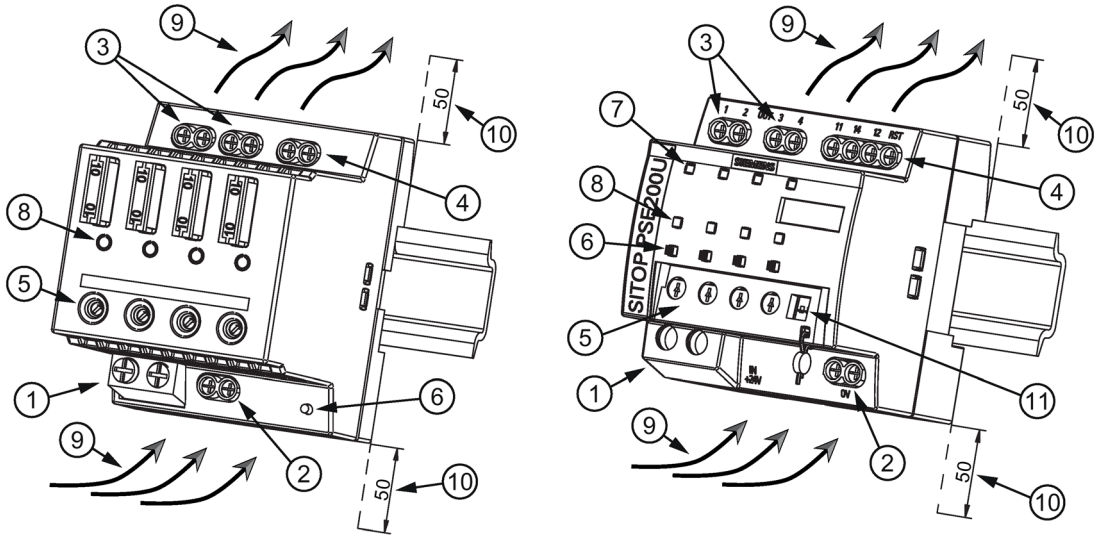
2.1 Device description

Using the selectivity module, a 24 V DC output voltage from a regulated power supply can be distributed across four load circuits. The response threshold of the output current can be individually set for each output using a potentiometer. When the set response threshold is exceeded, the output is automatically switched off according to a defined switch off characteristic, and can be switched on again after a wait time using a pushbutton or remote reset (SITOP PSE200U). The status of the output is displayed using a multi-color LED for each output. The status of the outputs can be processed via a serial single-channel signal.



SITOP select SITOP PSE200U

① +24 V input
② 0 V connection for the internal supply
③ +24 V outputs
④ Group signal contact/status output/remote reset input
⑤ Potentiometer for each output
⑥ Button
⑦ Measuring point
⑧ Indicator light for each output
⑨ Natural convection
⑩ Clearance above/below
⑪ Selector switch for switch-on delay

Figure 2-1 Design

2.2 Connections and terminal designation

The input terminals ① can be used to establish the connection to the supply voltage. The 0 V connection ② is used to supply the internal electronics. Output terminals ③ are used to connect to the loads to be supplied (also see Chapter Installation (Page 41)).

The operating status of the device can be processed using the group signal contact or status output ④ (function and contact rating, see Figure 2-4 Operating displays and signaling (SITOP select and SITOP PSE200U) (Page 13)).
The remote reset input ④ is used to reset outputs that have been automatically switched off (function, see Chapter Status displays and signaling (Page 13)).

Connections and terminal designations for 6EP1961-2BA00	
① + 24 V input	2 screw terminals
② 0 V connection	2 screw terminals
③ + 24 V output: 1, 2, 3, 4	One screw terminal each
④ group signaling contact 13, 14	One screw terminal each

Connections and terminal designations for 6EP1961-2BA11 and 6EP1961-2BA21	
① + 24 V input	2 screw terminals
② 0 V connection	2 screw terminals
③ + 24 V output: 1, 2, 3, 4	One screw terminal each
④ group signaling contact 11, 12, 14; remote reset RST	One screw terminal each

Connections and terminal designations for 6EP1961-2BA31 and 6EP1961-2BA41	
① + 24 V input	2 screw terminals
② 0 V connection	2 screw terminals
③ + 24 V output: 1, 2, 3, 4	One screw terminal each
④ status output S; remote reset RST	One screw terminal each

	①	② + ③ + ④	⑤
	SZS 1 x 5,5 / PZ2 / PH2	SZS 0,6 x 3,5 / PZ1	SZS 0,6 x 3,5 / PZ1
	0,5 - 16 mm^2	0,2 - 6 mm^2	-
	0,5 - 16 mm^2	0,2 - 4 mm^2	-
AWG	22 - 6	24 - 10	-
Nm	1,2 - 1,5 Nm	0,5 Nm	0,04 Nm *1)
	12 mm	8 mm	-

*1) Do not subject the end stop to higher loads

Figure 2-2 Terminal data

NOTICE
Wiring overload
The "0 V" connection is only used to supply the internal electronics of the selectivity module. The 0 V of the connected loads must be routed directly to the power supply using separate cables!

2.3 Potentiometer

The potentiometer ⑤ on the front of the device is used to set the response threshold of the output current. When delivered, the maximum possible response threshold is set.

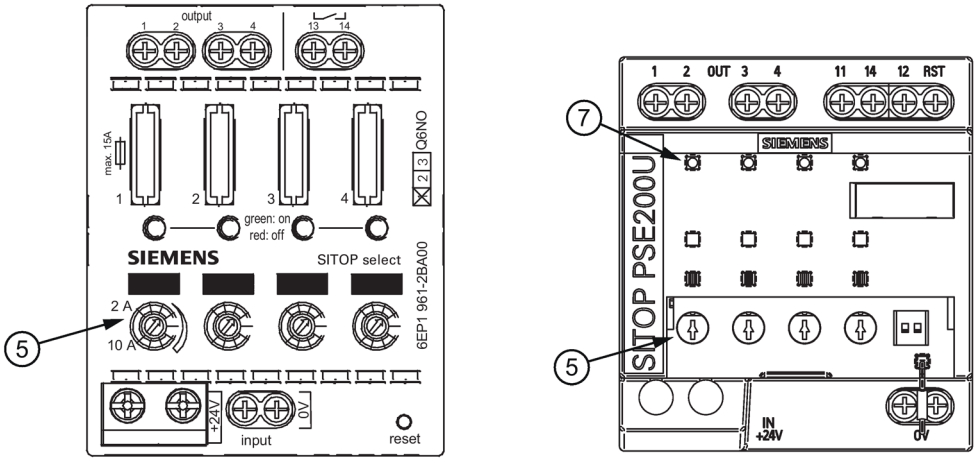


Figure 2-3 Potentiometer (SITOP select and SITOP PSE200U)

Note

It is only permissible to use an insulated screwdriver when actuating the potentiometer.

For information on actuating the potentiometer (screwdriver, torque), see Figure 2-2 Terminal data (Page 11).

Note

For SITOP PSE200U, the actual output current of a branch can be determined by measuring the voltage at measuring point "MP" ⑦ with respect to the "0 V" terminal ②. A measured voltage of 1 V corresponds to an output current of 1 A.

2.4 Status displays and signaling

	6EP1961-2BA00	6EP1961-2BA11 6EP1961-2BA21	6EP1961-2BA31 6EP1961-2BA41
Operating display	Two-color LED	Three-color LED	Three-color LED
Group signaling contact (13-14 or 11-12-14) ④	floating relay contact (NO contact), contact rating: 24 V/0.5 A	floating relay contact (changeover contact), contact rating: 24 V/0.1 A	-
Status output (S) ④	-	-	Non-floating 24 V DC output, max. 30 mA
Remote reset input (RST) ④	-	Non-floating 24 V DC input	Non-floating 24 V DC input

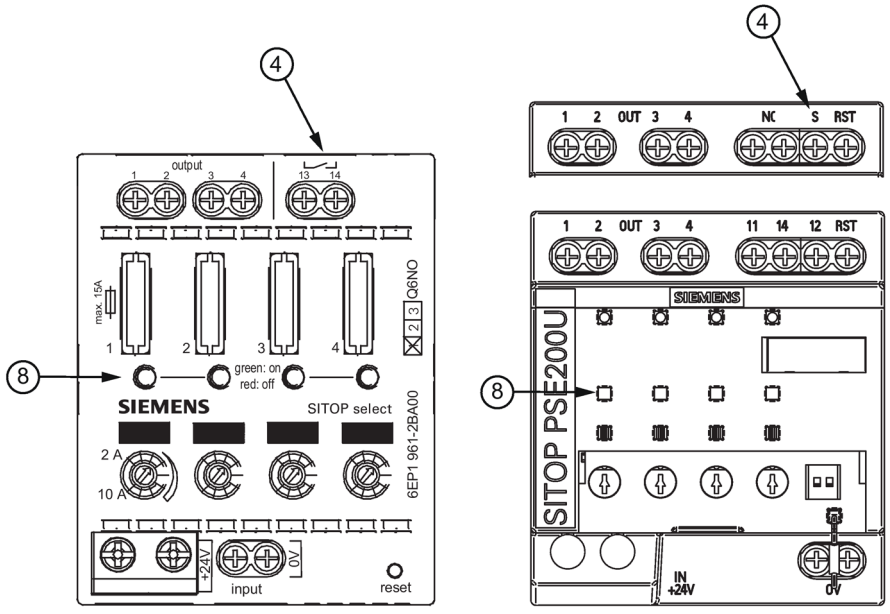


Figure 2-4 Operating displays and signaling (SITOP select and SITOP PSE200U)

The operating state of the outputs is displayed using multi-color LEDs at the front of the device. Symbols indicate the significance of each LED, which are listed in the following table.

○	LED off
●	LED is continuously lit
✷	LED flashes

SITOP select

LED ⑧ and group signaling contact ④

Signaling		6EP1961-2BA00
○	Off	All LEDs: • No supply voltage • Device powering up: After the device has powered up, the outputs are switched on, taking into consideration the switch-on delay that has been set.
●	Lights up green	Normal operation, output is switched on
●	Lights up red	Output switched off automatically to due overload
✷	Flashes red	Outputs ready to be reset after an automatic switch off by pressing the button
● ● ● ●	Light up red	All LEDs are red (after actuating the reset button for a minimum of 8 s): programming mode for the switch-on delay
✷ ✷ ✷ ✷	Flashes red	All LEDs flash red (in the programming mode): signals the programmed switch-on delay time: • all LEDs flash 1x simultaneously red, followed by a 2 s pause: 0 ms • all LEDs flash 2x simultaneously red, followed by a 2 s pause: 24 ms • all LEDs flash 3x simultaneously red, followed by a 2 s pause: 100 ms
Group signaling contact (NO contact)		Signal contact 13-14 opens (=quiescent position) when one/several outputs are switched off as a result of overload or when a fuse ruptures.

SITOP PSE200U

LED ⑧ and group signaling contact or status output ④

Signaling		6EP1961-2BA11 6EP1961-2BA21	6EP1961-2BA31 6EP1961-2BA41
○	Off	All LEDs: • No supply voltage • Device powering up: After the device has powered up, the outputs are switched on, taking into consideration the switch-on delay that has been set.	
		Group signal: Inactive	Status output1*: -
		LED, individual output: Output defective (internal fuse has ruptured)	
		Group signal: Inactive	Status output1*: Ci = '0'
●	Lights up green	Normal operation, output is switched on	
		Group signal: Active	Status output1*: Ci = '1'
✷	Flashes green	Overload at the output: Output current 101…150 % of the response threshold (for 5 s)	
		Group signal: Active	Status output1*: Ci = '1'
●	Lights up red	Output switched off automatically to due overload	
		Group signal: Inactive	Status output1*: Ci = '0'
✷	Flashes red	Output ready to be reset after an automatic switch off by actuating the button or remote reset (effective for all outputs that have been automatically switched off)	
		Group signal: Inactive	Status output1*: Ci = '0'
✷	Flashes orange	Output manually switched off using the button: The state is saved when the device is switched off, and can only be reset again by pressing the up button again.	
		Group signal: Active	Status output1*: Ci = '0'
✷○○○ ➔➔➔➔	Red running light	Device overtemperature: The outputs can be switched-on again once the temperature is in the normal range.	
		Group signal: Inactive	Status output1*: Ci = '0'
Group signaling contact (changeover contact)		In the "inactive" state, 11-12 are connected and 11-14 open	-
Status output		-	Serial signaling (see Figure 2-5 Status signaling (Page 16)), '1' = 24 V DC / '0' = 0 V (pull down)

1* The status of all four outputs ③ is serially signaled using status output ④ (see Figure 2-5 Status signaling (Page 16)). A frame comprises a start bit START and four status bits Ci (i=1 … 4), which are each separated by a pause bit P. While the device powers up, or if the supply voltage is missing, nothing is signaled, the status remains continuously at '0'. For SIMATIC-S7 controllers (S7-300/400/1200/1500), a function block for evaluation is available under (http://www.siemens.com/sitop)
or the direct link (http://support.automation.siemens.com/WW/view/en/61450284).

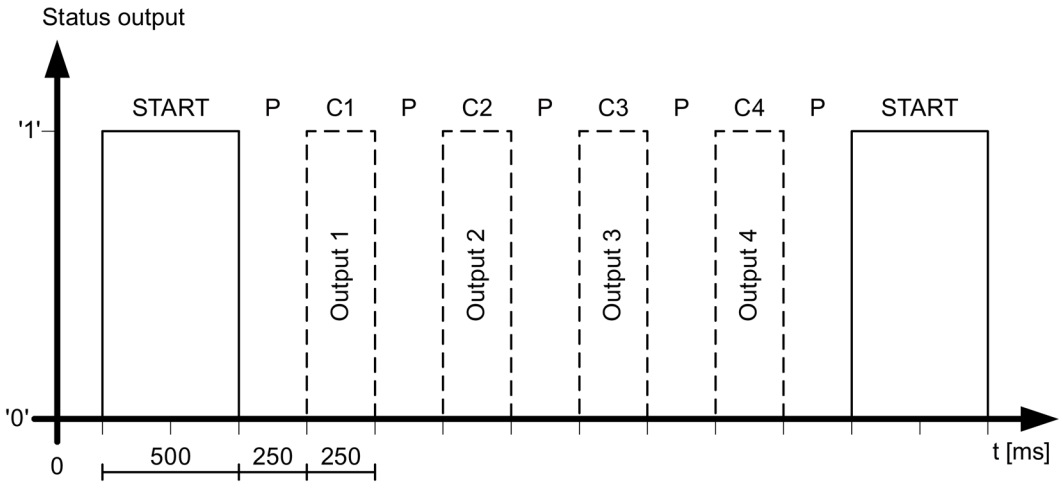


Figure 2-5 Status signaling

2.5 Buttons and selector switches

2.5.1 SITOP select

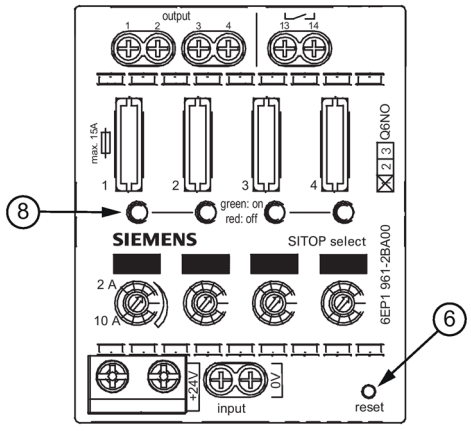


Figure 2-6 Reset button SITOP select

The reset button ⑥ for the SITOP select selectivity module has the following two functions:

1. resets all outputs automatically switched off due to an overload condition (see Chapter Electronic overload shutdown and reset (Page 19)).
2. is used to program the sequential switch-on delay (see Chapter Setting the switch-on delay time (Page 24).

2.5.2 SITOP PSE200U

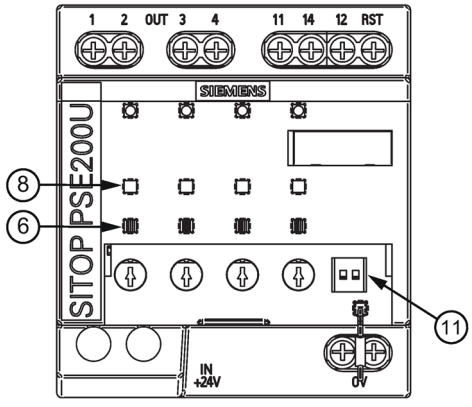


Figure 2-7 Buttons and selector switches, SITOP PSE200U

The button ⑥ for the SITOP PSE200U selectivity module has the following two functions:

1. manually switching an output off and on (see the following).
2. resetting an output automatically switched off due to an overload condition (see Chapter Electronic overload shutdown and reset (Page 19)).

The selector switch ⑪ can be used to select the delay time when switching on the individual outputs (see Chapter Setting the switch-on delay time (Page 24)).

Manually switching an output on and off

An individual output can be switched on and switched off using the button. When the device is delivered, the outputs are manually switched off.

Switching off an output:
For outputs that are switched on, LED ⑧ of the particular output is lit green. You can switch off the output by pressing the assigned button ⑥. The LED then flashes orange (output has been manually switched off).

Switching on an output:
For outputs that have been manually switched off, LED ⑧ of the particular output is lit orange. You can switch on the output by pressing the assigned button ⑥. The LED is then lit green (output is switched on).

Note

An output that has been manually switched-off can only be manually switched-on again by manually pressing the button again. It is not possible to switch on an output that has been manually switched off using the remote reset signal.

An output that has been manually switched off remains saved (latch) even when the supply voltage is no longer available, and is a manually switched off when the supply voltage returns.

2.6 Electronic overload shutdown and reset

An overload is permitted for a defined period of time for each selectivity module output. The output is electronically shut down according to the "Shutdown characteristic" diagram after the limit value has been exceeded.

2.6.1 SITOP select

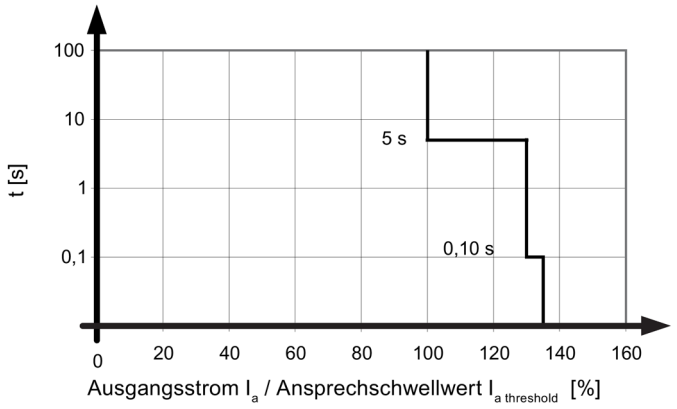


Figure 2-8 Shutdown characteristic SITOP select

- An output current is continuously permissible up to the selected current response threshold (LED of the output is lit green).
- In the range 101...129 % of the selected current response threshold, an overload current is permissible for 5 seconds; after this time, the output is electronically shut down (LED of the output is lit red).
- In the range > 130 % of the selected current response threshold, the current is limited to 130 %, after approx. 50 … 100 ms the output is electronically shut down (LED of the output is lit red).
- When the output current exceeds the selected current response threshold, and if the supply voltage simultaneously dips below 20 V, then the output is electronically shutdown (the LED of the output is lit red).

Reset of an electronic overload shutdown using the reset button

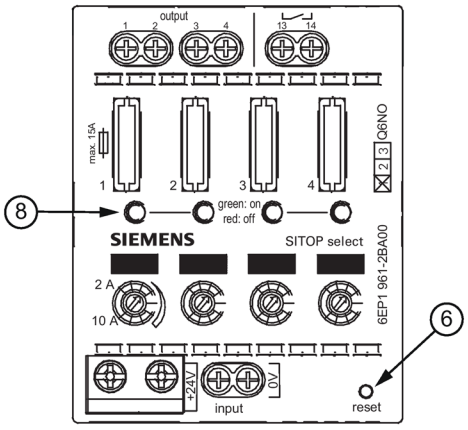


Figure 2-9 Reset button SITOP select

Using the reset button ⑥, after a delay time has elapsed, outputs that have been shut down due to an overload can be reset, i.e. the electronic shutdown can be reset.

The initial situation is an electronic shutdown of individual outputs as a result of an overload condition. This is signaled using the LED ⑧ of the particular output.

LED	Meaning/handling
Lit red	Electronic shutdown as a result of an overload; wait time until a reset is possible: approx. 20 seconds.
Flashes red	Output ready for a reset; press the button to switch-on the output again.
Lit green	The reset was carried out, the output was switched-on again.

Procedure to reset an electronic shutdown:

1. After an electronic shutdown (LED of the output is lit red), allow a wait time of 20 seconds to elapse.
2. Press the reset button ⑥
   Electronic shutdown was reset, and the output has been switched-on again (LED of the output is lit green).

Note

When pressing the button, all of the outputs shut down due to an overload, which are ready for reset (LED flashes red), are switched-in again together.

Note

If, after a reset, the cause of the overload is still present, then the output is again automatically shut down. Before carrying out a reset, remove the cause of the overload to prevent a new shutdown.

2.6.2 SITOP PSE200U

Shutdown characteristics SITOP PSE200U product version 1:

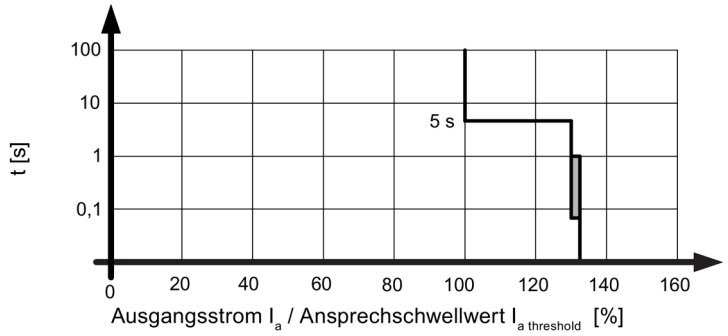


Figure 2-10 Shutdown characteristics SITOP PSE200U (product version 1)

- An output current is continuously permissible up to the selected current response threshold.
- In the range 101...129 % of the selected current response threshold, an overload current is permissible for 5 seconds; after this time, the output is electronically shut down.
- In the range > 130 % of the selected current response threshold, the current is limited to 130 %; at the earliest after 100 ms the output is electronically shut down.
- When the output current exceeds the selected current response threshold, and if the supply voltage simultaneously dips below 20 V, then the output is electronically shutdown.

Shutdown characteristics SITOP PSE200U from product version 2 and higher:

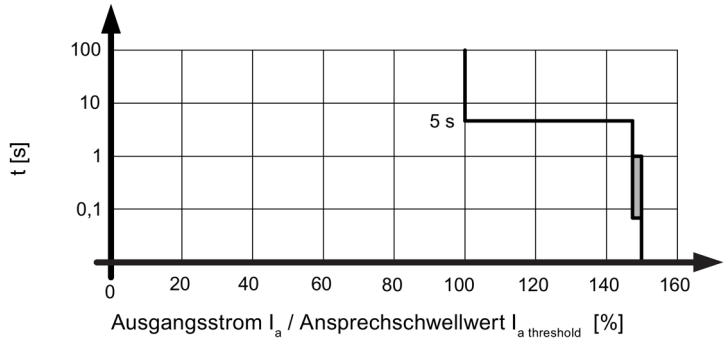


Figure 2-11 Shutdown characteristics SITOP PSE200U (from product version 2 and higher)

- An output current is continuously permissible up to the selected current response threshold (LED of the output is lit green).
- In the range 101...149 % of the selected current response threshold, an overload current is permissible for 5 seconds (LED of the output flashes green), then the output is electronically shut down (LED of the output is lit red).

- In the range > 150 % of the selected current response threshold, the current is limited to 150 %, at the earliest after 100 ms the output is electronically shut down (LED of the output is lit red).
- When the output current exceeds the selected current response threshold, and if the supply voltage simultaneously dips below 20 V, then the output is electronically shutdown (the LED of the output is lit red).

Reset of an electronic overload shutdown using the reset button and remote reset

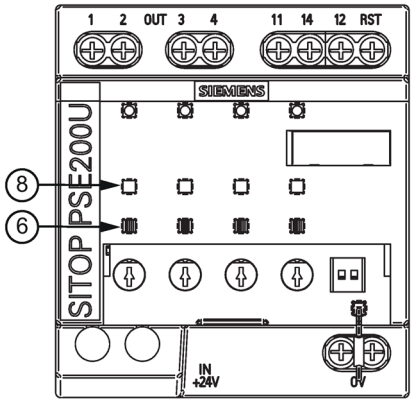


Figure 2-12 SITOP PSE200U button

An individual output can be reset using the button. This resets the electronic shutdown of the output, caused by an overload condition.

The initial situation is an electronic shutdown of individual outputs as a result of an overload condition. This is signaled using the LED ⑧ of the particular output.

LED	Meaning/handling
Lit red	Electronic shutdown as a result of an overload; wait time until a reset is possible: approx. 20 seconds.
Flashes red	Output ready for a reset; press the button to switch-on the output again.
Lit green	The reset was carried out, the output was switched-on again.

Procedure to reset an electronic shutdown:

1. After an electronic shutdown (LED of the output is lit red), allow a wait time of 20 seconds to elapse.
2. Press the reset button ⑥ of the particular output
   Electronic shutdown was reset, and the output has been switched-on again (LED of the output is lit green).

Remote reset:

Alternatively, a remote reset signal can be used. The non-isolated 24 V input (referred to terminal "0 V" of the module) at terminal "RST" can be used for this purpose. A reset is carried out for an input level of > 15 V.

Using a remote reset signal at terminal "RST" all outputs that were shut down electronically due to an overload are reset at this time. Prerequisite: The output is ready to be reset, i.e. the electronic overload shutdown occurred longer than 20 s ago (LED of the output flashes red).

Note

If, after a reset, the cause of the overload is still present, then the output is again automatically shut down. Before carrying out a reset, remove the cause of the overload to prevent a new shutdown.

2.7 Setting the switch-on delay time

For specific loads, it can make sense to sequentially switch-on the outputs in order to reduce the peak inrush currents, and therefore the load on the power supply. To achieve this, the individual outputs of the selectivity module can be switched-in with a time delay between one another in a fixed sequence (output 1 ⇒ 2 ⇒ 3 ⇒ 4). The delay time set between the individual outputs is the same for all of the outputs. When supplied, the delay time is set to 0 ms (all outputs switch on simultaneously).

2.7.1 SITOP select

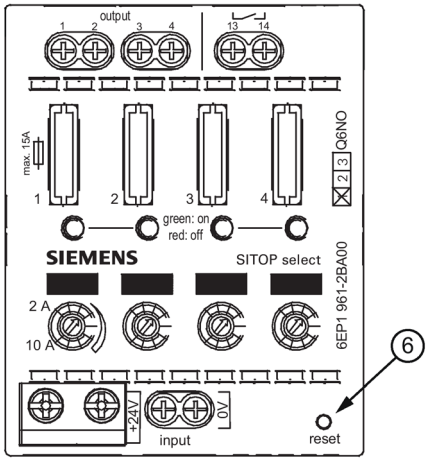


Figure 2-13 Reset button SITOP select

Programming the sequential switch-on delay

For specific loads, it can make sense to sequentially switch-on the outputs in order to reduce the peak inrush currents, and therefore the load on the power supply. To achieve this, the individual outputs of the selectivity module can be switched-in with a time delay between one another in a fixed sequence (output 1 ⇒ 2 ⇒ 3 ⇒ 4). The delay time between the individual outputs is the same for all outputs, and can be set to 0 ms, 24 ms or 100 ms. The selected setting is also kept for an unlimited time even when the power fails, and can be changed as often as required. When supplied, the delay time is set to 0 ms (all outputs switch on simultaneously).

Procedure when setting the delay time:

1. Keep the reset button ⑥ pressed for approximately 8 seconds. The selectivity module changes into the programming mode, all LEDs ⑧ are lit red and the outputs are shutdown.
2. Release the reset button. The LEDs signal the selected delay time using a specific flash rhythm. The meaning is as follows:

LED	Meaning
flash 1x simultaneously red, followed by a 2 s pause	Delay time of 0 ms selected
flash 2x simultaneously red, followed by a 2 s pause	Delay time of 24 ms selected
flash 3x simultaneously red, followed by a 2 s pause	Delay time of 100 ms selected

   The flashing rhythm is repeated after a pause of approx. 2 s.
3. Briefly press the reset button; this causes the actual setting to be moved forward by one stage (0 ms ⇒ 24 ms ⇒ 100 ms ⇒0 ms). Press the reset button several times until the required setting is signaled.
4. Then keep the reset button pressed for approximately 8 seconds. All LEDs are lit red.
5. Release the reset button. The selectivity module saves the delay time that has been set and sequentially switches on the outputs.

The LEDs of the outputs are lit green, and the selectivity module is again in its normal operating mode.

Note

In the programming mode, if the reset button is not pressed within 30 s, then the selectivity module automatically returns to the normal operating state without saving any change made to the delay time. The setting is also not saved if, while programming, the supply voltage fails.

Note

The selectivity module outputs are shut down while programming, and are automatically switched-on again after the programming mode is either manually or automatically exited. They are also automatically switched on again after the voltage returns after a power failure!

2.7.2 SITOP PSE200U

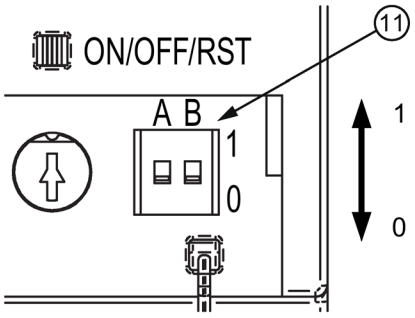


Figure 2-14 SITOP PSE200U selector switch

Setting the sequential switch-on delay

The switch-on delay is set at selector switch ⑪. When delivered, DIP switches "A" and "B" are in position "0" (no switch-on delay).

Procedure when setting the delay time:

With the selectivity module in a no-voltage condition, set DIP switches "A" and "B" to the required delay time.

	No delay, all four outputs are simultaneously switched-on (condition when delivered).
	25 ms delay between the outputs being switched on.
	100 ms delay between the outputs being switched on.
	Outputs switched on depending on the load: The next output is switched on as soon as the current of the previous output lies below the selected response threshold.

The next time that the selectivity module powers up, the outputs are sequentially switched on corresponding to the selected delay time.

2.8 Block diagram

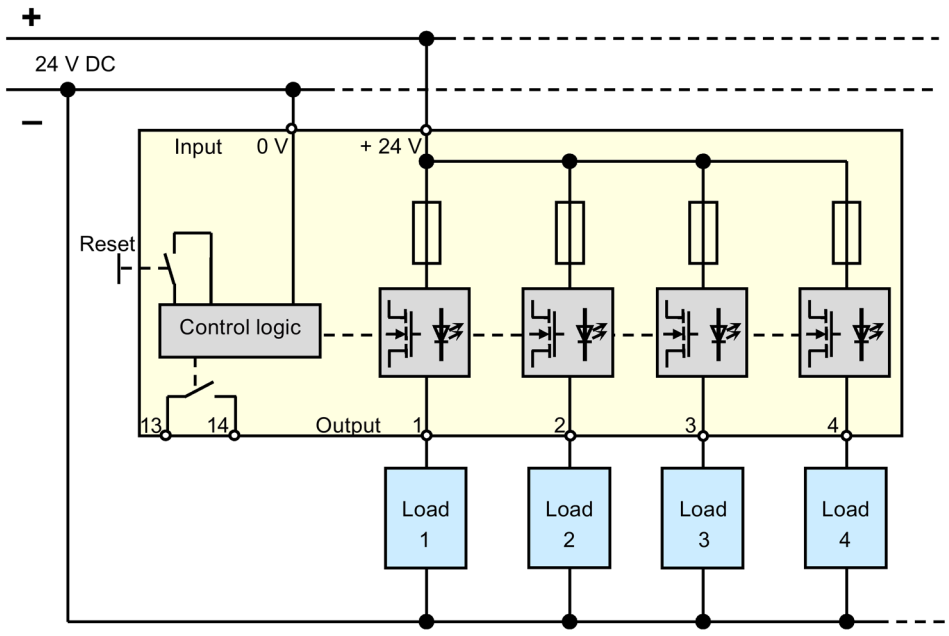


Figure 2-15 Block diagram of the 6EP1961-2BA00

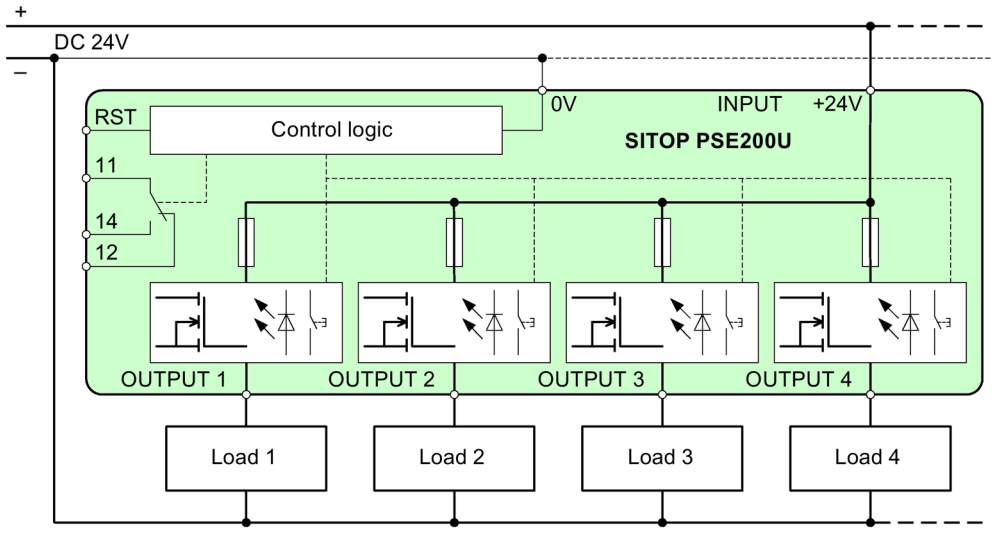


Figure 2-16 Block diagram of the 6EP1961-2BA11 and 6EP1961-2BA21

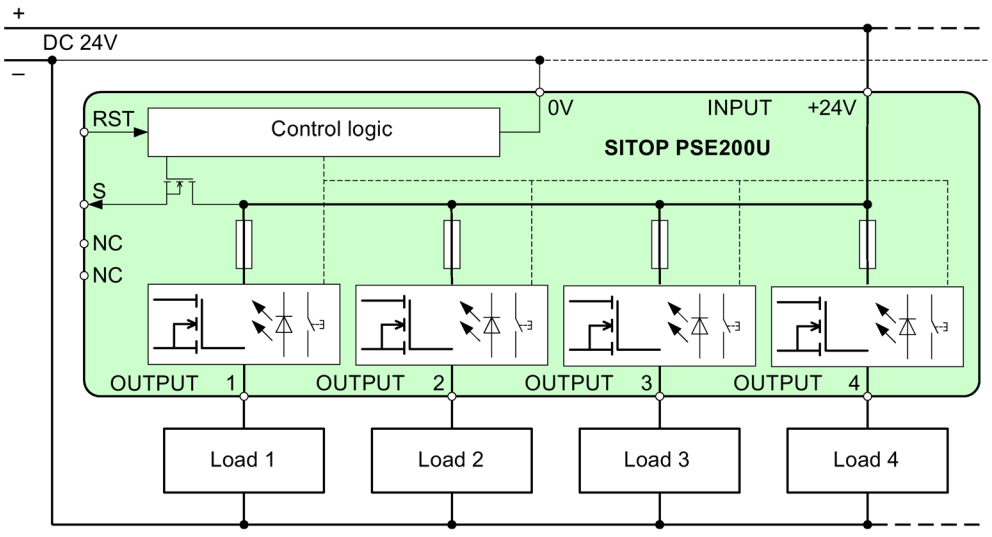


Figure 2-17 Block diagram of the 6EP1961-2BA31 and 6EP1961-2BA41

2.9 Dimensions and weight

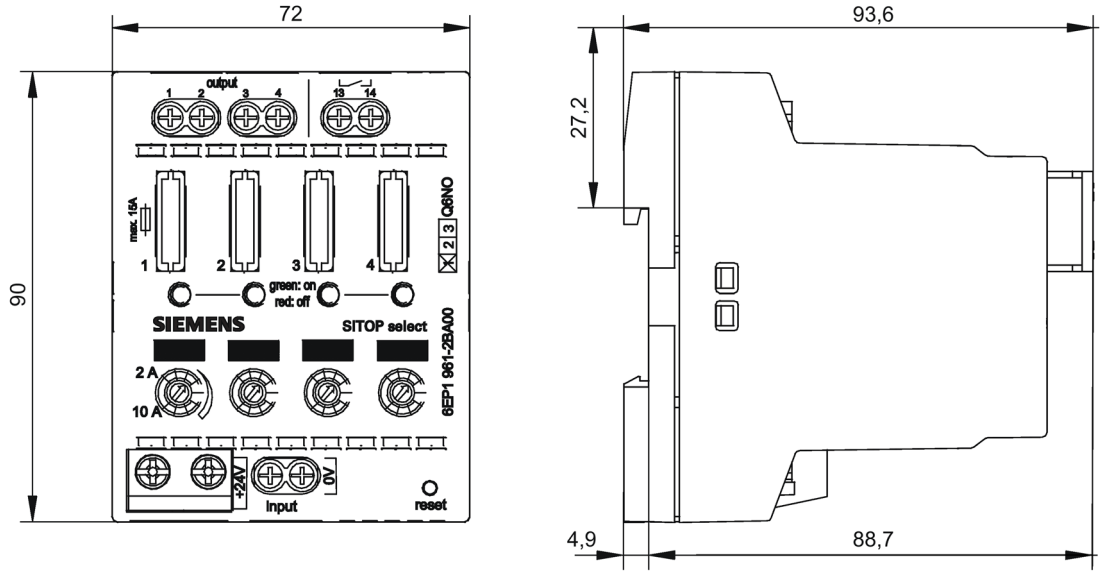


Figure 2-18 Dimension drawing 6EP1961-2BA00

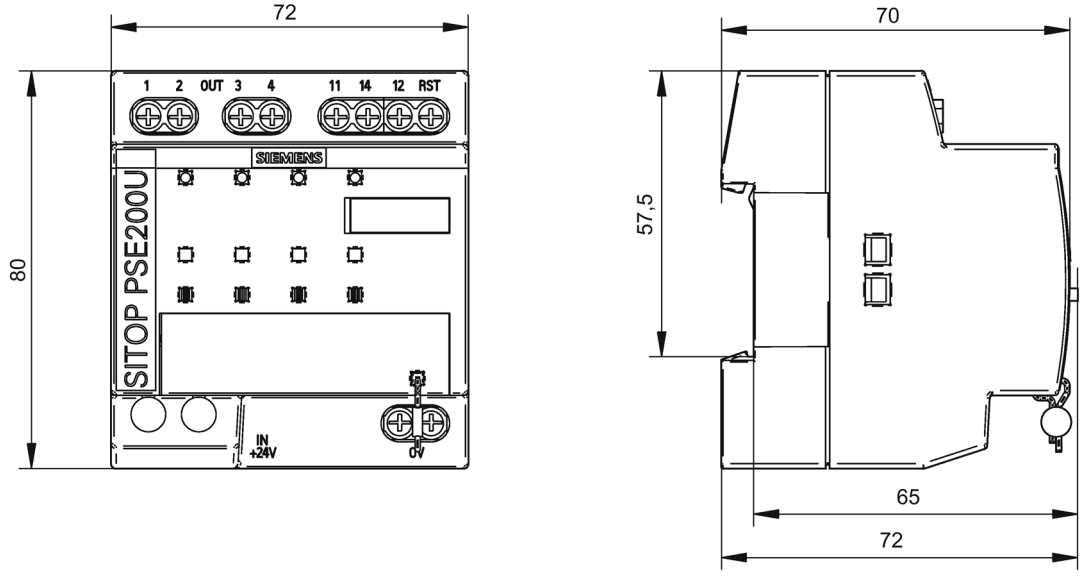


Figure 2-19 Dimension drawing 6EP1961-2BA11, 6EP1961-2BA21, 6EP1961-2BA31, 6EP1961-2BA41

	6EP1961-2BA00	6EP1961-2BA11 6EP1961-2BA31 6EP1961-2BA21 6EP1961-2BA41
Dimensions (W × H × D) in mm	72 × 90 × 88.7	72 × 80 × 65
Weight	Approx. 0.4 kg	Approx. 0.2 kg

Mounting/removal

3

⚠ WARNING

Installing the device in a housing or a control cabinet

The SITOP select and SITOP PSE200U selectivity modules 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 standard mounting rails according to EN 60715 35×7,5/15.

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 it is too difficult to snap them into place, press slider ① at the same time, as described under "Removal".

Removal

To remove, pull up the slider ① using a screwdriver ② (see Chapter Figure 3-1 Mounting/removal (example): 6EP1961-2BA11) (Page 31)) and disengage the device at the bottom edge of the standard mounting rail. Then you can remove the device from the upper edge of the standard mounting rail.

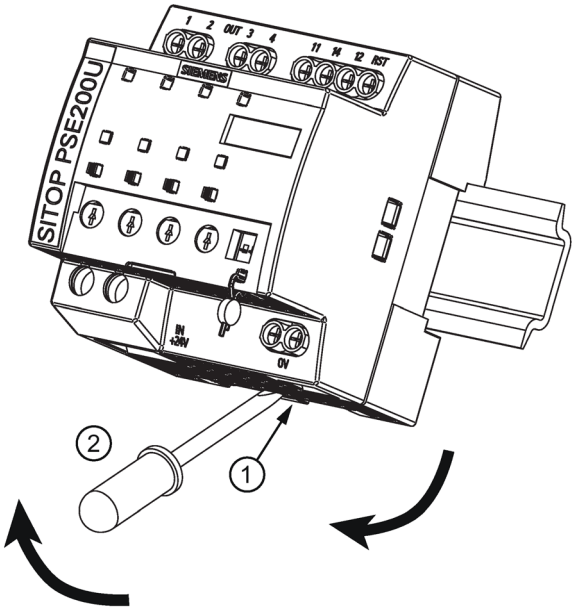


Figure 3-1 Mounting/removal (example): 6EP1961-2BA11)

⚠ WARNING

Use in hazardous zones

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

Mounting position, mounting clearances

4

4.1 Standard mounting position

The device is mounted on standard mounting rails according to EN 60715 35×7,5/15. The device must be mounted vertically in such a way that the input terminals are at the bottom.

A clearance of at least 50 mm should be maintained above and below the device (maximum depth of the cable duct, 50 mm).

No space is required at the side.

Individual output current as a function of the ambient temperature and installation altitude

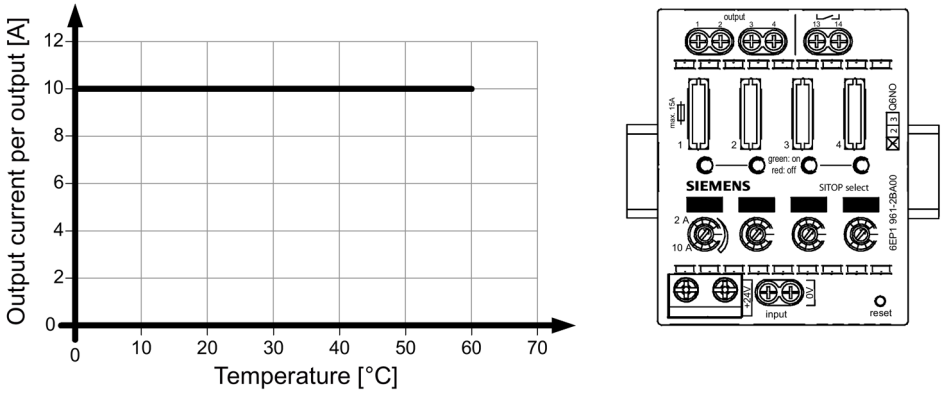


Figure 4-1 6EP1961-2BA00: Output current in the standard mounting position

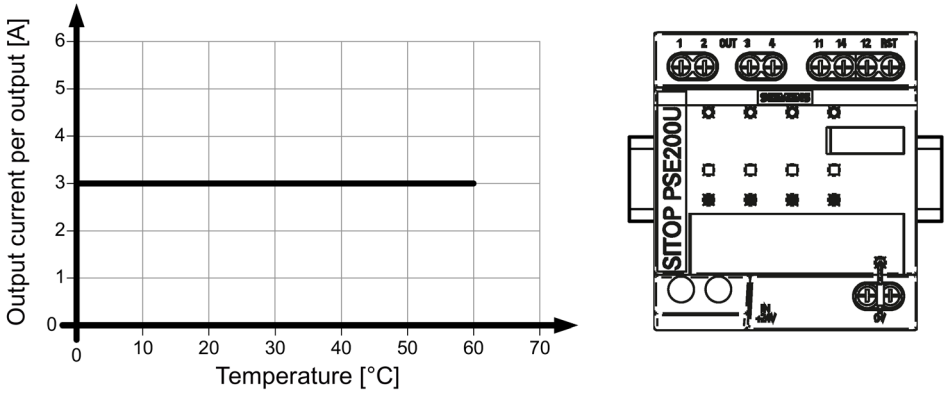


Figure 4-2 6EP1961-2BA11 and 6EP1961-2BA31 output current for the standard mounting position

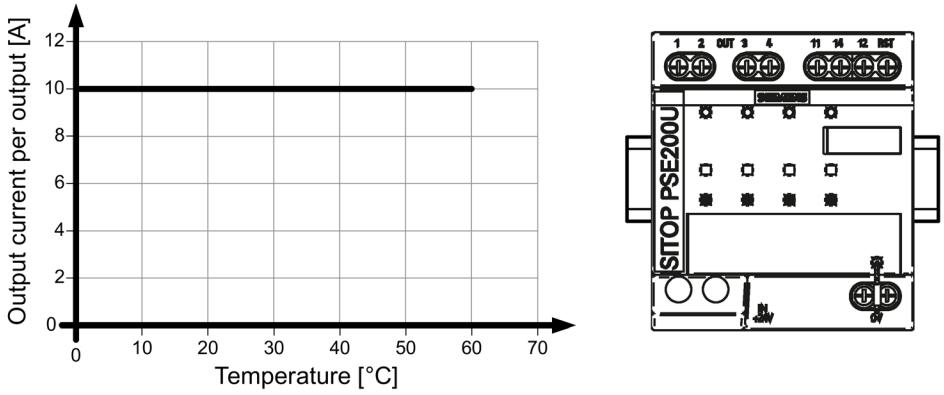


Figure 4-3 6EP1961-2BA21 and 6EP1961-2BA41: Output current in the standard mounting position

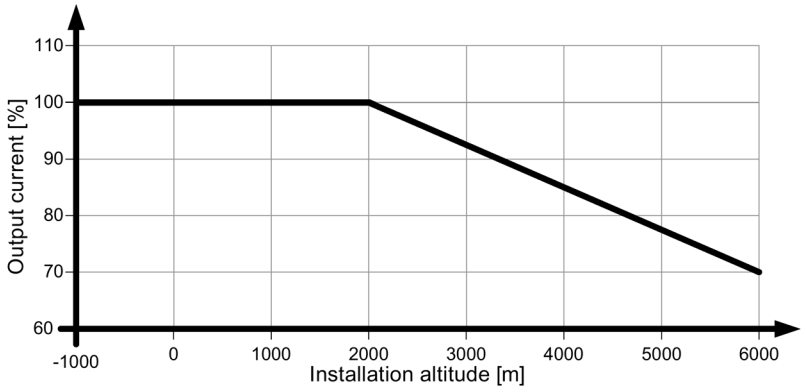


Figure 4-4 Mounting height derating

4.2 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.

4.2.1 6EP1961-2BA00

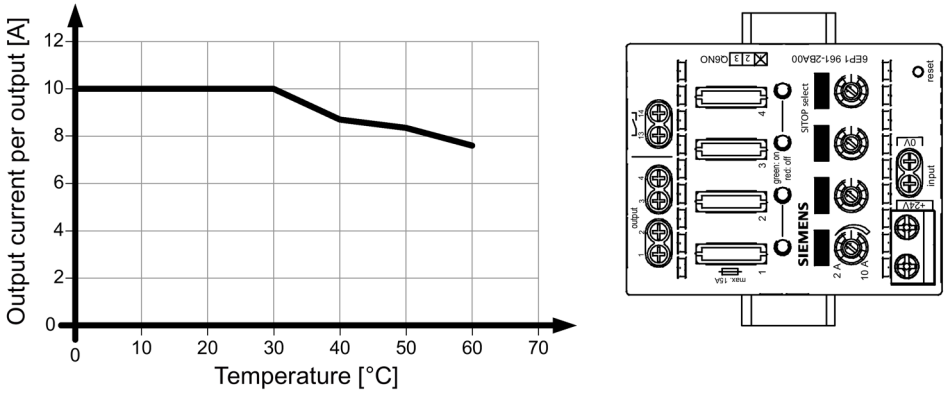


Figure 4-5 Mounting position (1)

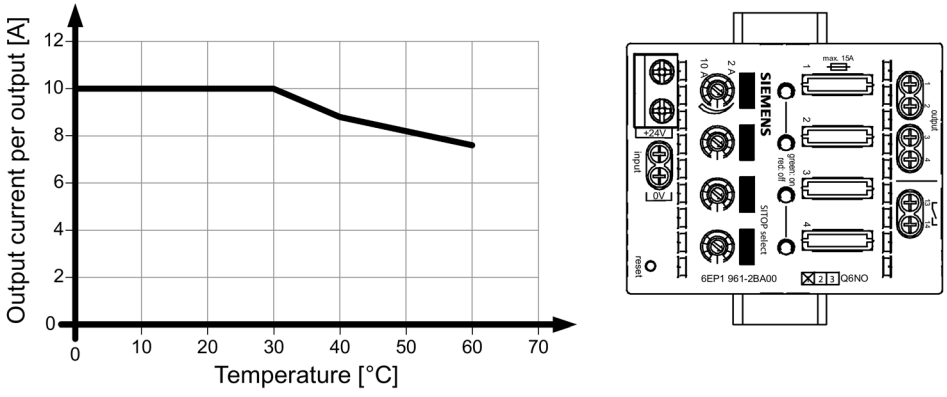


Figure 4-6 Mounting position (2)

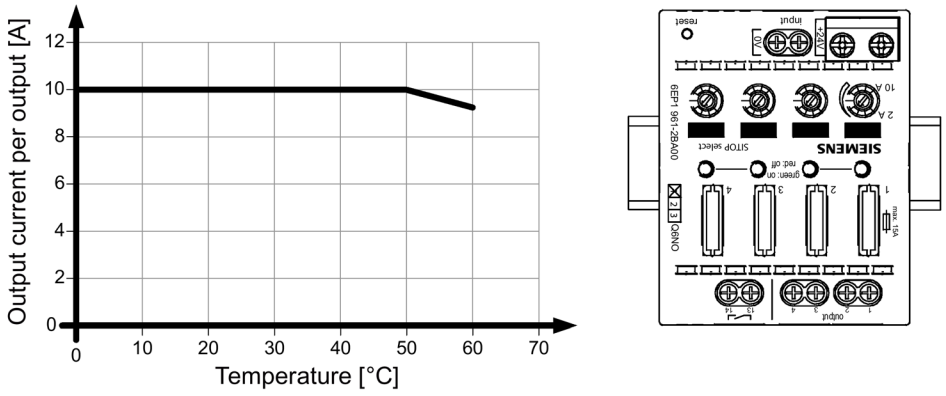


Figure 4-7 Mounting position (3)

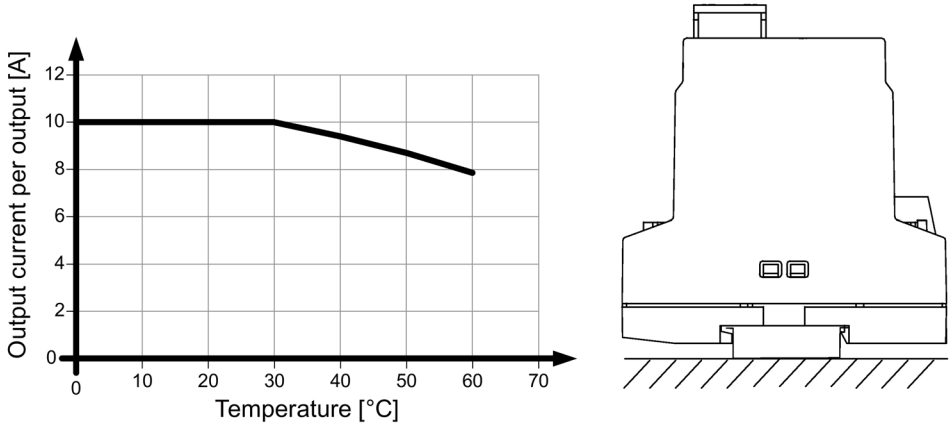


Figure 4-8 Mounting position (4)

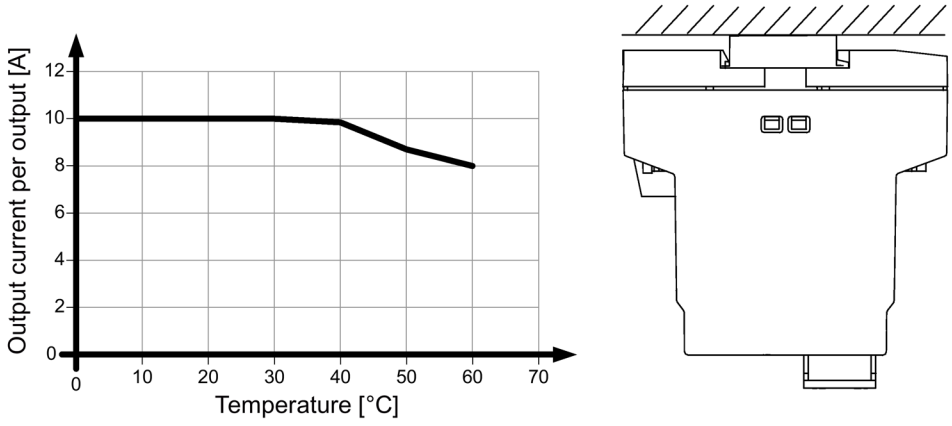


Figure 4-9 Mounting position (5)

4.2.2 6EP1961-2BA11 and 6EP1961-2BA31

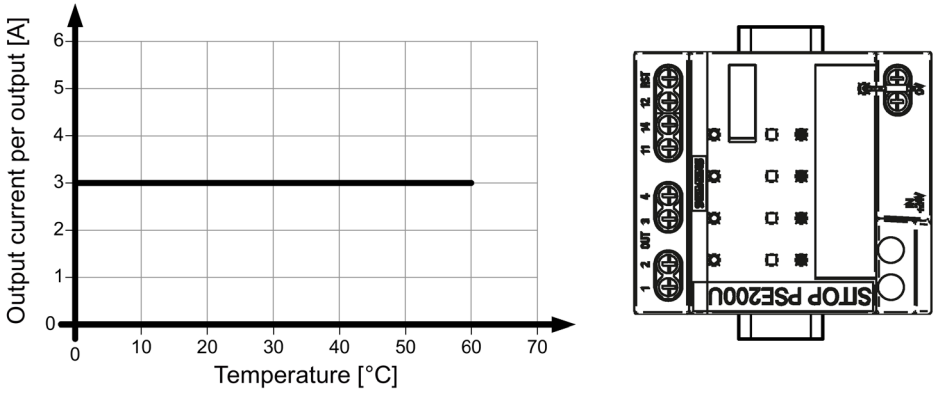


Figure 4-10 Mounting position (1)

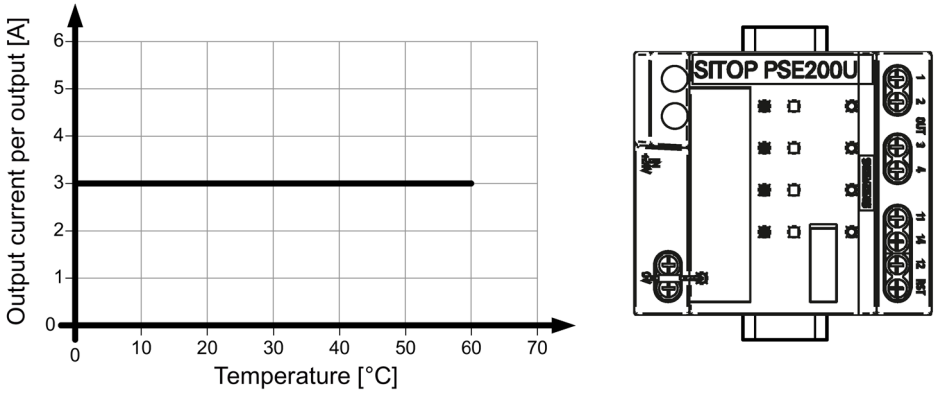


Figure 4-11 Mounting position (2)

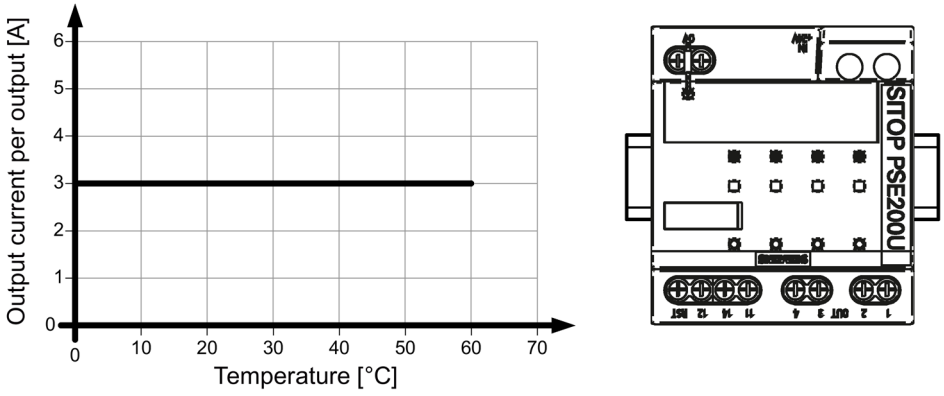


Figure 4-12 Mounting position (3)

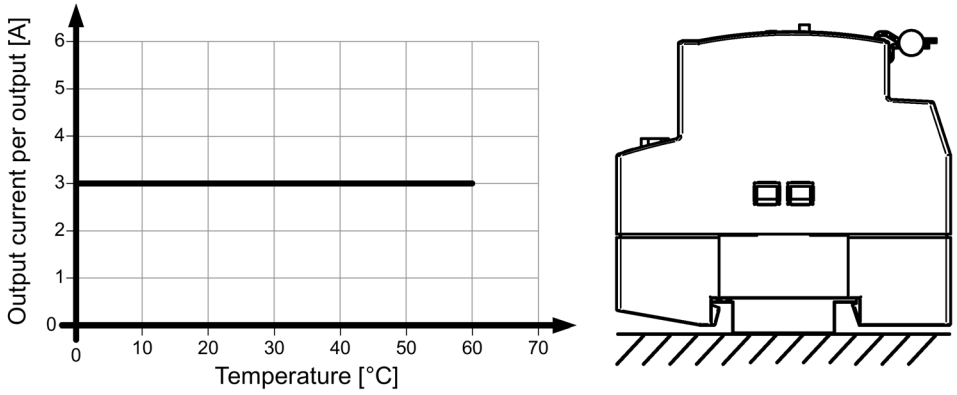


Figure 4-13 Mounting position (4)

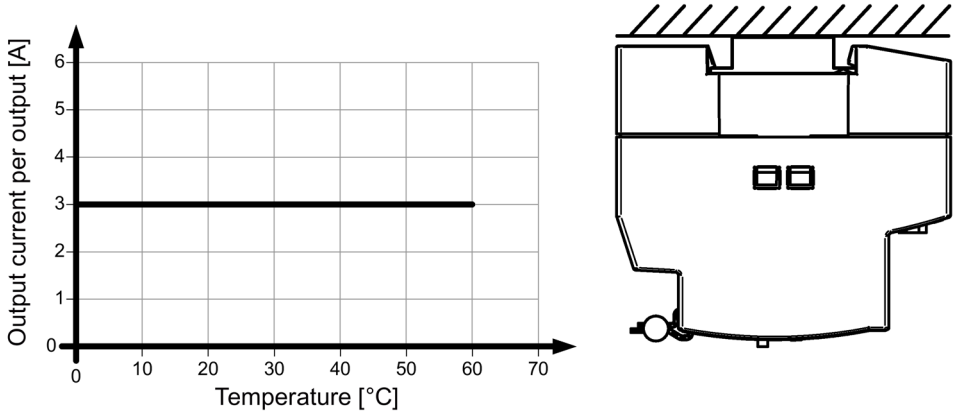


Figure 4-14 Mounting position (5)

4.2.3 6EP1961-2BA21 and 6EP1961-2BA41

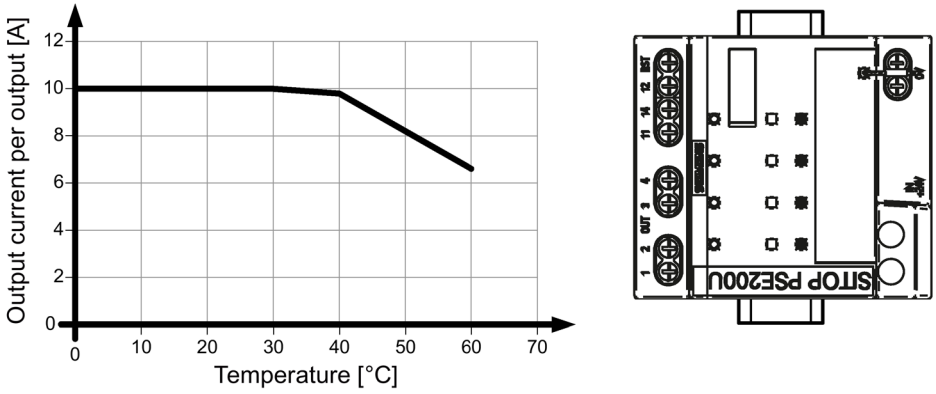


Figure 4-15 Mounting position (1)

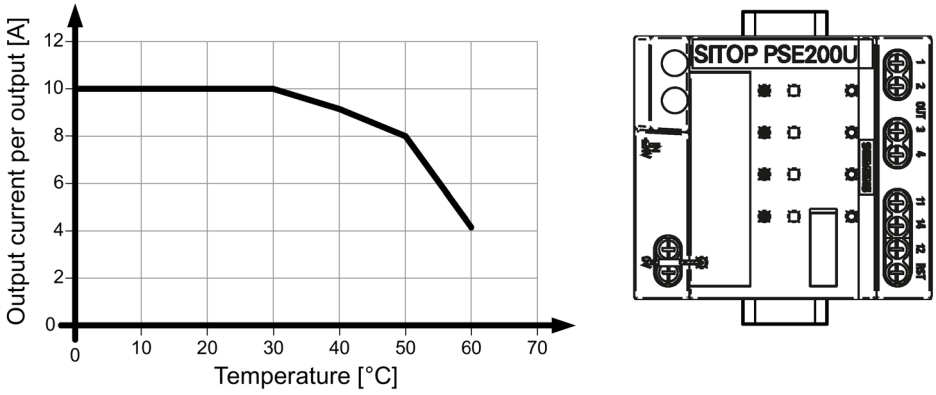


Figure 4-16 Mounting position (2)

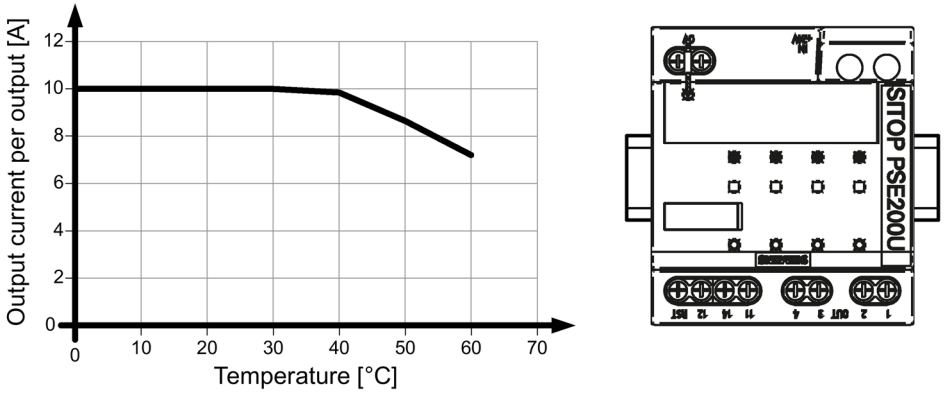


Figure 4-17 Mounting position (3)

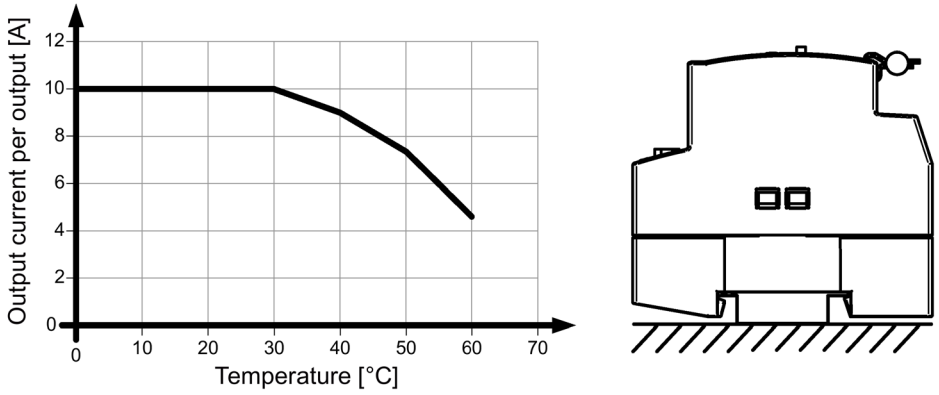


Figure 4-18 Mounting position (4)

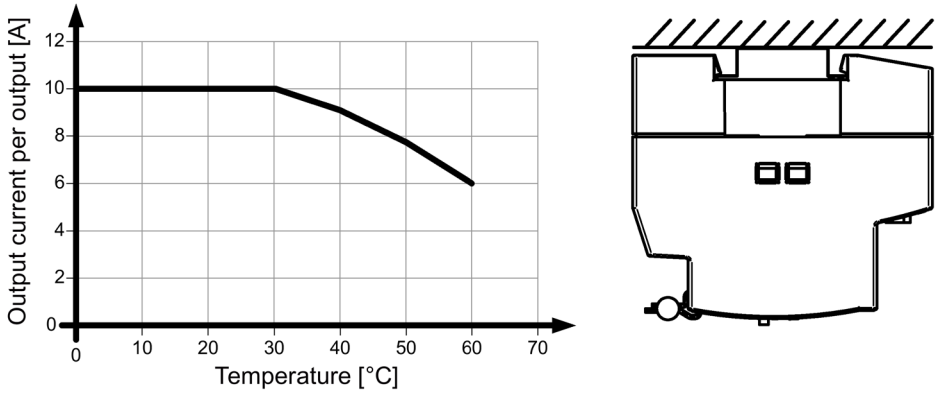


Figure 4-19 Mounting position (5)

Installation

5

WARNING

Hazard due to electric shock

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.

5.1 Input side connection

WARNING

The device is only suitable for operation with **24 V DC voltages** (safety extra low voltage). Directly connecting this device to 110 V, 230 V or 400 V line supplies – or line supplies with higher voltages – can therefore result in death or severe injury as well as significant levels of material 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.

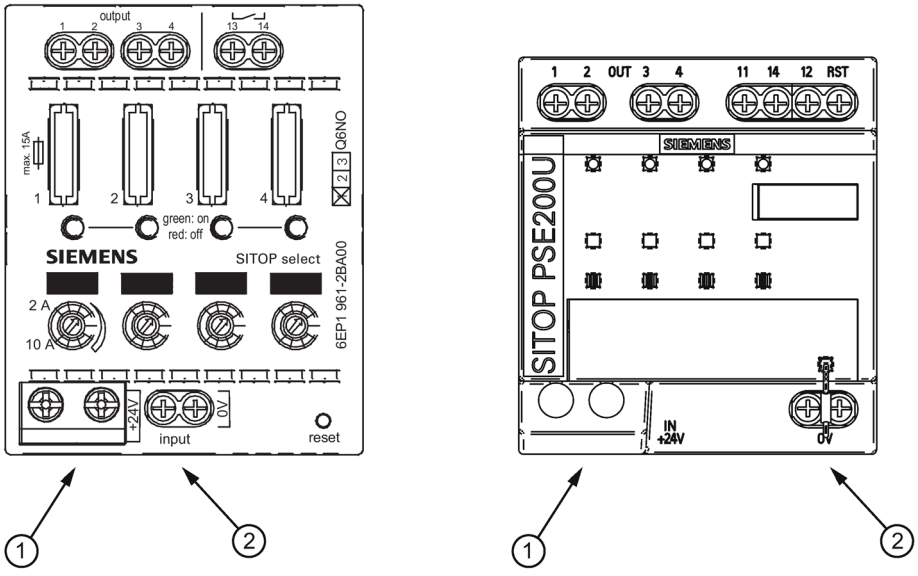


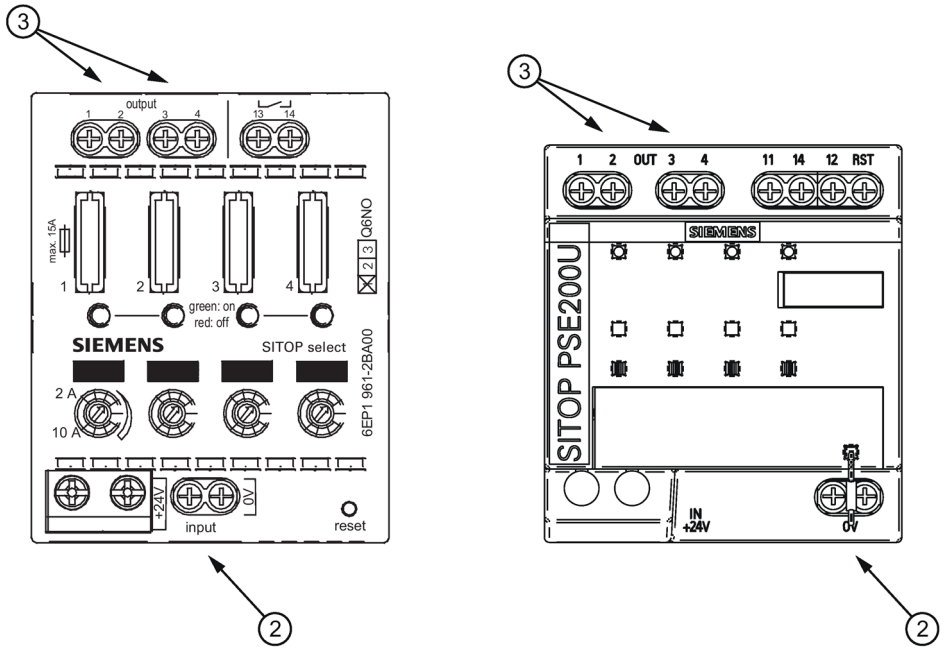
Figure 5-1 Input connection

The power supply is connected using input terminal ① with the designation "24 V" and the 0 V terminal ② with the designation "0 V"; the "0 V" connection is not for the load supply, but is only to supply the internal electronics of the selectivity module (terminal cross-sections, see Chapter Figure 2-2 Terminal data (Page 11)).

NOTICE
Overload of the wiring The "0 V" connection is only used to supply the internal electronics of the selectivity module. The 0 V of the connected loads must be routed directly to the power supply using separate cables!

5.2 Output-side connection

(see Chapter Technical data (Page 45))



③ +24 V output

Figure 5-2 Output connection

The load to be supplied is connected through output terminals ③ labeled OUT 1, 2, 3, 4. (terminal cross-sections, see Figure 2-2 Terminal data (Page 11)).

Note

The 0 V of the loads must be routed directly to the power supply using separate cables!

Technical data

6

Note

Technical data is applicable for a rated input voltage, rated load and +25° C ambient temperature (if nothing else is specified).

6.1 Input

	6EP1961-2BA00	6EP1961-2BA11 6EP1961-2BA31	6EP1961-2BA21 6EP1961-2BA41
Input	Regulated DC voltage [1*)]	Regulated DC voltage	Regulated DC voltage
Input voltage DC/rated value	24 V	24 V	24 V
Input voltage range for DC	22 … 30 V	22 … 30 V	22 … 30 V
Overvoltage strength	35 V; 100 ms	35 V	35 V
Input current at the rated input voltage 24 V/rated value	40 A	12 A	40 A

[1*)] SITOP select (6EP1961-2BA00) cannot be operated with the DC-UPS module 40 A (6EP1931-2FC21/-2FC42).

6.2 Output

	6EP1961-2BA00	6EP1961-2BA11 6EP1961-2BA31	6EP1961-2BA21 6EP1961-2BA41
Output	Regulated DC voltage	Regulated DC voltage	Regulated DC voltage
Output voltage	Ue - approx. 0.3 V	Ue - approx. 0.2 V	Ue - approx. 0.2 V
Total tolerance	Corresponding to the supplying input voltage	Corresponding to the supplying input voltage	Corresponding to the supplying input voltage
Number of outputs	4	4	4
Output current/up to 60°C/each output/rated value	10 A	3 A	10 A
Adjustable response threshold	2 … 10 A	0.5 … 3 A	3 … 10 A

	6EP1961-2BA00	6EP1961-2BA11 6EP1961-2BA31	6EP1961-2BA21 6EP1961-2BA41
Product feature/connecting outputs in parallel	No	No	No
Switching on outputs	All outputs are simultaneously switch on after the supply voltage has ramped up, delay time of 24 ms or 100 ms can be programmed for outputs to be sequentially switched on.	All outputs are simultaneously switched-on after the supply voltage ramps up > 20 V, delay time of 25 ms, 100 ms – or "load optimized" where the outputs are sequentially switched-on, selected using the DIP switch.	

Shutdown characteristics SITOP select:

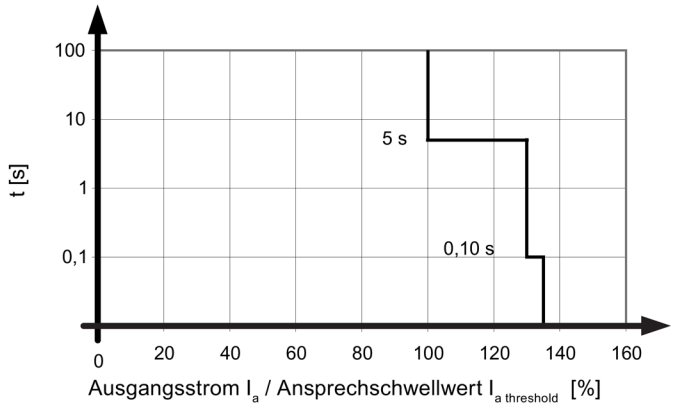


Figure 6-1 Shutdown characteristic SITOP select

- An output current is continuously permissible up to the selected current response threshold.
- In the range 101...129 % of the selected current response threshold, an overload current is permissible for 5 seconds; after this time, the output is electronically shut down.
- In the range > 130 % of the selected current response threshold, the current is limited to 130 %; after approximately 50 ... 100 ms the output is electronically shut down.
- When the output current exceeds the selected current response threshold, and if the supply voltage simultaneously dips below 20 V, then the output is electronically shutdown.

Shutdown characteristics SITOP PSE200U product version 1:

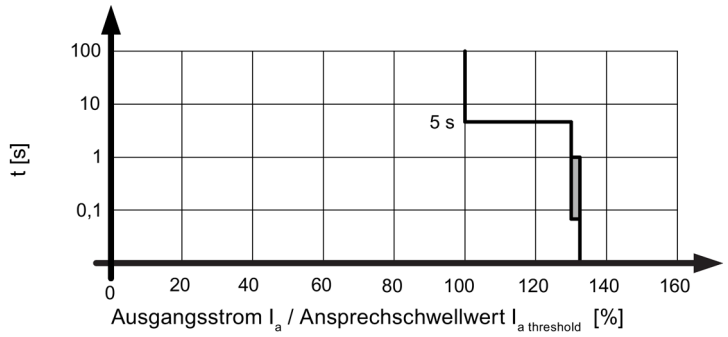


Figure 6-2 Shutdown characteristics SITOP PSE200U (product version 1)

- An output current is continuously permissible up to the selected current response threshold.
- In the range 101...129 % of the selected current response threshold, an overload current is permissible for 5 seconds; after this time, the output is electronically shut down.
- In the range > 130 % of the selected current response threshold, the current is limited to 130 %; at the earliest after 100 ms the output is electronically shut down.
- When the output current exceeds the selected current response threshold, and if the supply voltage simultaneously dips below 20 V, then the output is electronically shutdown.

Shutdown characteristics SITOP PSE200U from product version 2 and higher:

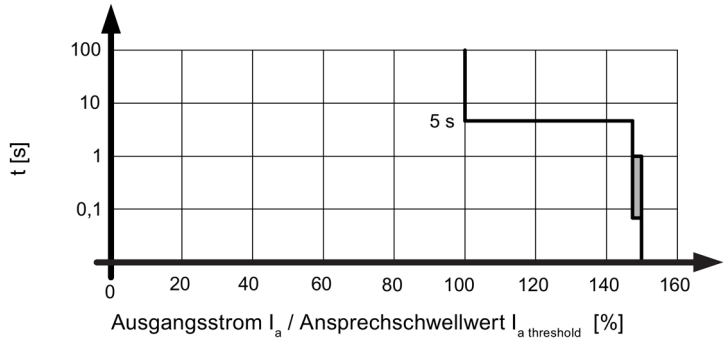


Figure 6-3 Shutdown characteristics SITOP PSE200U (from product version 2 and higher)

- An output current is continuously permissible up to the selected current response threshold.
- In the range 101...149 % of the selected current response threshold, an overload current is permissible for 5 seconds; after this time, the output is electronically shut down.

- In the range > 150 % of the selected current response threshold, the current is limited to 150 %; at the earliest after 100 ms the output is electronically shut down.
- When the output current exceeds the selected current response threshold, and if the supply voltage simultaneously dips below 20 V, then the output is electronically shutdown.

6.3 Efficiency

	6EP1961-2BA00	6EP1961-2BA11 6EP1961-2BA31	6EP1961-2BA21 6EP1961-2BA41
Efficiency at Ua rated, Ia rated, approx.	97 %	97 %	99 %
Power loss at Ua rated, Ia rated, approx.	30 W	9 W	10 W

6.4 Protection and monitoring

	6EP1961-2BA00	6EP1961-2BA11	6EP1961-2BA21	6EP1961-2BA31	6EP1961-2BA41
Device/cable protection	Flat fuse for each output (when supplied, equipped with a 15 A fuse)	Internal fuse 5 A for each output (not accessible)	Internal fuse 15 A for each output (not accessible)	Internal fuse 5 A for each output (not accessible)	Internal fuse 15 A for each output (not accessible)
Operating display	One LED per output: Green LED for "Output switched through", red LED for "Output shutdown due to overcurrent"	One LED per output: Green LED for "Output switched through", orange LED for "Output manually switched off", red LED for "Output shutdown due to overcurrent".			
Signaling	Group signaling contact (NO contact, contact rating 0.5 A/24 V)	Group signaling contact (changeover contact, contact rating 0.1 A/24 V)		Status signal output (pulse position signal that can be evaluated using a Simatic function block)	

6.5 MTBF

	6EP1961-2BA00 6EP1961-2BA11 6EP1961-2BA21 6EP1961-2BA31 6EP1961-2BA41
Mean Time Between Failures	> 500,000 hours at 40 °C, rated load, 24 hour operation

6.6 Mechanical system

	6EP1961-2BA00	6EP1961-2BA11 6EP1961-2BA21	6EP1961-2BA31 6EP1961-2BA41
Connection system	Screw-type terminal	Screw-type terminal	Screw-type terminal
+24 V input	2 screw terminals for 0.5 ... 16 mm²	2 screw terminals for 0.5 ... 16 mm²	2 screw terminals for 0.5 ... 16 mm²
0 V connection	2 screw terminals for 0.2 ... 6 mm²	2 screw terminals for 0.2 ... 6 mm²	2 screw terminals for 0.2 ... 6 mm²
Output 1, 2, 3, 4	One screw-type terminal for each output for 0.2 ... 6 mm²	One screw-type terminal for each output for 0.2 ... 6 mm²	One screw-type terminal for each output for 0.2 ... 6 mm²
Group signal contact	2 screw terminals for 0.2 ... 6 mm²	3 screw terminals for 0.2 ... 6 mm²	-
Status output	-	-	One screw terminal for 0.2 ... 6 mm²
Remote reset	-	One screw terminal for 0.2 ... 6 mm²	One screw terminal for 0.2 ... 6 mm²
Width of the housing	72 mm	72 mm	72 mm
Height of the housing	90 mm	80 mm	80 mm
Depth of the housing	88.7 mm	72 mm	72 mm
Installation width	72 mm	72 mm	72 mm
Mounting height	190 mm	180 mm	180 mm
Weight, approx.	0.4 kg	0.2 kg	0.2 kg
Mounting	Can be snapped onto standard EN 60715 35x7,5/15 mounting rails		

6.7 Dimension drawing

See chapter Dimensions and weight (Page 29)

CAD data that can be downloaded from the Internet:

6EP1961-2BA00
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00575)

6EP1961-2BA11
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00423)

6EP1961-2BA21
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00427)

6EP1961-2BA31
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00742)

6EP1961-2BA41
(http://www.automation.siemens.com/bilddb/index.aspx?objKey=G_KT01_XX_00745)

Safety, approvals, EMC

7

7.1 Safety

	6EP1961-2BA00 6EP1961-2BA11 6EP1961-2BA21 6EP1961-2BA31 6EP1961-2BA41
Standard / for safety	acc. to EN 60950-1 and EN 50178
Protection class	Class III

7.2 Approvals

	6EP1961-2BA00	6EP1961-2BA11 6EP1961-2BA21	6EP1961-2BA31 6EP1961-2BA41
CE marking	Yes	Yes	Yes
Degree of protection (EN 60529)	IP20	IP20	IP20
UL/cUL (CSA) approval	UL-Recognized (UL 2367) File E328600; cULus (UL 508, CSA C22.2 No. 107.1) File E197259; cURus (UL 60950, CSA C22.2 No. 60950) File E151273	UL-Recognized (UL 2367) File E328600; cULus (UL 508, CSA C22.2 No. 107.1) File E197259 The combination of the Listed Siemens AG power supply and solid-state overcurrent protector models 6EP1961, followed by -2BA11 or -2BA31 additionally create a Limited Voltage/Current circuit.	
Explosion protection	ATEX (EX) II 3G Ex nA nC IIC T4 Gc cCSAus Class I, Div. 2, Group ABCD, T4	ATEX (EX) II 3G Ex nA nC IIC T4 Gc cCSAus Class I, Div. 2, Group ABCD, T4	ATEX (EX) II 3G Ex nA IIC T4 Gc cCSAus Class I, Div. 2, Group ABCD, T4
Marine approvals	-	GL, ABS	GL, ABS

7.3 EMC

	6EP1961-2BA00 **6EP1961-2BA11** **6EP1961-2BA21** **6EP1961-2BA31** **6EP1961-2BA41**
Emitted interference	EN 55022 Class B
Noise immunity	EN 61000-6-2

Environmental conditions

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	6EP1961-2BA00 **6EP1961-2BA11** **6EP1961-2BA21** **6EP1961-2BA31** **6EP1961-2BA41**
Ambient temperature	0 ... +60 °C with natural convection
	Tested according to: • EN 60068-2-1 cold • EN 60068-2-2 dry heat • EN 60068-2-78 humid heat, constant • EN 60068-2-14 temperature change
Transport and storage temperature	-40 ... +85° C Tests (packed for shipping) according to: • 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, without condensation
Degree of pollution	2
Mechanical stressing in operation	• Tested according to EN 60068-2-6 vibration, test Fc:
	3.5 mm deflection in the range 5 – 8.4 Hz 2 g acceleration in the range 8.4 – 150 Hz
	• Tested according to EN 60068-2-27 shock, test Ea: acceleration 150 m/s², test duration 11 ms
Damaging gases	Tested according to: • EN 60068-2-42 sulfur dioxide • EN 60068-2-43 hydrogen sulfide
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 4-4 Mounting height derating (Page 34)) Storage: • 1080 ... 660 hPa (-1000 ... +3500 m)

Environment

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The devices are 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.

Service & Support

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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.com/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.com/sitop)

Information material

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

CAx data

2D/3D data and circuit diagram macros can be downloaded from 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)

SITOP Selection Tool

Simply and quickly select the optimum the power supply or DC-UPS:
SITOP Selection Tool (http://www.siemens.com/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.com/automation/partner)
- In Catalog CA 01