MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6EP1456-3BA00

48 V 10 A STABILIZED POWER SUPPLY

Used with the applicable SITOP PSU300M configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens SITOP PSU300M/300B Manual, C98130-A7574-A2-2-7629, November 2014; applicable 48 V/10 A pages.

SIEMENS

SITOP power supply

SITOP PSU300M/300B

Manual

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SITOP PSU300M 24 V/20 A
6EP1436-3BA10
SITOP PSU300M 48 V/10 A
6EP1456-3BA00
SITOP PSU300B 12 V/20 A
6EP1424-3BA00
SITOP PSU300B 24 V/17 A
6EP1436-3BA20
SITOP PSU300B 24 V/30 A
6EP1437-3BA20

11.2014
C98130-A7574-A2-2-7629

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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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.

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C98130-A7574-A2-2-7629
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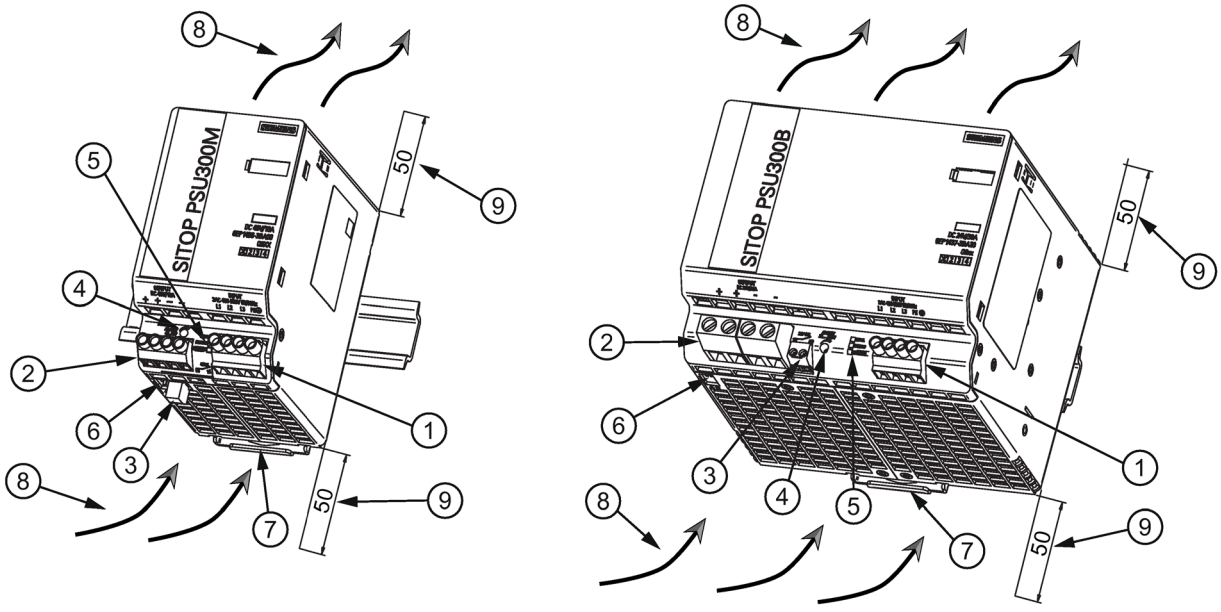
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Description, device design, dimension drawing

2

2.1 Device description

SITOP PSU300M/300B is a primary-clocked power supply for connection to a 3-phase AC line supply. An electronically regulated DC voltage that can be set via a potentiometer is available at the output of the device. The output of the device is isolated, no-load proof and short-circuit proof. The LED displays indicate the operating state. The operating state of the device can be processed via the signaling contact. The PSU300B devices are optimized to charge batteries.



① Line input
② DC output
③ Signaling contacts
④ Potentiometer 12 ... 14 V, 24 ... 28.8 V, 42 ... 56 V
⑤ Pilot lamps (12/24/48 V OK, OVERLOAD, SHUT DOWN)
⑥ Selector switch
⑦ DIN rail slider
⑧ Convection
⑨ Clearance above/below

Figure 2-1 Design

2.2 Connections and terminal designation

The line input terminals ① can be used to establish the connection to the supply voltage. The output terminals ② are used to connect to the loads to be supplied (see also Section Installation (Page 35)).

Connections and terminal designations	
① Line input L1, L2, L3, PE	One screw terminal each
② output "+"	2 screw terminals
② output "–"	2 screw terminals
③ signaling contacts 13, 14	One screw terminal each

	① + ②	③	④
	SZS 0,6 x 3,5 / PZ1 / PH1	SZS 0,6 x 3,5	SZS 0,6 x 3 / PZ1 / PH1 max. ∅ 3,5 mm
	1 x 0,2 - 6 mm^2	1 x 0,14 - 1,5 mm^2	-
	1 x 0,2 - 4 mm^2	1 x 0,14 - 1,5 mm^2	-
AWG	26 - 10	28 - 16	-
Nm	0,5 - 0,6 Nm	0,22 Nm	0,04 Nm *1)
	8 mm	7 mm	-

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

Figure 2-2 Terminal data for 6EP1436-3BA10, 6EP1456-3BA00, 6EP1424-3BA00, 6EP1436-3BA20

	①	②	③	④
	SZS 0,6 x 3,5 / PZ1 / PH1	SZS 1,0 x 5,5	SZS 0,6 x 3,5	SZS 0,4 x 2,5 / max. ∅ 3,5 mm
	1 x 0,2 - 6 mm^2	1 x 0,5 - 16 mm^2	1 x 0,14 - 4,0 mm^2	-
	1 x 0,2 - 4 mm^2	1 x 0,5 - 10 mm^2	1 x 0,14 - 2,5 mm^2	-
AWG	26 - 10	26 - 6	22 - 12	-
Nm	0,5 - 0,6 Nm	1,2 - 1,5 Nm	0,5 - 0,6 Nm	0,04 Nm *1)
	8 mm	12 mm	7 mm	-

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

Figure 2-3 Terminal data for 6EP1437-3BA20

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 12 V, 24 V or 48 V in the factory, and can be adjusted in the range 12 ... 14 V, 24 ... 28.8 V or 42 ... 56 V; for example, to compensate voltage drops across long supply lines to the connected load.

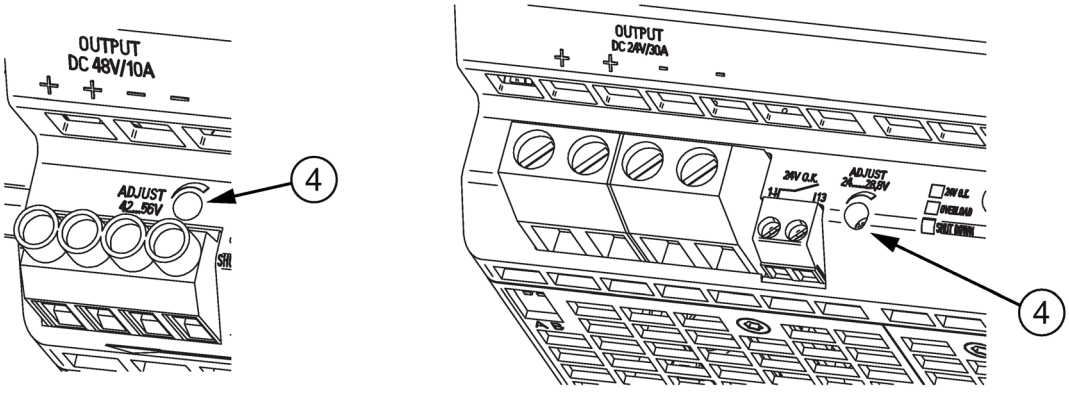


Figure 2-4 Potentiometer (example 6EP1456-3BA00 / 6EP1437-3BA20)

NOTICE
Thermal overload possible When adjusting the output voltage to >24 V (>48 V), the output current must be derated by 4 %/V or the permissible ambient temperature must be taken into account with 3 K/V (applies to PSU300M devices).

Note

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

For notes on actuating the potentiometer (screwdriver, torque), see Figure 2-2 Terminal data for 6EP1436-3BA10, 6EP1456-3BA00, 6EP1424-3BA00, 6EP1436-3BA20 (Page 10) and Figure 2-3 Terminal data for 6EP1437-3BA20 (Page 10).

2.4 Status displays and signaling

	6EP1436-3BA10 (24 V / 20 A)	6EP1456-3BA00 (48 V/10 A)
Operating display	LED green for "24 V O.K." Yellow LED for "overload" Red LED for "latching shutdown"	LED green for "48 V O.K." Yellow LED for "overload" Red LED for "latching shutdown"
Signaling contact	Relay contact (NO contact, rating 60 V DC / 0.3 A) for "24 V O.K."	Relay contact (NO contact, rating 60 V DC / 0.3 A) for "48 V O.K."

	6EP1424-3BA00 (12 V/20 A)	6EP1436-3BA20 (24 V/17 A) 6EP1437-3BA20 (24 V / 30 A)
Operating display	LED green for "12 V O.K." Yellow LED for "overload" Red LED for "latching shutdown"	LED green for "24 V O.K." Yellow LED for "overload" Red LED for "latching shutdown"
Signaling contact	Relay contact (NO contact, rating 60 V DC / 0.3 A) for "12 V O.K."	Relay contact (NO contact, rating 60 V DC / 0.3 A) for "24 V O.K."

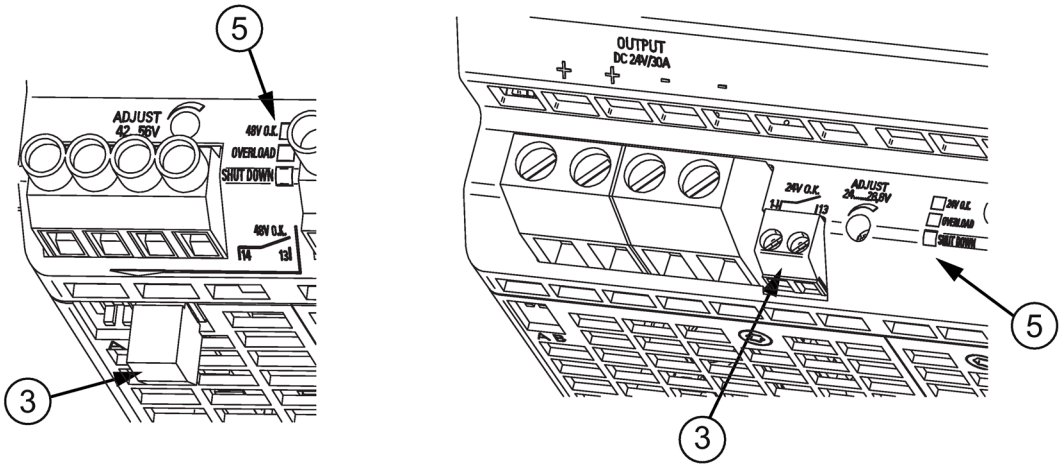


Figure 2-5 Operating display and signaling (example 6EP1456-3BA00 / 6EP1437-3BA20)

Signaling	6EP1436-3BA10 (24 V / 20 A)	6EP1456-3BA00 (48 V/10 A)
Green LED ⑤ lit Signaling contact ③, contacts 13-14 closed	Normal operation, output voltage > 20.5 V	Normal operation, output voltage > 41 V
LED ⑤ off Signaling contact ③, contacts 13-14 open (quiescent position)	No supply voltage	No supply voltage

2.5 Change-over switch

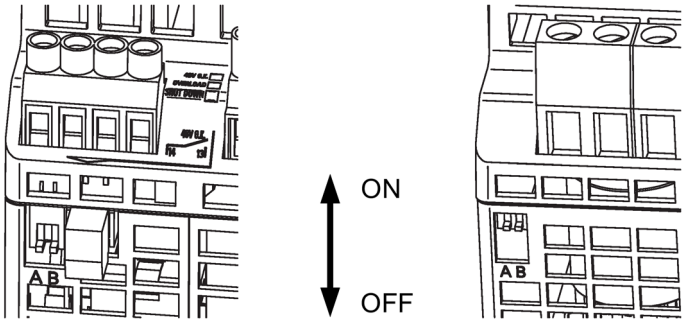


Figure 2-6 Selector switch (example 6EP1456-3BA00 / 6EP1437-3BA20)

The two switches A and B are used to influence the output characteristic curve:

Switch	ON	OFF
A influences the output characteristic in the load range	**Parallel operation:** 'Soft' characteristic curve (see, e.g. Figure 6-8 6EP1436-3BA10 parallel operation output characteristic curve (Page 46)) for the parallel operation of two or more devices: The output voltage falls with increasing output current (namely, also for the overcurrent pulse!). This means that for full output current the highest output voltage can normally no longer be attained.	**Single operation:** *Delivery state* 'Hard' characteristic curve (see, e.g. Figure 6-3 6EP1436-3BA10 single operation output characteristic curve (Page 44)) for normal operation (single operation): The output voltage is independent of the output current.
B influences the output characteristic in the overload range	**Latching shutdown:** If the output current rises above the rated value and above the current limit, the device reduces the output voltage (see, e.g. Figure 6-13 6EP1436-3BA10 latching shutdown output characteristic curve (Page 48)). If the output voltage falls below (10 V), (20 V), (40 V), the device shuts down latching, the red LED lights. This limit voltage of (10 V), (20 V), (40 V) is independent of the set output voltage. The 'Short-time overload current' feature is not available in this operating mode. In order to also be able to charge large capacitances in this operating mode at the output, non-latching shutdown is performed during the first ten seconds after power on. During these first 10 s, the device responds for overload as if the switch is OFF.	**Constant current:** *Delivery state* If the output current rises above the rated value and above the current limit, the device reduces the output voltage. The yellow LED lights if the output voltage falls below (10 V), (20 V), (40 V).

Delivery state: A-OFF; B-OFF

2.7 Dimensions and weight

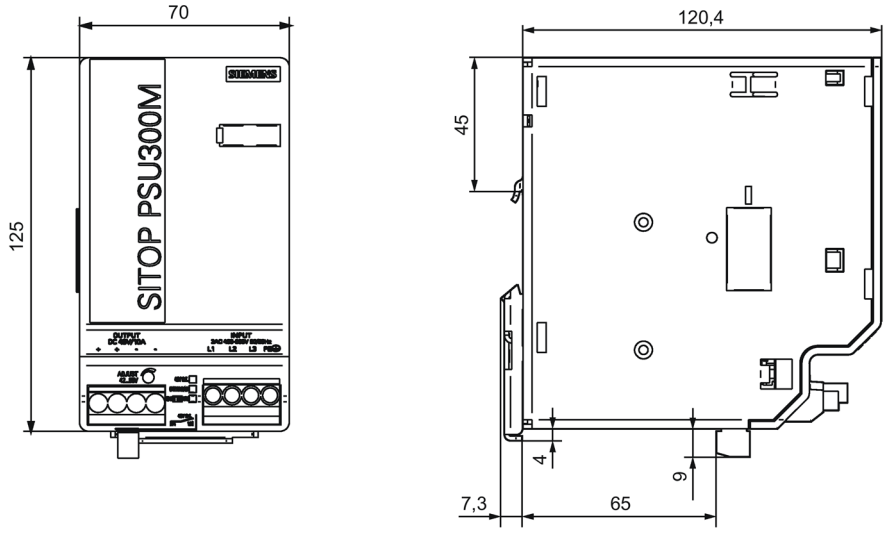


Figure 2-8 6EP1424-3BA00, 6EP1436-3BA20, 6EP1436-3BA10, 6EP1456-3BA00 dimensioned drawing

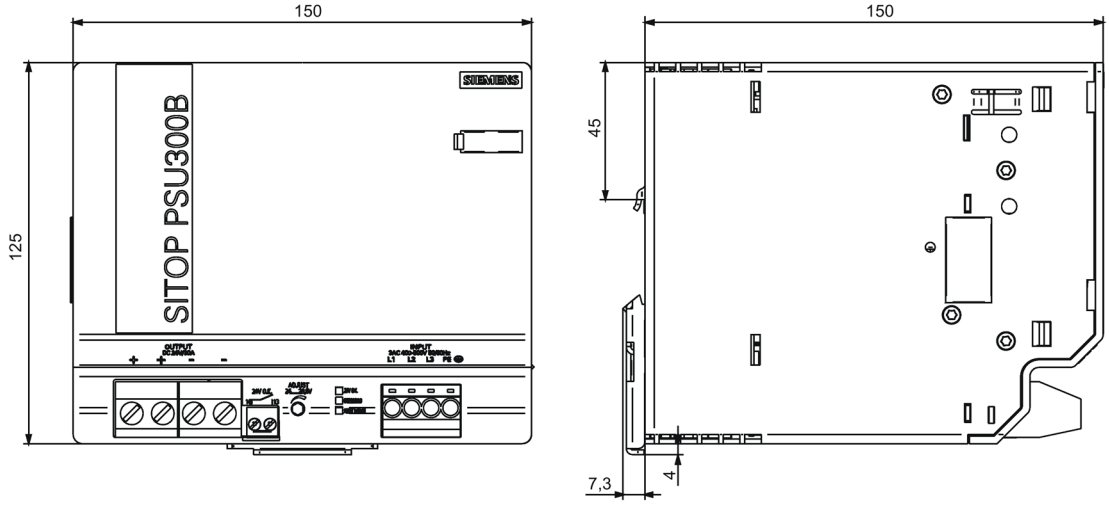


Figure 2-9 Dimension drawing 6EP1437-3BA20

	6EP1424-3BA00 (12 V / 20 A) **6EP1436-3BA20 (24 V / 17 A)** **6EP1436-3BA10 (24 V / 20 A)** **6EP1456-3BA00 (48 V / 10 A)**	**6EP1437-3BA20 (24 V / 30 A)**
Dimensions (W × H × D) in mm	70 × 125 × 125	150 × 125 × 150
Weight	approx. 1.2 kg	approx. 3.4 kg

Mounting/disassembly

3

⚠ WARNING

Installing the device in a housing or a control cabinet

The SITOP PSU300M/300B power supply is a built-in device. It must be installed in a housing or control cabinet, to which only qualified personnel have access.

The device can be mounted in a control cabinet on standard mounting rails according to EN 60715.

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 at the same time, as described under "Removal".

Removal

To remove, pull up the slider ① using a screwdriver ② 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.

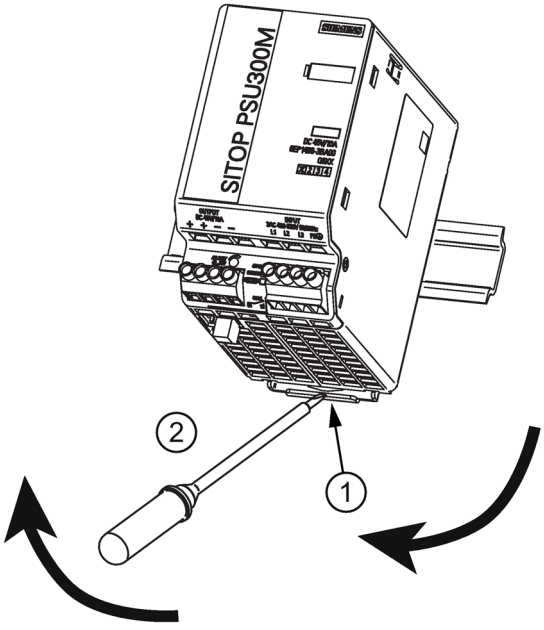


Figure 3-1 Mounting/removal (example 6EP1456-3BA00)

Mounting position, mounting clearances

4

4.1 Standard mounting position

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

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

No space is required at the side.

Output current as a function of the ambient temperature and mounting height

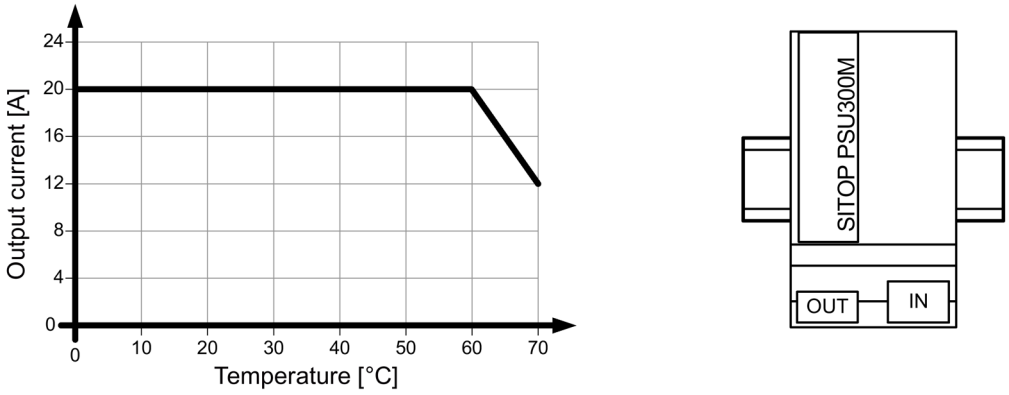


Figure 4-1 6EP1436-3BA10: Output current in the standard mounting position

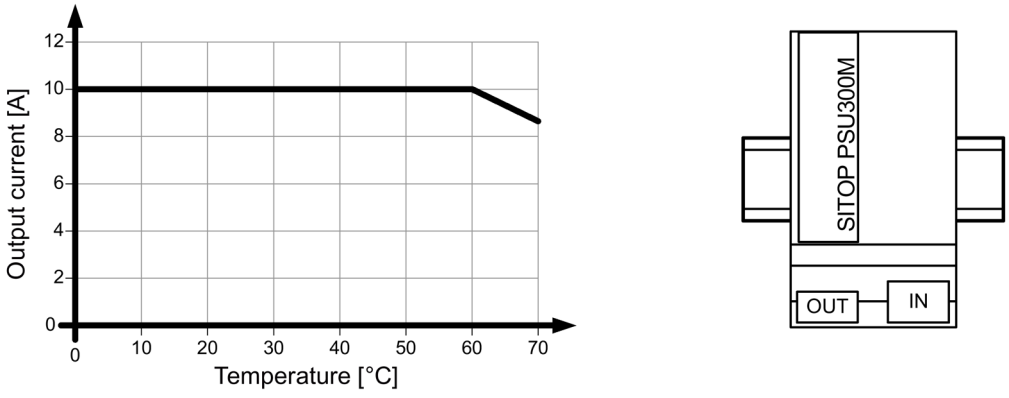


Figure 4-2 6EP1456-3BA00: Output current in the standard mounting position

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 Line-side connection

The SITOP PSU300M/300B power supply is designed for connection to a 3-phase AC line supply (TN or TT system according to VDE 0100 T 300/IEC 364-3) with a rated voltage of 3-phase 400-500 V AC, 50/-60 Hz, IT system with rated voltages 3-phase 400-480 V AC.

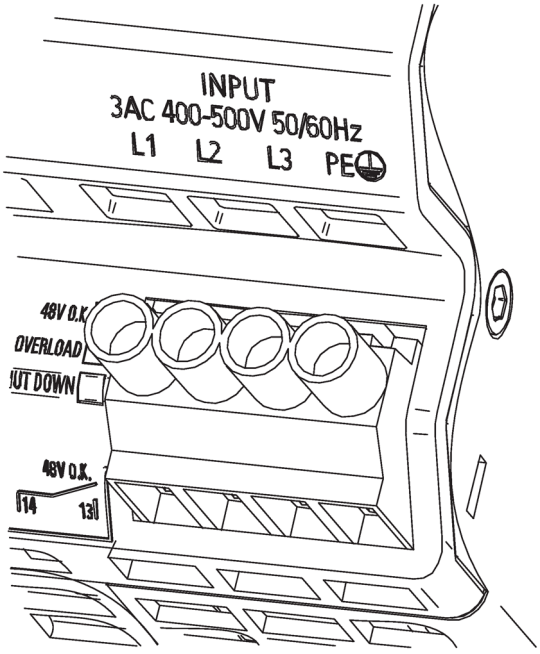


Figure 5-1 Line connection (example: 6EP1456-3BA00)

The line supply is connected using terminals L1, L2, L3 and PE (see Figure 5-1 Line connection (example: 6EP1456-3BA00) (Page 35)), 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 applies for the complete line supply protected by the ground-fault circuit interrupter.

5.2 Output-side connection

At its output, the SITOP PSU300M/300B power supply provides an isolated (= non-grounded) SELV output voltage (Safety Extra Low Voltage). The output of the power supply is no-load, overload, and short-circuit proof. If an overload occurs, the electronic current limiting function limits the output current to a maximum value (see Section Technical data (Page 39)).

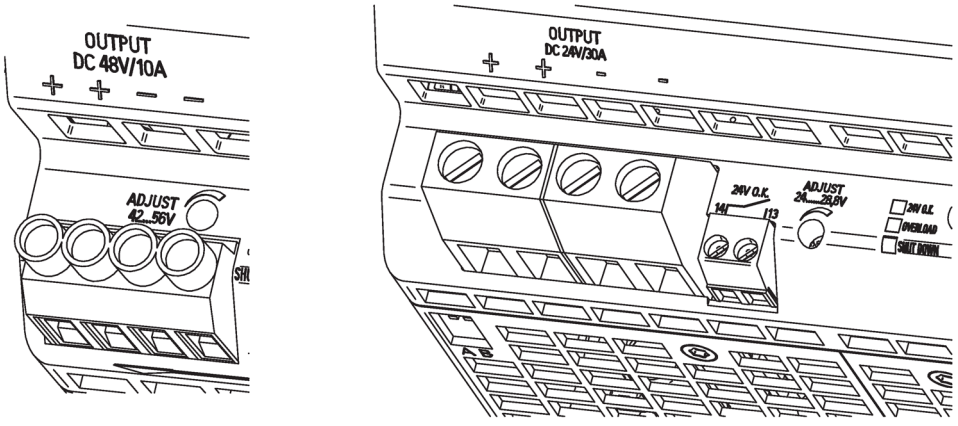


Figure 5-2 Output connection (example 6EP1456-3BA00 / 6EP1437-3BA20)

The output voltage is connected via the + and - terminals at the output of the power supply (see Figure 5-2 Output connection (example 6EP1456-3BA00 / 6EP1437-3BA20) (Page 37)). Ensure that the output cables are dimensioned correctly for the maximum output current rms value and fused accordingly.

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.

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

	6EP1436-3BA10 (24 V / 20 A)	6EP1456-3BA00 (48 V / 10 A)
Input	3-phase, AC	3-phase, AC
Rated voltage value Ue rated	400-500 V	400-500 V
Voltage range	320 ... 575 V	320 ... 575 V
• Remark	Derating at Ue < 340 V: 10% [Ia]	No derating
Wide-range input	Yes	Yes
Overvoltage strength	2.3 × Ue rated, 1.3 ms	2.3 × Ue rated, 1.3 ms
Power failure buffering at Ia rated, min	15 ms	15 ms
• Remark: at Ue = 400 V		
Rated line frequency	50-60 Hz	50-60 Hz
Line frequency range	47 ... 63 Hz	47 ... 63 Hz
Input current / at rated value of input voltage 400 V	1.2 A	1.2 A
Input current / at rated value of input voltage 500 V	1 A	1 A
Inrush current limiting (+25° C), max.	18 A	18 A
I^2t, max	0.8 A^2s	0.8 A^2s
Integrated input fuse	None	None
Protection in the line feeder cable (IEC 898)	Required: 3-pole, coupled miniature circuit breaker 6 ... 16 A characteristic C or circuit breaker 3RV2011-1DA10 (setting 3 A) or 3RV2711-1DD10 (UL 489)	

6.2 Output

	6EP1436-3BA10 (24 V/20 A)	6EP1456-3BA00 (48 V/10 A)
Output	Regulated, isolated DC voltage	Regulated, isolated DC voltage
Rated voltage value Ua rated DC	24 V	48 V
Total tolerance, static ±	3 %	3 %
Static line regulation, approx.	0,1 %	0,1 %
Static load regulation, approx.	0,2 %	0,2 %
Residual ripple in the load range peak-peak, max.	100 mV	100 mV
Spikes peak-peak, max. (bandwidth, approx. 20 MHz)	200 mV	200 mV
Adjustment range	24 … 28.8 V	42 … 56 V
• Remark	Derating, see Section Potentiometer (Page 11)	Derating, see Section Potentiometer (Page 11)
Product function / output voltage can be adjusted	Yes	Yes
Output voltage setting	Via potentiometer	Via potentiometer
• Remark	Max. 480 W	Max. 480 W
Operating display	LED green for "24 V O.K."	LED green for "48 V O.K."
Signaling	Relay contact (NO contact, rating 60 V DC / 0.3 A) for "24 V O.K."	Relay contact (NO contact, rating 60 V DC / 0.3 A) for "48 V O.K."
Response when switching on/off	No overshoot of Ua (Soft-Start)	No overshoot of Ua (Soft-Start)
Starting delay, max.	2.5 s	2.5 s
Voltage rise, typ.	150 ms	150 ms
Voltage rise time of the output voltage, maximum	500 ms	500 ms
Rated current value Ia rated	20 A	10 A
Current range	0 … 20 A	0 … 10 A
• Remark	14 A to +70° C	7 A to +70° C
Output active power / typical	480 W	480 W
Constant overload current / for a short circuit when powering up / typical	23 A	11 A
Short-time overload current / for a short circuit during operation, typical	60 A	23 A
Duration of the current overload capability / for a short circuit during operation	25 ms	25 ms
Can be connected in parallel to increase the power rating	Yes	Yes
• Remark	Switchable characteristic curve (see Figure 2-6 Selector switch (example 6EP1456-3BA00 / 6EP1437-3BA20) (Page 15))	Switchable characteristic curve (see Figure 2-6 Selector switch (example 6EP1456-3BA00 / 6EP1437-3BA20) (Page 15))

	6EP1436-3BA10 (24 V/20 A)	6EP1456-3BA00 (48 V/10 A)
Number of units connected in parallel to increase the power rating, units	2	2
Output characteristic	See Figure 6-3 6EP1436-3BA10 single operation output characteristic curve (Page 44)	See Figure 6-4 6EP1456-3BA00 single operation output characteristic curve (Page 44)

	6EP1424-3BA00 (12 V / 20 A)	6EP1436-3BA20 (24 V / 17 A)	6EP1437-3BA20 (24 V / 30 A)
Output	Regulated, isolated DC voltage	Regulated, isolated DC voltage	Regulated, isolated DC voltage
Rated voltage value Ua rated DC	12 V	24 V	24 V
Total tolerance, static ±	3 %	3 %	3 %
Static line regulation, approx.	2 %	0,1 %	0,1 %
Static load regulation, approx.	4 %	0,2 %	0,1 %
Residual ripple in the load range peak-peak, max.	100 mV	100 mV	100 mV
Spikes peak-peak, max. (bandwidth, approx. 20 MHz)	200 mV	200 mV	200 mV
Adjustment range	12 ... 14 V	24 … 28.8 V	24 … 28.8 V
Product function / output voltage can be adjusted	Yes	Yes	Yes
Output voltage setting	Via potentiometer	Via potentiometer	Via potentiometer
• Remark	-	Max. 480 W	-
Operating display	LED green for "12 V O.K."	LED green for "24 V O.K."	LED green for "24 V O.K."
Signaling	Relay contact (NO contact, rating 60 V DC / 0.3 A) for "12 V O.K."	Relay contact (NO contact, rating 60 V DC / 0.3 A) for "24 V O.K."	
Response when switching on/off	No overshoot of Ua (Soft-Start)	No overshoot of Ua (Soft-Start)	No overshoot of Ua (Soft-Start)
Starting delay, max.	2.5 s	2.5 s	2.5 s
Voltage rise, typ.	20 ms	40 ms	20 ms
Voltage rise time of the output voltage, maximum	500 ms	500 ms	500 ms
Rated current value Ia rated	20 A	20 A	30 A
Current range	0 … 20 A	0 … 17 A	0 … 30 A
• Remark	20 A to +70° C	14 A to +70 °C	25 A to +70° C
Output active power / typical	240 W	408 W	720 W
Constant overload current for a short-circuit when powering up, typical	22 A	19 A	32 A

6.5 Protection and monitoring

	6EP1436-3BA10 (24 V/20 A)	6EP1456-3BA00 (48 V/10 A)
Output overvoltage protection	< 35 V	Yes, according to EN 60950
Current limitation, typ.	23 A	11 A
Property of the output / short-circuit proof	Yes	Yes
Short-circuit protection	Optional constant current characteristic approx. 23 A or "latching shutdown"	Optional constant current characteristic approx. 11 A or "latching shutdown"
Continuous short-circuit current / rms value / typical	23 A	11 A
• Remark	Overload capability 150% Ia rated up to 5 s/min	Overload capability 150% Ia rated up to 5 s/min
Overload/short-circuit indicator	Yellow LED for "overload", red LED for "latching shutdown"	Yellow LED for "overload", red LED for "latching shutdown"

	6EP1424-3BA00 (12 V / 20 A)	6EP1436-3BA20 (24 V / 17 A)	6EP1437-3BA20 (24 V / 30 A)
Output overvoltage protection	< 35 V	< 35 V	< 35 V
Current limitation, typ.	22 A	19 A	32 A
Property of the output / short-circuit proof	Yes	Yes	Yes
Short-circuit protection	Optional constant current characteristic approx. 22 A or "latching shutdown"	Optional constant current characteristic approx. 19 A or "latching shutdown"	Optional constant current characteristic approx. 32 A or "latching shutdown"
Continuous short-circuit current / rms value / typical	22 A	19 A	32 A
• Remark	Overload capability 150% Ia rated up to 5 s/min	-	-
Overload / short-circuit display	Yellow LED for "overload", red LED for "latching shutdown"	Yellow LED for "overload", red LED for "latching shutdown"	Yellow LED for "overload", red LED for "latching shutdown"

6.6 MTBF

	6EP1436-3BA10 (24 V/20 A) 6EP1456-3BA00 (48 V/10 A) 6EP1424-3BA00 (12 V/20 A) 6EP1436-3BA20 (24 V/17 A) 6EP1437-3BA20 (24 V / 30 A)
Mean Time Between Failures	SN29500: > 500,000 hours (typ. 700,000 hours) at 40 °C, rated load, 24-hour operation

6.7 Mechanical system

	6EP1436-3BA10 (24 V/20 A)	6EP1456-3BA00 (48 V/10 A)
Connection system	Screw-type terminal	Screw-type terminal
Connections / line supply	L1, L2, L3, PE: 1 screw terminal each for 0.2 ... 6 (4) mm² solid (finely stranded)	L1, L2, L3, PE: 1 screw terminal each for 0.2 ... 6 (4) mm² solid (finely stranded)
Connections / output	+, -: 2 screw terminals each for 0.2 ... 6 (4) mm² solid (finely stranded)	+, -: 2 screw terminals each for 0.2 ... 6 (4) mm² solid (finely stranded)
Connections / auxiliary contacts	13, 14 (signaling contact): 1 screw terminal each for 0.14 ... 1.5 mm² solid (finely stranded)	13, 14 (signaling contact): 1 screw terminal each for 0.14 ... 1.5 mm² solid (finely stranded)
Width of the housing	70 mm	70 mm
Height of the housing	125 mm	125 mm
Depth of the housing	125 mm	125 mm
Mounting width	70 mm	70 mm
Mounting height	225 mm	225 mm
Weight, approx.	1.2 kg	1.2 kg
Product feature of the housing / housing that can be lined up next to one another	Yes	Yes
Type of mounting / panel mounting	No	No
Type of mounting / rail mounting	Yes	Yes
Type of mounting / S7-300 rail mounting	No	No
Mounting	Can be snapped onto standard EN 60715 35x7,5/15 mounting rails	Can be snapped onto standard EN 60715 35x7,5/15 mounting rails