Power Supply SITOP

Catalog KT 10.1 · 2012

SITOP

Answers for industry.

SIEMENS

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Note:
Information on customer-specific power supplies is included on our website under:
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SITOP
Power supply SITOP

Catalog KT 10.1 · 2012

The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. 1108). The certificate is recognized by all IQNet countries.

Supersedes:
Catalog KT 10.1 · 2009

Refer to the Industry Mall for current updates of this catalog:
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The products contained in this catalog can also be found in the Interactive Catalog CA 01 on DVD.
Order No.:
E86060-D4001-A510-D0-7600

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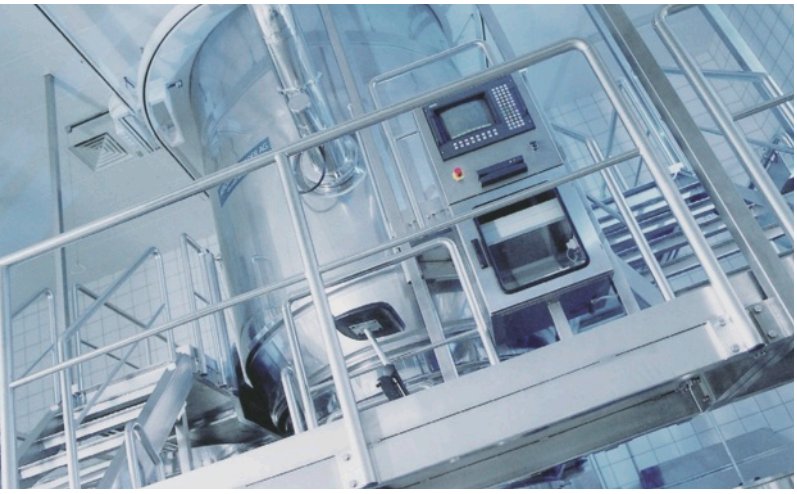
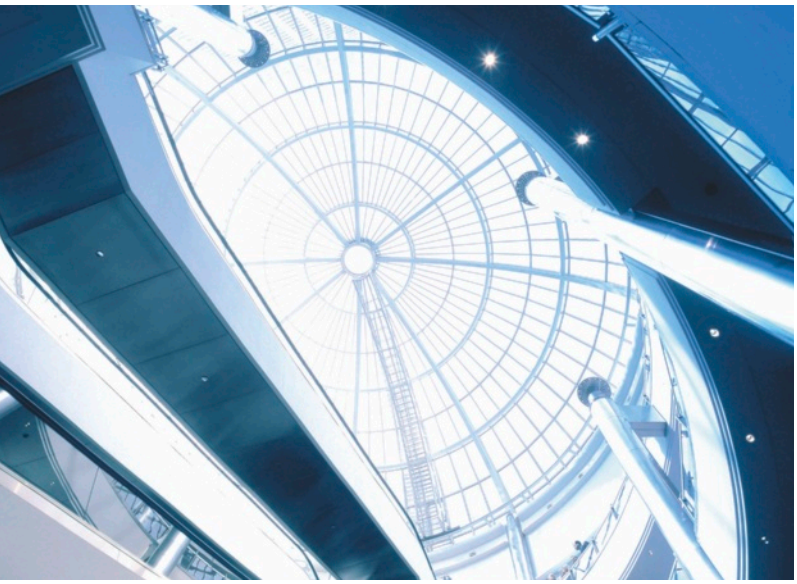
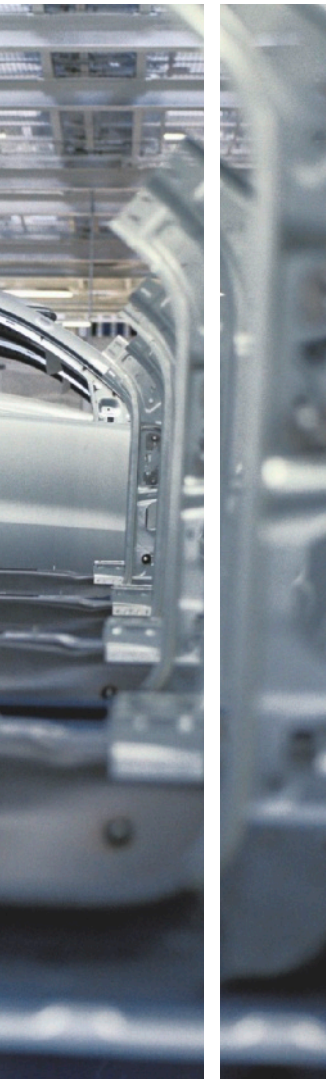






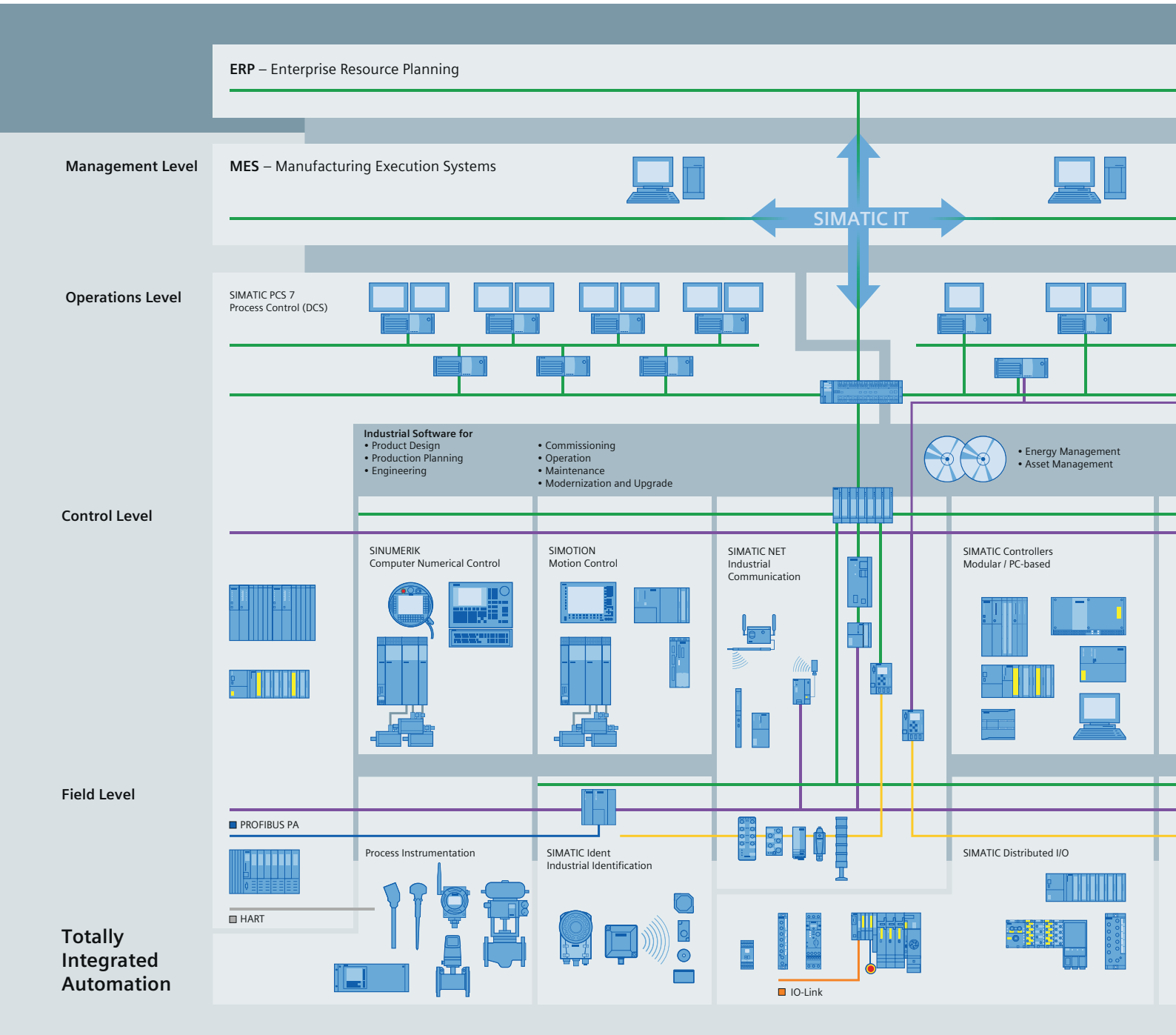
Answers for industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

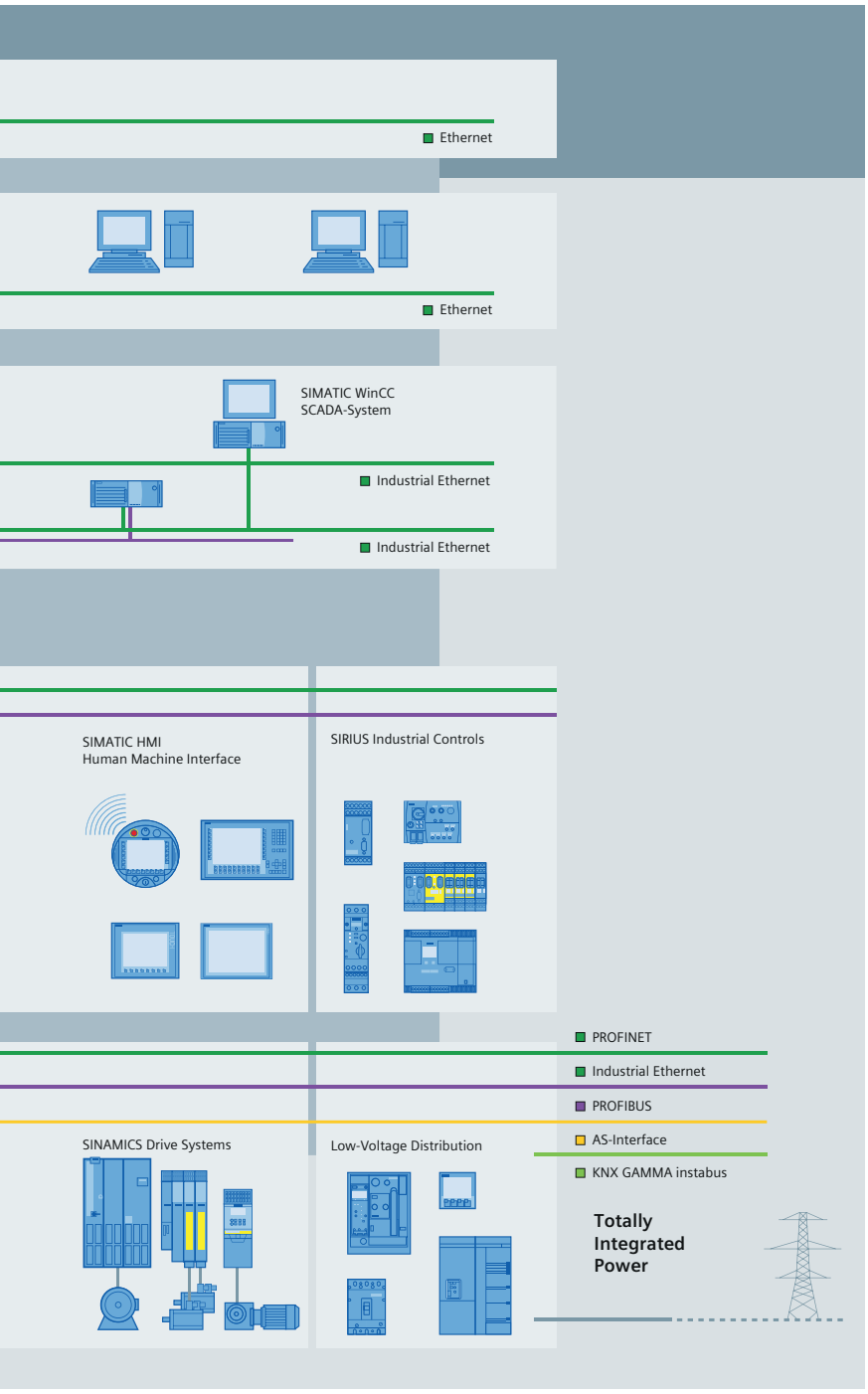
The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60 %.

Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.



Setting standards in productivity and competitiveness.

Totally Integrated Automation.



TIA is characterized by its unique continuity.

It provides maximum transparency at all levels with reduced interfacing requirements – covering the field level, production control level, up to the corporate management level. With TIA you also profit throughout the complete life cycle of your plant – starting with the initial planning steps through operation up to modernization, where we offer a high measure of investment security resulting from continuity in the further development of our products and from reducing the number of interfaces to a minimum.

The unique continuity is already a defined characteristic at the development stage of our products and systems.

The result: maximum interoperability – covering the controller, HMI, drives, up to the process control system. This reduces the complexity of the automation solution in your plant. You will experience this, for example, in the engineering phase of the automation solution in the form of reduced time requirements and cost, or during operation using the continuous diagnostics facilities of Totally Integrated Automation for increasing the availability of your plant.

Thanks to Totally Integrated Automation, Siemens provides an integrated basis for the implementation of customized automation solutions – in all industries from inbound to outbound.

Much more than a catalog. The Industry Mall.

You have a catalog in your hands that will serve you well for selecting and ordering your products. But have you heard of the electronic online catalog (the Industry Mall) and all its benefits? Take a look around it sometime:

www.siemens.com/industrymall

Selecting

Find your products in the structure tree, in the new "Bread-crumb" navigation or with the integral search machine with expert functions. Electronic configurators are also integrated into the Mall. Enter the various characteristic values and the appropriate product will be displayed with the relevant order numbers. You can save configurations, load them and reset them to their initial status.

Ordering

You can load the products that you have selected in this way into the shopping basket at a click of the mouse. You can create your own templates and you will be informed about the availability of the products in your shopping cart. You can load the completed parts lists directly into Excel or Word.

Delivery status

When you have sent the order, you will receive a short e-mail confirmation which you can print out or save. With a click on "Carrier", you will be directly connected to the website of the carrier where you can easily track the delivery status.

Added value due to additional information

So you have found your product and want more information about it? In just a few clicks of the mouse, you will arrive at the image data base, manuals and operating instructions. Create your own user documentation with My Documentation Manager.
Also available are FAQs, software downloads, certificates and technical data sheets as well as our training programs. In the image database you will find, depending on the product, 2D/3D graphics, dimension drawings and exploded drawings, characteristic curves or circuit diagrams which you can download.

Convinced? We look forward to your visit!

SITOP power supplies

The benchmark in reliability, compactness and functionality

Efficient operation of a machine or plant requires a reliable, constant power supply. The quality and reliability of the SITOP stabilized power supplies ensure high levels of safety in DC power supply in industrial engineering and building management systems.

Our extensive selection of SITOP power supplies is enhanced by expansion modules that extensively protect the 24 V power supplies against interference on the primary and secondary side, right up to complete all-round protection.

Energy efficient and usable world-wide

The fan-free power supplies deliver stabilized 24 Volts and are characterized by their compact and rugged design, high overload capability, as well as special energy efficiency. The high efficiency across the entire load range and the low no-load loss ensure efficient operation. The large input voltage range and the international approvals mean that use is possible in almost all supply networks worldwide.

Every day, SITOP is used successfully in innumerable practical applications.

Quick selection and fast delivery

With the SITOP Selection Tool - available in the Internet under www.siemens.com/sitop-selection-tool and in the Industry Mall - the suitable power supply can be selected quickly and easily The selected products can be saved or placed into the Mall's shopping cart and then ordered there.

We deliver all SITOP standard products from stock to ensure that you receive the SITOP power supply you selected quickly.

Customized SITOP products

Our standard power supplies cannot, of course, satisfy the requirements of every application. We can design a specific power supply for your application-specific requirements. You benefit from the expertise of large-scale production and gain maximum development security and quality.

Our customer-specific solutions are used today in many sectors of mechanical engineering, in automation technology, vehicle electronics, equipment manufacturing, or in industrial instrumentation technology.

If your are interested, please contact your local Siemens office.

SITOP lite

Low-cost basic power supply

The new range of power supplies is designed for standard requirements in industrial environments and offers all important functions at a favorable price, of course without compromising quality and the proverbial SITOP reliability. The wide-range input with manual switchover supports connection to a wide range of 1-phase supply systems. Thanks to the narrow width, the primary switched-mode regulators require little space on the DIN rail, and the good efficiency results in low thermal losses in the control cabinet. Short-circuit and overload protection as well as UL approval for export ensure problem-free use.

Its essential characteristics are

- 24 V/2.5 A, 5 A and 10 A for industrial applications with standard requirements
- 1-phase wide-range input with manual switchover
- Narrow mounting width
- High degree of efficiency
- Green LED for "24 V OK"
- Parallel connection possible
- No lateral installation clearances required
- Ambient temperature range of 0 °C to 60 °C (above 45 °C with derating)
- Cooling through natural convection
- Short-circuit and overload protection
- Certification in accordance with UL

SITOP compact

The slim power supply unit for control boxes

Thanks to the extremely space-saving slim design, the new power supply series for the lower performance range is especially suited to distributed applications in control boxes or in small control cabinets. The switched-mode power supplies are characterized by their low power losses throughout the load range. The losses are extremely low even during idling which predestines them for supplying machines and plants which are frequently in stand-by mode. The SITOP PSU100C power supplies have a wide-range input for AC and DC networks; plug-in terminals facilitate the electrical connection.

Its essential characteristics are

- For 24 V at 0.6 A, 1.3 A, 2.5 A and 4 A and for 12 V at 2 A and 6.5 A
- Small mounting surface thanks to its slim design
- Wide-range input for 85 V to 264 V AC or 110 V to 300 V DC
- High efficiency across the entire load range. Up to 28 % energy savings in comparison with similar devices
- Low energy consumption during no-load operation or stand-by. Energy savings of up to 53 % are possible
- Adjustable output voltage
- Green LED for "Output voltage OK"
- Plug-in terminals
- Temperature range from -20 °C to +70 °C
- Comprehensive certifications, such as ATEX

LOGO!Power

The flat power supply unit for distribution boards

The new miniature power supply units now offer even greater performance in the smallest space: The efficiency has been improved across the entire load range, and the power loss in no-load operation has been cut in half. The wide-range input now also allows operation with direct voltage, the switch-on behavior has been optimized for capacitive loads, and the operating temperature range has been extended to +70 °C. The power supplies with logic module design can be used extremely flexibly in numerous applications – thanks to their flat, stepped profile in distribution boards, for example.

Its essential characteristics are

- 2 performance classes, each with 5 V, 12 V, and 15 V
- 3 performance classes with 24 V
- Flat LOGO! design
- Wide-range input for 85 V to 264 V AC or 110 V to 300 V DC
- Constant current for connection of loads with high inrush current
- Power reserve on starting up through 1.5 times the rated current for capacitive loads
- Adjustable output voltage
- Green LED for "Output voltage OK"
- Temperature range from -20 °C to +70 °C
- Comprehensive certification, e.g. ATEX and GL

SITOP smart

The powerful standard power supply

SITOP smart is the optimum power supply for many 24 V applications, with the new SITOP PSU300S 10 A, 20 A, and 40 A now also for 3-phase networks. Whether 1-phase or 3-phase: They offer compact dimensions, a strong performance, and a favorable price. Despite its compactness it offers an outstanding overload withstand capability.
Thanks to the extra power feature with 1.5 times the rated current for 5 seconds, even large loads can be switched on without any problems. With a continuous rated power of 120 percent, the slim power supply units are among the most reliable of their kind.
Numerous certifications facilitate the universal and global use and permit their use in hazardous areas .

Its essential characteristics are

- 24 V/2.5 A, 5 A, 10 A, 20 A and 40 A for standard applications
- 24 V/10 A wall-mounted for high shock and vibration requirements
- Capable of providing extra power (150 %) for brief operational overloads
- Can be permanently overloaded with 120 % (provided ambient temperature is less than 45 °C)
- No lateral installation clearances required
- Output voltages are adjustable up to 28 V
- PSU300S: With signaling contact „24 V DC OK“
- Comprehensive certification, e.g. GL and ATEX
- Expandable with DC UPS, and extension modules

SITOP power supplies in SIMATIC design

The optimum supply for SIMATIC S7 and more

The original SIMATIC power supplies merge perfectly into the PLC network in terms of their design and functionality. In addition to the following SIMATIC systems, they also supply further loads reliably with 24 V.

Its essential characteristics are

- SIMATIC S7-1200 – The compact PM1207 power module supplies power to the new micro PLCs. The automatic range switchover ensures problem-free connection to 1-phase 120 to 230 V grids.
- SIMATIC S7-200 – This flat power supply unit is also used for low installation depths.
- SIMATIC S7-300 – These innovative power supplies require up to 33 % less space on the S7 rail than the previous PS307. The range switchover to 1-phase 120/230 V AC grids now takes place automatically, thus preventing operator errors. The scope of supply includes the connection comb for the CPU, an optional adapter permits mounting on a DIN rail.
- The SIMATIC ET 200pro – The power supply unit with IP67 is used as electronics/encoder supply and load voltage supply of the new I/O device. With a signaling contact for "24 V OK" and "Overtemperature", as well as a second plug-in connector for input voltage loop-through.

SITOP modular

The technology power supply for demanding solutions

SITOP modular fulfills the highest functionality requirements, e.g. for use in complex plants and machines. The wide-range input allows a connection to almost any electrical power system worldwide and ensures a high degree of safety even if there are large voltage fluctuations. The power boost provides up to three times the rated current for brief periods. In the event of an overload, you have two options: Constant current with automatic restart or latching shutdown.

The innovated power supplies SITOP PSU100M 20 A with 1-phase connection, the SITOP PSU300M 20 and 40 A 3-phase, and the SITOP PSU400M 20 A with a second DC input have even more to offer. Due to their slim design, they are among the most compact units in their performance class. The innovations include the integrated signaling contact for "24 V OK", the extended input range, the high efficiency and 1.5 times the rated current for up to 5 seconds.

Its essential characteristics are

- For demanding applications from 5 to 40 A
- DC/DC converter 24 V/20 A for drive and battery networks
- 48 V/10 A and 20 A enable small cable cross-sections
- Compact metal enclosure
- No lateral installation clearances required
- Wide-range input
- Extra power of 150 % for brief operational overloads
- Power boost of 300 % for tripping protective devices
- Selectable short-circuit response
- A soft characteristic can be selected for parallel connection
- High efficiency
- Operating status on 3 LEDs
- Expandable with SITOP add-on modules and DC UPS

SITOP in special designs, made for special tasks

Well prepared for special tasks and conditions

Whether restricted installation conditions, harsh ambient conditions, or special input or output voltages are concerned: These standard power supply units also fulfill exceptional requirements.
It is the purpose of the new, low cost power supplies PSU100D, which reside in an aluminium housing, to provide you with 12 V and 24 V voltages. The sturdy aluminium housing can be screwed directly to a wall. Or, if the task a t hand is to charge batteries, you can use the SITOP PSU300B which is optimized for battery charging. This PS comes in slim design and 3-phase wide range input.

Its essential characteristics are

- PSU100D – cost-effective power supplies up to 300 W, for direct wall mounting, in many orientations.
- SITOP flat design – with flat metal housing, suitable for DIN rail mounting.
- SITOP PSA100E – for DIN rails or wall mounting
- SITOP 3.7 A Class II, with power limiter set to 100 W
- SITOP PSU300P – in IP67 type of protection, identical in construction to SIMATIC ET 200pro PS, but without the second connector for looping the input voltage.
- SITOP PSU300B – power supply optimized for battery charging, with 3-phase wide-range input, 12 V and 24 V output voltages.

Alternative voltages

Power supplies with alternative output voltages

SITOP provides a reliable supply of precisely stabilized DC voltage not just to 24 V loads, but also to loads with "alternative" supply voltages.

SITOP flexi: 3 ... 52 V/10 A
Limitless diversity thanks to variable output. Allows flexible adjustment between 3 and 52 V, so just one standard PS can be used for different voltages.

SITOP compact: 12 V/2 A and 6.5 A
Narrow power supply, designed for switching cubicles, also suitable for 12 V consumers.

LOGO!Power: 5 V, 12 V and 15 V
Flat power supply, for installation junction boxes, available in two power classes.

SITOP modular: 48 V/10 A und 20 A
The high output voltage allows smaller strand cross sections for wires leading to consumers.

SITOP DC/DC: 12 V/2.5 A
The DC/DC converter features a narrow DIN rail housing and needs a 24 V DC input voltage. It is possible to operate it in conjunction with a SITOP DC UPS, thus obtaining uninterruptible 12 V.

SITOP dual: 2 x 15 V/3.5 A
The electronics power supply for the control cabinet. The industry-standard rail-mounted device has two 15 V outputs. For example, for electronic loads requiring ±15 V.

Expansion modules

Reliable protection against the most varied hazard sources: SITOP expansion modules

A power supply unit on its own cannot guarantee fault-free 24 V supply. Power failures, extreme variations in the mains voltage, or a faulty load can bring plant operation to a standstill and cause high costs. The expansion modules offer everything from extensive protection against interference on the primary and secondary side right up to complete all-round protection.

- The signaling module with signal contacts and remote ON/OFF function optimally integrates SITOP modular (devices without integral signaling contact) into automated plants.
- For maximum availability, the redundancy module decouples SITOP power supplies of the same type.
- The buffer module bridges short power failures up to 3 seconds with capacitors as energy storage.
- The SITOP select diagnostics module and the new SITOP PSE200U selectivity module offer selective protection of individual 24 V paths against overload and short-circuits. With this protection and by means of fast fault localization, downtimes can be reduced to a minimum. New features of the selectivity module include the finely adjustable current range (from 0.5 A), remote reset, and a reset button for each channel.

DC UPS

Permanently reliable 24 V – even when the power fails: Uninterruptible power supplies

Supply network irregularities in the millisecond range are compensated for supremely well by all our power supplies. Large fluctuations or even power failures, however, require special measures: The buffer module (see SITOP expansion modules) ensures optimal protection in the case of brief power failures up to 3 seconds.

SITOP UPS500 uses capacitors to cover power failures in the time range of minutes. Its essential characteristics are:

- Absolutely maintenance free DC UPS featuring high-capacity double-layer capacitors.
- Modularly cascadable for standard mounting rail: Basic unit SITOP UPS500S 24 V / 15 A with integrated energy storage 2.5 oder 5 kWs, combinable with up to three expansion modules UPS501S (5 kWs).
- SITOP UPS500P 24 V / 7 A, 5 or 10 kWs in IP65 type of protection, for distributed use.
- Long-life capacitors protect your investment, replacements can be postponed:
  After 8 years the UPS500 (at 50 °C ambient temperature) still retains 80 % of its rated capacity.
- No ventilation is required in the installation area (VDE 0510 Part 2 / EN 50272-2).
- Fast restoration of buffering capability.

DC UPS modules outfitted with batteries secure operation in the time range of hours. Its essential characteristics are:

- DC UPS modules 6 A, 15 A and 40 A.
- Maintenance-free battery modules from 1.2 to 12 Ah.
- High security and availability due to monitoring of back-up capability status, battery cables, aging and charging status.
- Long service life of consumers, and batteries , facilitated by an integrated battery management.
- DIP switches can be used for setting the following: Connection threshold for buffering, end-of-charge voltage, charging current, buffering time.
- Uninterrupted transition from „buffer ready“ to „buffering“.

Both DC UPS systems can be incorporated into PC-based automation solutions with a free software tool. This tool supports the processing of status annunciations and the secure shutting down of the PC.

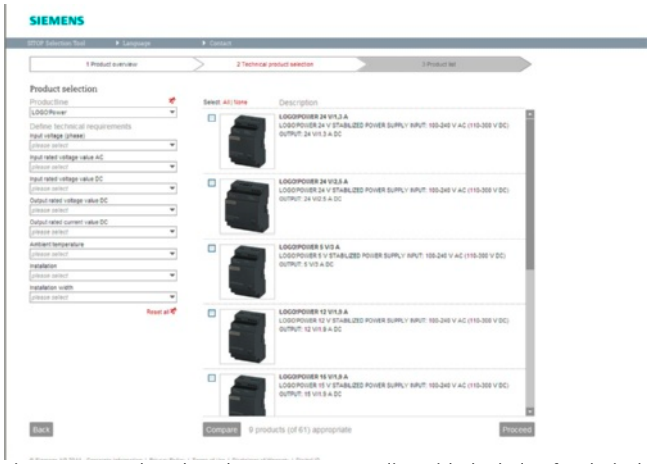
SITOP Selection Tool –
find the appropriate power supply quickly and easily

The SITOP Selection Tool is available in the Internet under
www.siemens.com/sitop-selection-tool
and also in the Industry Mall. This tool enables you to find the appropriate power supply in just a few steps.

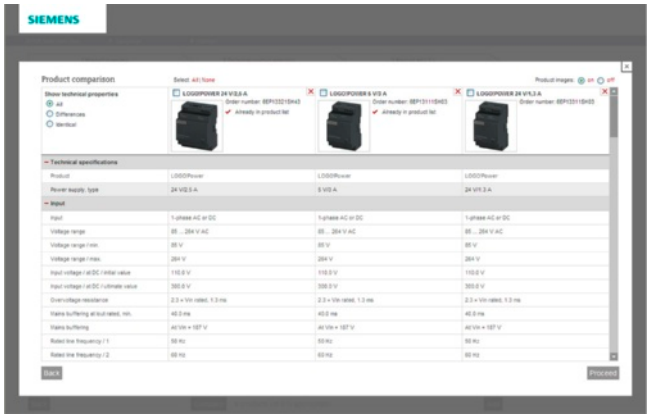
And this is how it works:
Entering a few technical specifications the tool will automatically select the relevant parameters and show the matching products. You can edit the selection parameters anytime.

An added support is provided by the possibility to compare several products according to their technical data. You can select between "all data", "all identical data" and "all different data".

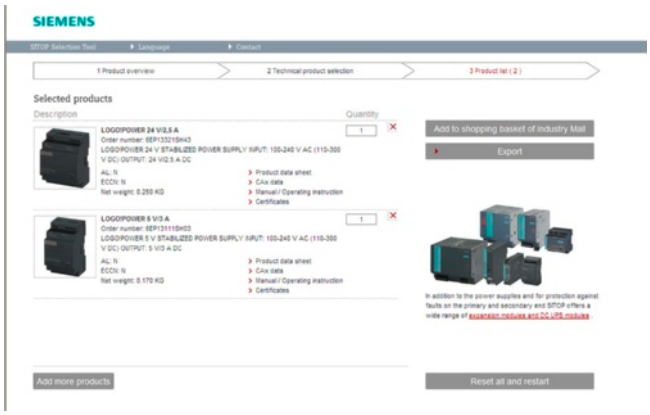
The products thus selected can be transferred into a product list. You can export this list into several file formats, or even let the Industry Mall adopt this list in the cart. It is also possible to invoke additional data concerning the selected products, for example 3D data, circuit diagram macros, or certificates.



First step: Preselect the relevant power supplies with the help of technical properties



Second step: To further limit the selection compare the technical data of several power supplies



Third step: Once you have have selected the appropriate product, you can export the data or transfer it into the Industry Mall

Selection table
SITOP power supplies

Input voltage	Output current	SITOP lite	SITOP compact	LOGO!Power	SITOP smart	SIMATIC design	SITOP modular	Special design special uses
Output voltage 24 V DC		The complete technical specifications on these products are on the pages shown						
1-phase AC								
120 V, 230 V	0.6 A		2/2					
	1.3 A		2/2	2/3				
	2 A					2/3		
	2.1 A							3/3
	2.5 A	3/3	3/2	3/2	3/2	3/3		3/3
	3.1 A							4/3
	3.5 A					4/2		
	3.7 A							4/3
	4 A		4/2	4/2				4/3
	4.1 A							4/3
	5 A	5/3			5/2	5/3	5/2	5/3
	6 A							6/2
	6.2 A							6/2
	10 A	7/3			7/2	7/3	7/2	7/3
	12 A							8/2
	12.5 A							8/2
	20 A						8/2, 8/3	
	40 A						8/3	
1-phase DC								
48 ... 220 V	0.375 A							2/2
48 ... 110 V	2 A							2/3
24 ... 110 V	2 A					2/3		
110 ... 300 V	0.6 A		2/2					
	1.3 A		2/2	2/3				
	2.5 A		3/2	3/2				
	4 A		4/2	4/2				
120 ... 375 V	2.1 A							
	3.1 A							
	4.1 A							
	6.2 A							
	12 A							
200 ... 900 V	20 A						8/3	
3-phase AC								
400 ... 500 V	5 A						5/2, 9/2	
	8 A							9/2
	10 A				9/3		7/2, 9/2	
	20 A				9/3		8/2, 8/3, 9/3	
	30 A							10/2
	40 A				10/3		8/3, 10/2, 10/3	

Input voltage	Output current	SITOP lite	SITOP compact	LOGO!Power	SITOP smart	SIMATIC design	SITOP modular	Special design special uses
Output voltage 5, 12, 15, 48 V DC		The complete technical specifications on these products are on the pages shown						
1-phase AC								
120 V, 230 V	3 - 52 V/ 2 - 10 A							13/2
	5 V/3 A			13/4				
	5 V/6.3 A			13/4				
	12 V/1.9 A			13/6				
	12 V/2 A		13/6					
	12 V/3 A							13/7
	12 V/4.5 A			13/7				
	12 V/6.5 A		13/7					
	12 V/8.3 A							13/10
	15 V/1.9 A			13/12				
	15 V/4 A			13/12				
	2 x 15 V/3.5 A							13/12
1-phase DC								
24 V	12 V/2.5 A							13/6
110 ... 300 V	5 V/3 A			13/4				
	5 V/6.3 A			13/4				
	12 V/1.9 A			13/6				
	12 V/2 A		13/6					
	12 V/4.5 A			13/7				
	12 V/6.5 A		13/7					
	15 V/1.9 A			13/12				
	15 V/4 A			13/12				
3-phase AC								
400 ... 500 V	12 V/20 A							13/10
	48 V/10 A						13/14	
	48 V/20 A						13/14	

SITOP 1-phase 24 V DC, up to 2 A

2

Export regulations AL and ECCN
see page 17/9

Output current up to 2 A

Overview

Product	Special design The smallest ones	SITOP compact PSU100C NEW	SITOP compact PSU100C NEW
Power supply, type	0.375 A	0.6 A	1.3 A
Order No.	6EP1 731-2BA00 [1]	6EP1 331-5BA00	6EP1 331-5BA10
The product families are highlighted in the same color. For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.			
	The optimum power supply units for automation solutions in the lowest performance range; with wide-range input for AC or DC voltages; thanks to their compact and slim design, they are particularly suitable for solutions where space is limited and in conjunction with low-voltage switchgear.	Narrow power supply in the lower performance range, e.g. for distributed use in cubicles. Low energy consumption over the entire power range, minimal energy loss at no load, with removable terminals.	Narrow power supply in the lower performance range, e.g. for distributed use in cubicles. Low energy consumption over the entire power range, minimal energy loss at no load, with removable terminals.

Technical data

Product	Special design The smallest ones	SITOP compact PSU100C	SITOP compact PSU100C
Input			
Rated voltage value $V_{in\ rated}$	DC voltage **48-220 V DC** Wide-range input	1-phase AC or DC **100-230 V AC** Wide-range input	1-phase AC or DC **100-230 V AC** Wide-range input
Voltage range	30 ... 264 V (AC 30 ... 187 V AC)	85 ... 264 V AC or 110 ... 300 V DC	85 ... 264 V AC or 110 ... 300 V DC
Overvoltage resistance		2.3 x $V_{in\ rated}$, 1.3 ms	2.3 x $V_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 10 ms at V_{in} = 220 V	> 20 ms at V_{in} = 230 V	> 20 ms at V_{in} = 230 V
Rated line frequency value; range	–	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$ Switch-on current limit (+25 °C) I^2t	0.3-0.06 A < 35 A, typ. 3 ms 1.2 A^2s	0.28-0.18 A < 28 A 0.7 A^2s	0.63-0.31 A < 34 A 1.2 A^2s
Built-in incoming fuse Recommended miniature circuit breaker (IEC 898) in the mains power input	F 4 A/250 V (not accessible) 6 A or higher, characteristic C, suitable for DC	Internal 16 A or higher, characteristic B or 10 A or higher, characteristic C	Internal 16 A or higher, characteristic B or 10 A or higher, characteristic C
Output			
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance • Static line compensation • Static load compensation	±3 % Approx. 0.1 % Approx. 0.1 %	±3 % Approx. 0.1 % Approx. 0.2%	±3 %
Residual ripple Spikes (bandwidth: 20 MHz)	< 150 mV_{pp} (typ. 50 mV_{pp}) < 240 mV_{pp} (typ. 50 mV_{pp})	< 200 mV_{pp} (typ. 40 mVpp) < 300 mV_{pp} (typ. 20 mVpp)	< 200 mV_{pp} (typ. 25 mVpp) < 300 mV_{pp} (typ. 20 mVpp)
Adjustment range Status display On/off behavior	– Green LED for 24 V OK No overshoot of V_{out} (soft start)	– Green LED for 24 V OK Overshoot of V_{out} approx. 5 %	22.2 ... 26.4 V Green LED for 24 V OK Overshoot of V_{out} approx. 5 %
Startup delay / voltage rise Rated current value $I_{out\ rated}$	< 2.5 s/typ. 90 ms **0.375 A**	< 1 s/typ. 25 ms **0.6 A**	< 0.6 s/typ. 90 ms **1.3 A**
Current range • Up to + 60 °C • Derating	0 ... 0.375 A 0 ... 0.255 A (up to +70 °C)	0 ... 0.6 A (up to +55 °C) 0 ... 0.33 A (up to +70 °C)	0 ... 1.3 A (up to +55 °C) 0 ... 0.7 A (up to +70 °C)
Dynamic overcurrent on • Power-up on short circuit • Short circuit during operation	Typ. 2.7 A for 200 ms	Typically 1 A	Typically 3.1 A
Parallel switching for enhanced performance	Not permitted	Not permitted	Yes, 2 units

[1] SIPLUS module see page 15/2.

LOGO!Power NEW	SITOP in SIMATIC design The S7-300 version	SITOP in SIMATIC design The outdoor version	Special design The DC/DC converter
1.3 A	2 A	2 A	2 A
6EP1 331-1SH03	6ES7 307-1BA01-0AA0	6ES7 305-1BA80-0AA0 [2]	6EP1 732-0AA00
			
LOGO!Power supplies are optimally matched in design and functionality to the LOGO! logic modules; with wide-range input 85 V to 264 V AC and 110 V to 300 V DC, as well as an option for installing in built-in miniature distribution boards, they can be used universally in the low-end performance range.	The proven power supply in SIMATIC S7-300 design; with PS-CPU connecting comb and for mounting directly on S7 rail.	The power supply for extreme environmental conditions in SIMATIC S7-300 design; can be snapped onto S7 rail; with PS-CPU connecting comb.	The DC/DC converter for supply from battery and DC systems; with a wide input voltage range from 38 V to 121 V DC.
LOGO!Power	**SITOP in SIMATIC design The S7-300 version**	**SITOP in SIMATIC design The outdoor version**	**Special design The DC/DC converter**
1-phase AC or DC **100-240 V AC** Wide-range input	1-phase AC **120/230 V AC** Automatic range switch-over	DC voltage **24 V-110 V DC** Wide-range input	DC voltage **48-110 V DC** Wide-range input
AC 85 ... 264 V or DC 110 ... 300 V	85 ... 132 V/170 ... 264 V	16.8 ... 138 V	38 ... 121 V
2.3 × $V_{in\ rated}$, 1.3 ms > 40 ms at V_{in} = 187 V	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V	154 V; 0.1 s > 10 ms at $V_{in\ rated}$	> 5 ms at V_{in} = 48 V
50/60 Hz; 47 ... 63 Hz	50/60 Hz, 47 ... 63 Hz	–	–
0.7-0.35 A < 25 A < 0.8 A^2s	0.9/0.5 A < 22 A, < 3 ms < 1.0 A^2s	2.7-0.6 A (4.0-0.9 A) < 20 A, < 10 ms < 5 A^2s	1.2-0.5 A < 33 A
Internal 16 A or higher, characteristic B or 10 A or higher, characteristic C	T 1.6 A/250 V (not accessible) 3 A, characteristic C	T 6.3 A/250 V (not accessible) 10 A or higher, characteristic C, suitable for DC	T 2.5 A (not accessible) 10 to 25 A, characteristic B, or 6 to 25 A, characteristic C, DC-compatible
Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
±3 % Approx. 0.1 % Approx. 1.5 %	±3 % Approx. 0.1 % Approx. 0.2 %	±3 % Approx. 0.2 % Approx. 0.4%	±1 % Approx. 0.1 % Approx. 0.4 %
< 200 mV_{pp} (typ. 10 mV_{pp}) < 300 mV_{pp} (typ. 20 mV_{pp})	< 50 mV_{pp} (typ. < 5 mV_{pp}) < 150 mV_{pp} (typ. < 20 mV_{pp})	< 150 mV_{pp} (typ. < 30 mV_{pp}) < 240 mV_{pp} (typ. < 150 mV_{pp})	< 100 mV_{pp} < 300 mV_{pp}
22.2 ... 26.4 V Green LED for 24 V OK No overshoot of V_{out} (soft start)	– Green LED for 24 V OK No overshoot of V_{out} (soft start)	– Green LED for 24 V OK No overshoot of V_{out} (soft start)	23.5 ... 26.5 V Green LED for 24 V OK Overshoot of V_{out} on startup max. 25 V
< 0.5 s/typ. 15 ms	< 2 s/typ. 10 ms	< 3 s/typ. 5 ms	< 3 s/typ. 30 ms
1.3 A	**2 A**	**2 A (3 A at V_{in} > 24 V)**	**2 A**
0 ... 1.3 A (up to +55 °C) 0 ... 0.9 A (up to +70 °C)	0 ... 2 A –	0 ... 2 A (3 A) –	0 ... 2 A 0 ... 2 A (up to +70 °C)
	Typ. 9 A for 90 ms Typ. 9 A for 90 ms	Typ. 9 A for 270 ms Typ. 9 A for 270 ms	
Yes, 2 units	Yes	Yes, 2 units	Yes, 2 units

[2] SIPLUS module see page 15/2.

Output current up to 2 A

2

Technical specifications (continued)

Product	Special design The smallest ones	SITOP compact PSU100C	SITOP compact PSU100C
Power supply, type	**0.375 A**	**0.6 A**	**1.3 A**
Order No.	**6EP1 731-2BA00**	**6EP1 331-5BA00**	**6EP1 331-5BA10**
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 66%	Approx. 82 %	Approx. 86 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 4.6 W	Approx. 2.6 W	Approx. 4.5 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	Typ. ±0.3 % V_{out}	Typ. ±0.1 % V_{out}	Typ. ±0.1 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±0.4 % V_{out}	Typ. ±3 % V_{out} (I_{out}: 10/90/10 %)	Typ. ±3 % V_{out} (I_{out}: 10/90/10 %)
Load step settling time			
• 50 to 100 %	Typ. 2 ms	Typ. 3 ms (10 to 90 %)	Typ. 5 ms (10 to 90 %)
• 100 to 50 %	Typ. 2 ms	Typ. 3 ms (10 to 90 %)	Typ. 5 ms (10 to 90 %)
Protection and monitoring			
Output overvoltage protection	Yes, according to EN 60950	Yes, according to EN 60950	Yes, according to EN 60950
Current limitation	0.41 ... 0.49 A	Typically 0.7 A	Typically 1.4 A
Short-circuit protection	Electronic shutdown, auto restart	Electronic shutdown, auto restart	Electronic shutdown, auto restart
Sustained short-circuit current rms value	< 0.9 A		
Overload/short-circuit indicator	–	–	–
Safety			
Primary/secondary isolation	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178
Protection class	Class I	Class I	Class I
Leakage current	< 3.5 mA	< 3.5 mA	< 3.5 mA
Safety test	Yes	Yes; CB Scheme	Yes; CB Scheme
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 142), File E143289; cURus-recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
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	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
FM approval	–	–	–
Marine approval	–	GL and ABS available soon	GL and ABS available soon
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	Not applicable	Not applicable	Not applicable
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Ambient temperature range	-25 ... +70 °C with natural convection	-20 ... +70 °C with natural convection	-20 ... +70 °C with natural convection
Transport/storage temp. range	-40 ... +70 °C	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections			
• Supply input L, N, PE (DC input: L+1, M1, PE)	1 screw terminal each for 0.5 ... 2.5 mm^2 single-core/finely stranded	Removable screw terminals, one each 0.5 ... 2.5 mm^2 solid/finely stranded	Removable screw terminals, one each 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	1 screw terminal for 0.5 ... 2.5 mm^2	1 screw terminal for 0.5 ... 2.5 mm^2	1 screw terminal for 0.5 ... 2.5 mm^2
• Output –	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	22.5 × 80 × 91	22.5 x 80 x 100	30 x 80 x 100
Weight, approx.	0.14 kg	0.12 kg	0.17 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15
Accessories			
	–	Removable spring-loaded terminals (6EP1971-5BA00)	Removable spring-loaded terminals (6EP1971-5BA00)

LOGO!Power	SITOP in SIMATIC design The S7-300 version	SITOP in SIMATIC design The outdoor version	Special design The DC/DC converter
1.3 A	2 A	2 A	2 A
6EP1 331-1SH03	6ES7 307-1BA01-0AA0	6ES7 305-1BA80-0AA0	6EP1 732-0AA00
Approx. 85 % Approx. 6 W	Approx. 84% Approx. 9 W	Approx. 75 % Approx. 16 W (24 W)	Approx. 84 % Approx. 9 W
<0.2 % V_{out} Typ. ±1 % V_{out} (I_{out}: 10/90/10 %)	Typ. ±0.1 % V_{out} Typ. ±0.8 % V_{out}	Typ. ±0.3 % V_{out} Typ. ±2.5 % V_{out}	Typ. ±0.3 % V_{out} Typ. ±0.8 % V_{out}
Typ. 1 ms (10 to 90 %) Typ. 1 ms (90 to 10%)	< 1 ms (typ. 0.5 ms) < 1 ms (typ. 0.5 ms)	< 5 ms (typ. 2.5 ms) < 5 ms (typ. 2.5 ms)	< 5 ms (typ. 2.5 ms) < 5 ms (typ. 2.5 ms)
Yes, according to EN 60950 Typically 1.7 A	Additional control loop, shutdown at < 28.8 V, automatic restart 2.2 ... 2.6 A	Additional control loop, shutdown at approx. 30 V, automatic restart 3.3 ... 3.9 A	Yes, suppressor diode at output 2.1 ... 3 A
Constant current characteristic	Electronic shutdown, auto restart	Electronic shutdown, auto restart	Electronic shutdown, auto restart
< 2.4 A –	< 2 A –	< 2 A –	< 2 A –
Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class II (without protective conductor)	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output V_{out} acc. to EN 60950-1, EN 50178, creepage distances and clearances > 5 mm Class I	Yes, safety extra low output voltage V_{out} according to EN 60950-1 Class I
– Yes; CB Scheme Yes	< 3.5 mA (typ. 0.5 mA) Yes Yes	< 3.5 mA (typ. 0.7 mA) Yes Yes	< 3.5 mA (typ. 0.7 mA) Yes Yes
cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289	UL-listed (UL 508), File E143289, CSA (CSA C22.2 No. 142)	cULus-listed (UL 508, CSA C22.2 No. 142), File E179336
ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABCD, T4 Class I Div. 2. Group ABCD, T4 GL, ABS IP20	ATEX (EX) II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group ABCD Class I Div. 2. Group ABCD, T4 In S7-300 system IP20	– – – IP20	– – – IP20
EN 55022 Class B Not applicable EN 61000-6-2	EN 55022 Class B Not applicable EN 61000-6-2	EN 55011 Class A Not applicable EN 61000-6-2	EN 55022 Class B Not applicable EN 61000-6-2
-20 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	-25 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K5 according to EN 60721, transient condensation permitted	0 ... +70 °C with natural convection -40 ... +70 °C Climate class 3K3 according to EN 60721, no condensation
One screw-type terminal each (L, N) for 0.5 ... 2.5 mm^2 solid/finely stranded 2 screw terminals for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 2 screw terminals for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2	1 screw terminal each for 0.5 ... 2.5 mm^2 single-core/finely stranded 3 screw terminals for 0.5 ... 2.5 mm^2 3 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 2 × 0.5 ... 2.5/1.5 mm^2 solid/finely stranded 1 screw terminal for 2 × 0.5 ... 2.5 mm^2 1 screw terminal for 2 × 0.5 ... 2.5 mm^2
54 × 90 × 55 0.17 kg Snaps onto DIN rail EN 60715 35x7.5/15	40 × 125 × 120 0.4 kg Can be mounted onto S7 rail	80 × 125 × 120 0.75 kg Can be mounted onto S7 rail	80 × 135 × 120 0.5 kg Snaps onto DIN rail EN 60715 35×7.5/15
–	Mounting adapter for standard mounting rail (6EP1 971-1BA00)	Mounting adapter for DIN rail (6ES7 390-6BA00-0AA0)	–

Output current up to 2 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
Special design: The smallest ones					
	**48-220 V DC**	**24 V DC**	0.375 A	**6EP1 731-2BA00**	
SITOP compact, PSU100C NEW					
	**100-230 V AC**	**24 V DC**	0.6 A	**6EP1 331-5BA00**	
	100-230 V AC	**24 V DC**	1.3 A	**6EP1 331-5BA10**	
LOGO!Power NEW					
	**100-240 V AC**	**24 V DC**	1.3 A	**6EP1 331-1SH03**	
SITOP in SIMATIC design, S7-300 version					
	**120/230 V AC**	**24 V DC**	2 A	**6ES7 307-1BA01-0AA0**	
SITOP in SIMATIC design, Outdoor version					
	**24-110 V DC**	**24 V DC**	2 A	**6ES7 305-1BA80-0AA0**	
Special design, The DC/DC converter					
	**48-110 V DC**	**24 V DC**	2 A	**6EP1 732-0AA00**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool:
  www.siemens.com/sitop-selection-tool

SITOP 1-phase 24 V DC, 2.5 A

3

Export regulations AL and ECCN
see page 17/9

Output current 2.5 A

Overview

Product	SITOP smart	SITOP compact PSU100C NEW	LOGO!Power NEW
Power supply, type	2.5 A	2.5 A	2.5 A
Order No.	6EP1 332-2BA10	6EP1 332-5BA00	6EP1 332-1SH43
			
	The single-phase power supply for universal use; complies with EU directive 94/9/EEC (ATEX 100a); slim design; with 50 % extra power for 5 s and 120 % rated power up to 45 °C	Narrow power supply in the lower performance range, e.g. for distributed use in cubicles. Low energy consumption thanks to a high degree of efficiency across the entire power range and minimum power loss in no-load operation.	LOGO!Power supplies are optimally matched in design and functionality to the LOGO! logic modules; with wide-range input 85 V to 264 V AC and 110 V to 300 V DC, as well as an option for installing in built-in miniature distribution boards, they can be used universally in the low-end performance range.

The product families are highlighted in the same color.

For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.

Technical specifications

Product	SITOP smart	SITOP compact PSU100C	LOGO!Power
Input			
Rated voltage value $V_{in\ rated}$	1-phase AC **120/230 V AC**	1-phase AC or DC **100-230 V AC**	1-phase AC or DC **100-240 V AC**
Voltage range	set by means of selector switch 85 ... 132 V/170 ... 264 V	Wide-range input 85 ... 264 V AC or 110 ... 300 V DC	Wide-range input AC 85 ... 264 V or DC 110 ... 300 V
Overvoltage resistance	2.3 × $V_{in\ rated}$, 1.3 ms	2.3 x $V_{in\ rated}$, 1.3 ms	2.3 × $V_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 93/187 V	> 20 ms at V_{in} = 230 V	> 40 ms at V_{in} = 187 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current value $I_{in\ rated}$	1.1/0.65 A	1.21-0.67 A	1.22-0.66 A
Switch-on current limit (+ 25 °C)	< 27 A, typ. 3 ms	< 31 A	< 46 A
I^2t	< 0.3 A^2s	< 2.4 A^2s	< 3 A^2s
Built-in incoming fuse	T 2 A/250 V (not accessible)	Internal	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 3 A, characteristic C	16 A or higher, characteristic B or 10 A or higher, characteristic C	16 A or higher, characteristic B or 10 A or higher, characteristic C
Output			
Rated voltage value $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance	± 3 %	±3 %	±3 %
• Static line compensation	Approx. 0.1 %		Approx. 0.1 %
• Static load compensation	Approx. 0.5 %		Approx. 1.5 %
Residual ripple	< 150 mV_{pp} (typ. 10 mV_{pp})	< 200 mV_{pp}	< 200 mV_{pp} (typ. 10 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. 50 mV_{pp})	< 300 mV_{pp}	< 300 mV_{pp} (typ. 50 mV_{pp})
Adjustment range	22.8 ... 28 V	22.2 ... 26.4 V	22.2 ... 26.4 V
Status display	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK
On/off behavior	Overshoot of V_{out} approx. 4%	Overshoot of V_{out} approx. 1 %	No overshoot of V_{out} (soft start)
Startup delay/voltage rise	< 0.1 s at 230 V AC/typ. 50 ms	< 0.7 s/typ. 100 ms	< 0.5 s/typ. 10 ms
Rated current value $I_{out\ rated}$	**2.5 A**	**2.5 A**	**2.5 A**
Current range			
• Up to + 60 °C	0 ... 2.5 A	0 ... 2.5 A (up to +50 °C)	0 ... 2.5 A (up to +55 °C)
• Derating	0 ... 3 A (up to +45 °C)	0 ... 0.75 A (up to +70 °C)	0 ... 1.75 A (up to +70 °C)
Dynamic overcurrent on			
• Power-up on short circuit	Typ. 7 A for 100 ms		
• Short circuit during operation	Typ. 7 A for 200 ms		
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units	Yes, 2 units

SITOP in SIMATIC design The S7-1200 version	SITOP lite PSU100L NEW	Special design PSU100D NEW	Special design PSA100E
2.5 A	2.5 A	2.1 A	2.5 A
6EP1 332-1SH71 [1]	6EP1 332-1LB00	6EP1 331-1LD00	6EP1 232-1AA00
			
The power supply PM1207 (Power Module) is optimized for the new SIMATIC S7-1200 controllers in terms of design and functionality and serves as an external supply for the inputs and outputs which, to prevent an imbalance, must not be drawn from the CPU encoder supply.	The low-cost power supply for standard requirements in industrial environments; slim design; wide-range input with manual switchover.	The low-cost power supply in flat aluminum housing can be screwed directly on a wall in various mounting positions; with wide-range input for global use.	The power supply is optimally tailored to standard requirements in the industrial environment; rugged metal enclosure; flexible mounting either on standard rails or directly on a wall; removable terminals.
SITOP in SIMATIC design The S7-1200 version	**SITOP lite PSU100L**	**Special design PSU100D**	**Special design PSA100E**
1-phase AC **120/230 V AC** Automatic range switch-over 85 ... 132 V/176 ... 264 V	1-phase AC **120/230 V AC** set by means of selector switch 85 ... 132 V/170 ... 264 V	1-phase AC **100-240 V AC** Wide-range input 85 ... 264 V	1-phase AC **230 V AC** 187 ... 264 V
2.3 x $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V	> 15 ms at V_{in} = 115/230 V	– > 10 ms
50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
1.2/0.67 A < 13 A, < 3 ms (V_{in} = 230 V) < 0.5 A^2s	1.1/0.65 A < 27 A, typ. 3 ms < 0.3 A^2s	1.1-0.7 A < 60 A < 1.2 A^2s	0.65 A < 30 A < 0.8 A^2s
T 3.15 A/250 V (not accessible) 16 A or higher, characteristic B or 10 A or higher, characteristic C	T 2 A/250 V (not accessible) 3 A or higher, characteristic C	Internal 16 A or higher, characteristic B or 10 A or higher, characteristic C	Internal 6 A or higher, characteristic C
Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
±3 % Approx. 0.1 % Approx. 0.2 %	±3 % Approx. 0.1 % Approx. 0.5 %	±2 % Approx. 0.5 % Approx. 1.0 %	±3 % Approx. 0.1 % Approx. 0.5 %
< 150 mV_{pp} < 240 mV_{pp}	< 150 mV_{pp} (typ. 10 mV_{pp}) < 240 mV_{pp} (typ. 50 mV_{pp})	< 100 mV_{pp} < 100 mV_{pp}	< 150 mV_{pp} < 250 mV_{pp}
– 24 V OK = green LED No overshoot of V_{out} (soft start)	22.8 ... 26.4 V Green LED for 24 V OK Overshoot of V_{out} approx. 4 %	22.0 ... 28.0 V Green LED for 24 V OK Overshoot of V_{out} <2%	23 ... 26 V Green LED for 24 V OK Overshoot of V_{out} <1 %
< 2 (6) s at 230 (120) V / typ. 10 ms	< 1.5 s/typ. 150 ms	< 1 s/< 30 ms	< 1.5 s/< 100 ms
2.5 A	**2.5 A**	**2.1 A**	**2.5 A**
0 ... 2.5 A –	0 ... 1.75 A 0 ... 2.5 A (up to + 45 °C)	0 ... 2.1 A (up to + 50 °C) 0 ... 1.0 A (up to + 70 °C)	0 ... 2.5 A (up to + 45 °C) 0 ... 1.25 A (up to + 70 °C)
Typ. 6 A for 100 ms Typ. 6 A for 100 ms			
Yes, 2 units	Yes, 2 units	Yes, 2 units	Yes, 2 units

[1] SIPLUS module see page 15/3

Output current 2.5 A

Technical specifications (continued)

Product	SITOP smart	SITOP compact PSU100C	LOGO!Power
Power supply, type	**2.5 A**	**2.5 A**	**2.5 A**
Order No.	**6EP1 332-2BA10**	**6EP1 332-5BA00**	**6EP1 332-1SH43**
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 85 %	Approx. 87 %	Approx. 88 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 9 W	Approx. 9 W	Approx. 8 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	Typ. ±0.3 % V_{out}	Typ. ±0.1 % V_{out}	< 0.2 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±1% V_{out}	Typ. ±3 % V_{out} (I_{out}: 10/90/10 %)	Typ. ±2 % V_{out} (I_{out}: 10/90/10 %)
Load step settling time			
• 50 to 100%	Typ. 0.2 ms	Typ. 4 ms (10 to 90 %)	Typ. 1 ms (10 to 90 %)
• 100 to 50%	Typ. 0.2 ms	Typ. 4 ms (10 to 90 %)	Typ. 1 ms (90 to 10 %)
Protection and monitoring			
Output overvoltage protection	<33 V	Yes, according to EN 60950	Yes, according to EN 60950
Current limitation	Typ. 3.2 ... 3.4 A, overload capability 150 % $I_{out\ rated}$ to 5 s/min	Typically 3 A	Typically 3.3 A
Short-circuit protection	Constant current characteristic	Electronic shutdown, auto restart	Constant current characteristic
Sustained short-circuit current rms value	Approx. 5 A		Approx. 3.5 A
Overload/short-circuit indicator	–	–	–
Safety			
Primary/secondary isolation	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178
Protection class	Class I	Class I	Class II (without protective cndct)
Leakage current	< 3.5 mA (typ. 0.4 mA)	< 3.5 mA	–
Safety test	Yes; CB scheme	Yes; CB Scheme	Yes; CB Scheme
CE mark	Yes	Yes	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)	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-recognized (UL 60950, CSA C22.2 No. 60950), File E151273
Explosion protection	ATEX (EX) II 3G Ex nA II T4; UL 1604 Class I, Div. 2. Group ABCD	ATEX (EX) II 3G Ex nA IIC T4	ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABDC T4
FM approval	–		Class I, Div. 2. Group ABCD T4
Marine approval	GL	GL and ABS available soon	GL, ABS
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	Not applicable	Not applicable	Not applicable
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Ambient temperature range	0 ... + 60 °C with natural convection	-20 ... +70 °C with natural convection	-20 ... +70 °C with natural convection
Transport/storage temp. range	-40 ... + 85 °C	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections			
• Supply input L, N, PE	One screw terminal each for 0.5 ... 2.5 mm^2 single-core/finely stranded	Removable screw terminals, one each 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each (L, N) for 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	2 screw terminals for 0.5 ... 2.5 mm^2	1 screw terminal for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
• Output –	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	32.5 × 125 × 125	45 x 80 x 100	72 × 90 × 55
Weight, approx.	0.32 kg	0.22 kg	0.25 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15
Accessories			
	–	Removable spring-loaded terminals (6EP1971-5BA00)	–

SITOP in SIMATIC design The S7-1200 version	SITOP lite PSU100L	Special design PSU100D	Special design PSA100E
2.5 A	2.5 A	2.1 A	2.5 A
6EP1 332-1SH71	6EP1 332-1LB00	6EP1 331-1LD00	6EP1 232-1AA00
Approx. 83 % Approx. 12 W	Approx. 85 % Approx. 9 W	Approx. 86 % Approx. 8 W	Approx. 84 % Approx. 11 W
Typ. ±0.3 % V_{out} Typ. ±0.3 % V_{out}	Typ. ±0.3 % V_{out} Typ. ±2 % V_{out} (I_{out}: 10/90/10 %)	Typ. ±0.5 % V_{out} Typ. ±5.0 % V_{out} (0 to 100 %)	<0.3 % V_{out} Typ. ±2.0 % V_{out}
< 5 ms < 5 ms	Typ. 0.5 ms (10 to 90 %) Typ. 0.7 ms (90 to 10 %)		Typ. 0.2 ms Typ. 0.2 ms
< 33 V 2.65 A	<33 V Typically 2.6 A	< 35 V 2.5 A	< 35 V 3 A
Constant current characteristic	Constant current characteristic	Electronic shutdown, auto restart	Electronic shutdown, auto restart
– –	Approx. 4 A –	Approx. 6 A –	< 2 A –
Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, safety extra low output voltage V_{out} according to EN 60950-1 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
< 3.5 mA Yes Yes	< 3.5 mA (typ. 0.4 mA) Yes; CB Scheme in preparation Yes	< 3.5 mA (typ. 1 mA) Yes; CB Scheme in preparation Yes	< 3.5 mA (typ. 0.4 mA) Yes; CB Scheme Yes
cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cULus-Recognized (UL 60950-1, CSA C22.2 No. 60950-1), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 107.1) in preparation	cULus-Listed (UL 508, CSA C22.2 No. 107.1) in preparation, cURus (UL 60950-1, CSA C22.2 No. 60950-1) in preparation	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259
ATEX (EX) II 3G Ex nA T4 – GL, ABS, DNV, NK, BV, LRS IP20	– – – IP20	– – – IP20	– – – IP20
EN 55022 Class B Not applicable EN 61000-6-2	EN 55022 Class A Not applicable EN 61000-6-2	EN 55022 Class B Not applicable EN 61000-6-2	EN 55022 Class B Not applicable EN 61000-6-2
0 ... + 60 °C with natural convection -40 ... + 85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... + 60 °C with natural convection -40 ... + 85 °C Climate class 3K3 according to EN 60721, no condensation	-10 ... +70 °C with natural convection -25 ... +85 °C	-10 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
One screw terminal each for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 2 screw terminals for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.3 ... 1.3 mm^2 solid/finely stranded 1 screw terminal for 0.3 ... 1.3 mm^2 solid/finely stranded 1 screw terminal for 0.3 ... 1.3 mm^2 solid/finely stranded	Removable screw terminal, each 1 x 0.5 ... 2.5 mm^2 Removable screw terminal, each 1 x 0.5 ... 2.5 mm^2 Removable screw terminal, each 1 x 0.5 ... 2.5 mm^2
70 x 100 x 75 0.3 kg Snaps onto DIN rail EN 60715 35x7.5/15. Wall mounting	32.5 × 125 × 125 0.32 kg Snaps onto DIN rail EN 60715 35x7.5/15	97 x 128 x 38 0.35 kg Wall mounting	52 x 170 x 110 0.8 kg Snaps onto DIN rail EN 60715 35x7.5/15. Wall mounting
–	–	–	–

Output current 2.5 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
SITOP smart					
	**120/230 V AC**	**24 V DC**	2.5 A	**6EP1 332-2BA10**	
SITOP compact, PSU100C NEW					
	**100-230 V AC**	**24 V DC**	2.5 A	**6EP1 332-5BA00**	
LOGO!Power NEW					
	**100-240 V AC**	**24 V DC**	2.5 A	**6EP1 332-1SH43**	
SITOP in SIMATIC design, S7-1200 version					
	**120/230 V AC**	**24 V DC**	2.5 A	**6EP1 332-1SH71**	
SITOP lite, PSU100L NEW (Planned delivery date: November 2011)					
	**120/230 V AC**	**24 V DC**	2.5 A	**6EP1 332-1LB00**	
Special design, PSU100D NEW (Planned delivery date: December 2011)					
	**100-240 V AC**	**24 V DC**	2.1 A	**6EP1 331-1LD00**	
Special design, PSA100E					
	**230 V AC**	**24 V DC**	2.5 A	**6EP1 232-1AA00**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros: www.siemens.com/sitop-cax
- Operating instructions: www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool: www.siemens.com/sitop-selection-tool

SITOP 1-phase 24 V DC, 4 A

4

Export regulations AL and ECCN
see page 17/9

Output current 4 A

Overview

Product	SITOP compact PSU100C NEW	LOGO!Power NEW	SITOP in SIMATIC design The S7-200 version
Power supply, type	4 A	4 A	3.5 A
Order No.	6EP1 332-5BA10	6EP1 332-1SH52	6EP1 332-1SH31 [1]
			
	Narrow power supply in the lower performance range, e.g. for distributed use in cubicles. Low energy consumption thanks to a high degree of efficiency across the entire power range and minimum power loss in no-load operation.	LOGO!Power supplies are optimally matched in design and functionality to the LOGO! logic modules; with wide-range input 85 V to 264 V AC and 110 V to 300 V DC, as well as an option for installing in built-in miniature distribution boards, they can be used universally in the low-end performance range.	Optimally matched in design and functionality to the SIMATIC S7-200 micro PLC; flat design, particularly suitable for low cabinet depths.

The product families are highlighted in the same color.

For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.

4

Technical specifications

Product	SITOP compact PSU100C	LOGO!Power	SITOP in SIMATIC design The S7-200 version
Input			
Rated voltage value $V_{in\ rated}$	1-phase AC or DC **100-230 V AC**	1-phase AC or DC **100-240 V AC**	1-phase AC **120/230 V AC**
Voltage range	wide-range input 85 ... 264 V AC or 110 ... 300 V DC	Wide-range input AC 85 ... 264 V DC 110 ... 300 V	Set with wire jumper 93 ... 132 V/187 ... 264 V
Overvoltage resistance	2.3 x $V_{in\ rated}$, 1.3 ms	2.3 × $V_{in\ rated}$, 1.3 ms	2.3 × $V_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 230 V	> 40 ms at V_{in} = 187 V	> 20 ms at V_{in} = 187 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	0.28-0.18 A	1.95-0.97 A	1.65/0.95 A
Switch-on current limit (+25 °C)	< 35 A	< 30 A	< 33 A, < 3 ms (V_{in} = 230 V)
I^2t	< 3 A^2s	< 2.5 A^2s	< 1.0 A^2s
Built-in incoming fuse	Internal	Internal	T 2.5 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, characteristic B or 10 A or higher, characteristic C	16 A or higher, characteristic B or 10 A or higher, characteristic C	Two-pole miniature circuit breaker, 10 A or higher, characteristic C or 6 A or higher, characteristic D
Output			
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance	±3 %	±3 %	±5 % (typ. ±2 %)
• Static line compensation		Approx. 0.1 %	Approx. 0.1 %
• Static load compensation		Approx. 1.5 %	Approx. 0.2 %
Residual ripple	< 200 mV_{pp}	< 200 mV_{pp} (typ. 30 mV_{pp})	< 150 mV_{pp} (typ. 30 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 300 mV_{pp}	< 300 mV_{pp} (typ. 60 mV_{pp})	< 240 mV_{pp} (typ. 110 mV_{pp})
Adjustment range	22.2 ... 26.4 V	22.2 ... 26.4 V	–
Status display	Green LED for 24 V OK	Green LED for 24 V OK	–
On/off behavior	Overshoot of V_{out} approx. 1 %	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)
Startup delay/voltage rise	< 1 s/typ. 500 ms	< 0.5 s/typ. 15 ms	< 1 s/typ. 80 ms
Rated current value $I_{out\ rated}$	**4 A**	**4 A**	**3.5 A**
Current range			
• Up to +60 °C	0 ... 4 A (up to +50 °C)	0 ... 4 A (up to +55 °C)	0 ... 3.5 A
• Derating	0 ... 1.2 A (up to +70 °C)	0 ... 2.8 A (up to +70 °C)	–
Dynamic overcurrent on			
• Power-up on short circuit			Typ. 5 A for 100 ms
• Short circuit during operation			Typ. 5 A for 100 ms
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units	Yes, up to 5 units

[1] SIPLUS module see page 15/3.

Special design PSU100D NEW	Special design The Class2 version	Special design PSA100E	Special design PSU100D NEW
3.1 A	3.7 A	4 A	4.1 A
6EP1 332-1LD00	6EP1 332-2BA00	6EP1 232-1AA10	6EP1 332-1LD10
			
The low-cost power supply in flat aluminum housing can be screwed directly on a wall in various mounting positions; with wide-range input for global use.	The Class2 version with output limited to 100 W maximum.	The power supply is optimally tailored to standard requirements in the industrial environment; rugged metal enclosure; flexible mounting either on standard rails or directly on a wall; removable terminals.	The low-cost power supply in flat aluminum housing can be screwed directly on a wall in various mounting positions; with wide-range input for global use.

Special design PSU100D	Special design The Class2 version	Special design PSA100E	Special design PSU100D
1-phase AC **100-240 V AC** Wide-range input 85 ... 264 V	1-phase AC **120/230 V AC** Set via wire jumper 93 ... 132 V/187 ... 264 V	1-phase AC **230 V AC** 187 ... 264 V	1-phase AC **120-240 V AC** Wide-range input 85 ... 264 V
> 15 ms at V_{in} = 115/230 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 10 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz	– > 10 ms 50/60 Hz; 47 ... 63 Hz	> 15 ms at V_{in} = 115/230 V 50/60 Hz; 47 ... 63 Hz
1.5-1.0 A < 60 A 1.2 A^2s	1.8/0.7 A < 32 A, typ. 3 ms (V_{in} = 230 V) < 0.8 A^2s	1.1 A < 30 A < 0.8 A^2s	2.0-1.1 A < 75 A 4 A^2s
Internal 10 A or higher, characteristic C or 16 A, characteristic B	T 3.15 A/250 V (not accessible) From 6 A, characteristic C	Internal From 6 A, characteristic C	Internal 10 A or higher, characteristic C or 16 A, characteristic B
Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
±2 % Approx. 0.5 % Approx. 1.0 %	±3 % Approx. 0.1 % Approx. 0.2 %	±3 % Approx. 0.1 % Approx. 0.5 %	±2 % Approx. 0.5 % Approx. 1.0 %
< 100 mV_{pp} < 100 mV_{pp}	< 150 mV_{pp} < 240 mV_{pp}	< 150 mV_{pp} < 250 mV_{pp}	< 100 mV_{pp} < 100 mV_{pp}
22.0 ... 28.0 V Green LED for 24 V OK Overshoot of V_{out} < 2 %	22.8 ... 26.4 V[2)] Green LED for 24 V OK No overshoot of V_{out} (soft start)	23 ... 26 V Green LED for 24 V OK Overshoot of V_{out} < 1 %	22.0 ... 28.0 V Green LED for 24 V OK Overshoot of V_{out} < 2 %
< 2.5 s/< 30 ms **3.1 A**	< 3 s/typ. 80 ms **3.7 A**	< 1.5 s/< 200 ms **4 A**	< 1 s/< 30 ms **4.1 A**
0 ... 3.1 A (up to +50 °C) 0 ... 1.5 A (up to +70 °C)	0 ... 3.7 A –	0 ... 4 A (up to +45 °C) 0 ... 2 A (up to +70 °C)	0 ... 4.1 A (up to +50 °C) 0 ... 2.0 A (up to +70 °C)
Yes, 2 units	Yes, 2 units [2)]	Yes, 2 units	Yes, 2 units

[2)] Only permissible at ambient temperature 0 °C to +50 °C.

Output current 4 A

Technical specifications (continued)

Product	SITOP compact PSU100C	LOGO!Power	SITOP in SIMATIC design The S7-200 version
Power supply, type	**4 A**	**4 A**	**3.5 A**
Order No.	**6EP1 332-5BA10**	**6EP1 332-1SH52**	**6EP1 332-1SH31**
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 88 %	Approx. 89 %	Approx. 84 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 13 W	Approx. 12 W	Approx. 16 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	<0.1 % V_{out}	<0.2 % V_{out}	Typ. ±0.3 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±3 % V_{out} (I_{out}: 10/90/10 %)	Typ. ±1.5 % V_{out} (I_{out}: 10/90/10 %)	Typ. ±3 % V_{out}
Load step settling time			
• 50 to 100 %	Typ. 4 ms (10 to 90 %)	Typ. 1 ms (10 to 90 %)	< 5 ms
• 100 to 50 %	Typ. 4 ms (90 to 10%)	Typ. 1 ms (90 to 10%)	< 5 ms
Protection and monitoring			
Output overvoltage protection	Yes, according to EN 60950	Yes, according to EN 60950	Yes, according to EN 60950
Current limitation	Typically 4.8 A	Typically 5.2 A	3.8 A
Short-circuit protection	Electronic shutdown, automatic restart	Constant current characteristic	Constant current characteristic up to typ. 14 V, electronic shutdown below that, automatic restart
Sustained short-circuit current rms value		< 7.9 A	< 4 A
Overload/short-circuit indicator	–	–	–
Safety			
Primary/secondary isolation	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, safety extra low output voltage V_{out} according to EN 60950-1
Protection class	Class I	Class II (without protective cndct)	Class I
Leakage current	< 3.5 mA	–	< 3.5 mA
Safety test	Yes; CB scheme	Yes; CB Scheme	Yes
CE mark	Yes	Yes	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)	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289
Explosion protection	ATEX (EX) II 3G Ex nA IIC T4	ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABCD, T4	–
FM approval		Class I, Div. 2. Group ABCD, T4	–
Marine approval	GL and ABS available soon	GL, ABS	–
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	EN 61000-3-2	EN 61000-3-2	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Ambient temperature range	-20 ... +70 °C with natural convection	– 20 ... + 70 °C with natural convection	0 ... + 60 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	– 40 ... + 85 °C	– 40 ... + 85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections			
• Supply input L, N, PE	Removable screw terminals, one each 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each (L, N) for 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 1.5 mm^2 solid/finely stranded
• Output +	1 screw terminal for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 to 2.5 mm^2	1 screw terminal for 0.5 ... 1 mm^2
• Output –	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 to 2.5 mm^2	2 screw terminals for 0.5 ... 1 mm^2
Dimensions (W x H x D) in mm	52.5 x 80 x 100	90 × 90 × 55	160 × 80 × 62
Weight, approx.	0.32 kg	0.34 kg	0.5 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15. Wall mounting
Accessories			
	Removable spring-loaded terminals (6EP1971-5BA00)	–	

Special design PSU100D	Special design The Class2 version	Special design PSA100E	Special design PSU100D
3.1 A	3.7 A	4 A	4.1 A
6EP1 332-1LD00	6EP1 332-2BA00	6EP1 232-1AA10	6EP1 332-1LD10
Approx. 86 % Approx. 12 W	> 80 % Approx. 22 W	Approx. 87 % Approx. 15 W	Approx. 86 % Approx. 16 W
Typ. ±0.5 % V_{out} Typ. ±5.0 % V_{out} (0 to 100 %)	Typ. ±0.3 % V_{out} Typ. ±2.5 % V_{out}	<0.3 % V_{out} Typ. ±3.0 % V_{out}	Typ. ±0.5 % V_{out} Typ. ±5.0 % V_{out} (0 to 100 %)
	Typ. 0.2 ms Typ. 0.2 ms	Typ. 0.2 ms Typ. 0.2 ms	
< 35 V 3.7 A	Yes, according to EN 60950 Typ. 3.8 ... 4.1 A	< 35 V Typically 4.4 A	< 35 V 4.9 A
Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart
Approx. 6 A –	– –	< 3 A –	Approx. 10 A –
Yes, safety extra low output voltage V_{out} according to EN 60950-1 Class I	Yes, safety extra low output voltage V_{out} according to EN 60950-1 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, safety extra low output voltage V_{out} according to EN 60950-1 Class I
< 3.5 mA (typ. 1 mA) Yes; CB Scheme in preparation Yes	< 3.5 mA (typ. 0.4 mA) Yes; CB Scheme Yes	< 3.5 mA (typ. 0.4 mA) Yes; CB Scheme Yes	< 3.5 mA (typ. 1 mA) Yes; CB Scheme in preparation Yes
cULus-Listed (UL 508, CSA C22.2 No. 107.1) in preparation, cURus (UL 60950-1, CSA C22.2 No. 60950-1) in preparation	cULus-listed (UL 508, CSA C22.2 No. 142), File E143289; cURus-recognized (UL 1950, CSA C22.2 No. 60950), File E151273; UL 1310	cULus-Listed (UL 508, CSA C22.2 No.107.1), File E197259	cULus-Listed (UL 508, CSA C22.2 No. 107.1) in preparation, cURus (UL 60950-1, CSA C22.2 No. 60950-1) in preparation
– – – IP20	– – – IP20	– – – IP20	– – – IP20
EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class B – EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2
-10 ... +70 °C with natural convection -25 ... +85 °C	0 ... + 60 °C with natural convection -40 ... + 85 °C Climate class 3K3 according to EN 60721, no condensation	-10 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	-10 ... +70 °C with natural convection -25 ... +85 °C
One screw-type terminal each for 0.3 ... 1.3 mm^2 solid/finely stranded 1 screw terminal for 0.3 ... 1.3 mm^2 1 screw terminal for 0.3 ... 1.3 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 1 screw terminal for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2	Removable screw terminal, each 1 × 0.5 ... 2.5 mm^2 Removable screw terminal, 1 × 0.5 ... 2.5 mm^2 Removable screw terminal, 1 × 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.3 ... 1.3 mm^2 solid/finely stranded 2 screw terminals for 0.3 ... 1.3 mm^2 2 screw terminals for 0.3 ... 1.3 mm^2
97 x 128 x 38 0.37 kg Wall mounting	75 × 125 × 125 0.75 kg Snaps onto DIN rail EN 60715 35x7.5/15	52 × 170 × 110 0.8 kg Snaps onto DIN rail EN 60715 35x7.5/15. Wall mounting	97 x 158 x 38 0.5 kg Wall mounting
–	–	–	–

Output current 4 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
SITOP compact, PSU100C NEW					
	**100-230 V AC**	**24 V DC**	4 A	**6EP1 332-5BA10**	
LOGO!Power NEW					
	**100-240 V AC**	**24 V DC**	4 A	**6EP1 332-1SH52**	
SITOP in SIMATIC design, The S7-200 version					
	**120/230 V AC**	**24 V DC**	3.5 A	**6EP1 332-1SH31**	
Special design, The Class2 version					
	**120/230 V AC**	**24 V DC**	3.7 A	**6EP1 332-2BA00**	
Special design, PSU100D NEW (Planned delivery date: December 2011)					
	**100-240 V AC**	**24 V DC**	3.1 A	**6EP1 332-1LD00**	
Special design, PSA100E					
	**230 V AC**	**24 V DC**	4 A	**6EP1 232-1AA10**	
Special design, PSU100D NEW (Planned delivery date: December 2011)					
	**100-240 V AC**	**24 V DC**	4.1 A	**6EP1 332-1LD10**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros: www.siemens.com/sitop-cax
- Operating instructions: www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool: www.siemens.com/sitop-selection-tool

SITOP 1-phase and 2-phase 24 V DC, 5 A

5

Export regulations AL and ECCN
see page 17/9

Output current 5 A

Overview

Product	SITOP modular	SITOP smart	SITOP smart
Power supply, type	5 A	5 A	5 A
Order No.	6EP1 333-3BA00 [1)2)]	6EP1 333-2AA01	6EP1 333-2BA01
The product families are highlighted in the same color. For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.			
	The modular power supply with 1-phase and 2-phase wide-range input for global use; with switchable output characteristic; functional expansion possible using expansion modules.	The 1-phase power supply for universal use; complies with EU directive 94/9/EEC (ATEX 100a); slim design; with 50 % extra power for 5 s and 120 % rated power up to 45 °C; without limiting supply harmonics.	The 1-phase power supply for universal use; complies with EU directive 94/9/EEC (ATEX 100a); slim design; with 50 % extra power for 5 s and 120 % rated power up to 45 °C.
Expansion possibilities	Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12)		

Technical data

Product	SITOP modular	SITOP smart	SITOP smart
Input			
Rated voltage value $V_{in\ rated}$	1-phase and 2-phase AC **120-230/230-500 V AC** Set by means of selector switch on device	1-phase AC **120/230 V AC** Set by means of selector switch on device	1-phase AC **120/230 V AC** Set by means of selector switch on device
Voltage range	85 ... 264/176 ... 500 V (startup from V_{in} 90/180 V)	85 ... 132 V/170 ... 264 V	85 ... 132 V/170 ... 264 V
Overvoltage resistance Mains buffering at $I_{out\ rated}$ Rated line frequency value; range	1300 V_{peak}, 1.3 ms > 25 ms at V_{in} = 120/230 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz
Rated current value $I_{in\ rated}$ Switch-on current limit (+25 °C) I^2t	2.2-1.2/1.2-0.61 A < 35 A < 1.7 A^2s	2.1/1.15 A < 32 A, typ. 3 ms < 0.8 A^2s	2.1/1.15 A < 32 A, typ. 3 ms < 0.8 A^2s
Built-in incoming fuse Recommended miniature circuit breaker (IEC 898) in the mains power input	T 3.15 A (not accessible) From 6 A (10 A) characteristic C (B); required for two-phase operation: MCB 2-pole coupled or circuit-breaker 3RV2011-1EA10 (setting 3.8 A) or 3RV2711-1ED10 (UL 489) at 230 V; 3RV2011-1DA10 (setting 3 A) or 3RV2711-1DD10 (UL 489) at 400/500 V	T 3.15 A/250 V (not accessible) From 6 A, characteristic C	T 3.15 A/250 V (not accessible) From 6 A, characteristic C
Output			
Rated voltage value $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance • Static line compensation • Static load compensation	±3 % Approx. 0.1 % Approx. 0.1 %	±3 % Approx. 0.1 % Approx. 0.5 %	±3 % Approx. 0.1 % Approx. 0.5 %
Residual ripple Spikes (bandwidth: 20 MHz)	< 50 mV_{pp} < 200 mV_{pp}	< 150 mV_{pp} (typ. 50 mV_{pp}) < 240 mV_{pp} (typ. 150 mV_{pp})	< 150 mV_{pp} (typ. 50 mV_{pp}) < 240 mV_{pp} (typ. 150 mV_{pp})
Adjustment range Status display On/off behavior	24 ... 28.8 V Green LED for 24 V OK Overshoot of V_{out} approx. 3 %	22.8 ... 28 V Green LED for 24 V OK Overshoot of V_{out} approx. 4 %	22.8 ... 28 V Green LED for 24 V OK Overshoot of V_{out} approx. 4 %
Startup delay/voltage rise Rated current value $I_{out\ rated}$	< 1 s/< 50 ms **5 A**	< 0.1 s at 230 V AC/typ. 50 ms **5 A**	< 0.1 s at 230 V AC/typ. 50 ms **5 A**
Current range • Up to + 60 °C • Derating	 0 ... 5 A > 60 °C	 0 ... 5 A 0 ... 6 A (up to +45 °C)	 0 ... 5 A 0 ... 6 A (up to +45 °C)
Dynamic overcurrent on • Power-up on short circuit • Short circuit during operation	 Approx. 5.5 A constant current Typ. 15 A for 25 ms	 Typ. 17 A for 100 ms Typ. 17 A for 200 ms	 Typ. 17 A for 100 ms Typ. 17 A for 200 ms
Parallel switching for enhanced performance	Yes, 2 units (switchable characteristic)	Yes, 2 units	Yes, 2 units

1) SITOP modular plus 6EP1 333-3BA00-8AC0, PCB with protective coating.

2) SIPLUS module see page 15/3.

SITOP lite PSU100L NEW	SITOP in SIMATIC design The S7-300 version	SITOP in SIMATIC design The outdoor version	Special design The flat design
5 A	5 A	5 A	5 A
6EP1 333-1LB00	6ES7 307-1EA01-0AA0	6ES7 307-1EA80-0AA0 2)	6EP1 333-1AL12
			
The low-cost power supply for standard requirements in industrial environments; slim design; wide-range input with manual switchover.	The proven power supply in SIMATIC S7-300 design; with PS-CPU connecting comb and for mounting direct on S7 rail.	The power supply unit for extreme environmental conditions in SIMATIC S7-300 design; can be snapped onto S7 rail; with PS-CPU connecting comb.	The flat design is of great advantage where only low mounting depths are available, e.g. for use with distributed I/O, in machine benches or alcoves; design matched to SIMATIC ET 200B.

Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12)

SITOP lite PSU100L	SITOP in SIMATIC design The S7-300 version	SITOP in SIMATIC design The outdoor version	Special design The flat design
1-phase AC **120/230 V AC** Set by means of selector switch on device 85 ... 132 V/170 ... 264 V	1-phase AC **120/230 V AC** Automatic range switch-over 85 ... 132 V/170 ... 264 V	1-phase AC **120/230 V AC** Set by means of selector switch on device 93 ... 132 V/187 ... 264 V	1-phase AC **120/230 V AC** Set by means of selector switch on device 85 ... 132 V/170 ... 264 V
2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz
2.1/1.15 A < 32 A, typ. 3 ms < 0.8 A^2s	2.3/1.2 A < 20 A, < 3 ms < 1.2 A^2s	2.1/1.2 A < 45 A, < 3 ms < 1.8 A^2s (typ. 1.2 A^2s)	2.2/1.2 A < 32 A, < 3 ms < 0.8 A^2s
T 3.15 A/250 V (not accessible) From 6 A, characteristic C	T 3.15 A/250 V (not accessible) From 6 A, characteristic C	T 3.15 A/250 V (not accessible) 10 A or higher, characteristic C or 6 A or higher, characteristic D	T 3.15 A/250 V (not accessible) From 6 A, characteristic C
Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
±3 % Approx. 0.1 % Approx. 0.5 %	±3 % Approx. 0.1 % Approx. 0.5 %	±3 % Approx. 0.2 % Approx. 0.4 %	±1 % Approx. 0.1 % Approx. 0.5 %
< 150 mV_{pp} (typ. 50 mV_{pp}) < 240 mV_{pp} (typ. 150 mV_{pp})	< 50 mV_{pp} (typ. 10 mV_{pp}) < 150 mV_{pp} (typ. 20 mV_{pp})	< 150 mV_{pp} (typ. 40 mV_{pp}) < 240 mV_{pp} (typ. 90 mV_{pp})	< 150 mV_{pp} (typ. 40 mV_{pp}) < 240 mV_{pp} (typ. 100 mV_{pp})
22.8 ... 26.4 V Green LED for 24 V OK Overshoot of V_{out} approx. 4 %	– Green LED for 24 V OK No overshoot of V_{out} (soft start)	– Green LED for 24 V OK No overshoot of V_{out} (soft start)	22 ... 29 V Green LED for 24 V OK No overshoot of V_{out} (soft start)
< 1.5 s/typ. 130 ms **5 A**	< 2 s/typ. 10 ms **5 A**	< 3 s/typ. 100 ms **5 A**	< 2 s/typ. 40 ms **5 A**
0 ... 3.5 A 0 ... 5 A (up to +45 °C)	0 ... 5 A –	0 ... 5 A 0 ... 5 A (up to +70 °C)	0 ... 5 A –
	Typ. 20 A for 100 ms Typ. 20 A for 100 ms	Typ. 20 A for 180 ms Typ. 20 A for 80 ms	Typ. 20 A for 500 ms Typ. 20 A for 500 ms
Yes, 2 units	Yes	Not permitted	Yes, 2 units

Output current 5 A

Technical specifications (continued)

Product	SITOP modular	SITOP smart	SITOP smart
Power supply, type	**5 A**	**5 A**	**5 A**
Order No.	**6EP1 333-3BA00**	**6EP1 333-2AA01**	**6EP1 333-2BA01**
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 87 %	Approx. 87 %	Approx. 87 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 18 W	Approx. 17 W	Approx. 17 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	Typ. ± 0.1 % V_{out}	Typ. ± 0.3 % V_{out}	Typ. ± 0.3 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. + 3 % V_{out}	Typ. ± 1 % V_{out}	Typ. ± 1 % V_{out}
Load step settling time			
• 50 to 100 %	< 5 ms (typ. 2 ms)	Typ. 0.2 ms	Typ. 0.2 ms
• 100 to 50 %	< 5 ms (typ. 2 ms)	Typ. 0.2 ms	Typ. 0.2 ms
Protection and monitoring			
Output overvoltage protection	< 35 V	< 33 V	< 33 V
Current limitation	Typ. 5.5 A	Typ. 6.4 ... 6.6 A, overload capability 150 % $I_{out\ rated}$ < 5 s/min	Typ. 6.4 ... 6.6 A, overload capability 150 % $I_{out\ rated}$ < 5 s/min
Short-circuit protection	Alternatively, constant current characteristic approx. 5.5 A or latching shutdown	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	Approx. 5.5 A	Approx. 10 A	Approx. 10 A
Overload/short-circuit indicator	LED yellow for "overload", LED red for "latching shutdown"	–	–
Safety			
Primary/secondary isolation	Yes, safety extra low output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178
Protection class	Class I	Class I	Class I
Leakage current	< 3.5 mA (typ. 0.25 mA)	< 3.5 mA (typ. 0.4 mA)	< 3.5 mA (typ. 0.4 mA)
Safety test	Yes	Yes; CB Scheme	Yes; CB Scheme
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
Explosion protection	ATEX (available soon)	ATEX (EX) II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group ABCD	ATEX (EX) II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group ABCD
FM approval	–	–	–
Marine approval	GL and ABS available soon	GL	GL
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	EN 61000-3-2	–	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Ambient temperature range	-25 ... + 70 °C with natural convection	0 ... + 60 °C with natural convection	0 ... + 60 °C with natural convection
Transport/storage temp range	-40 ... + 85 °C	-40 ... + 85 °C	-40 ... + 85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections			
• Supply input L, N, PE	One screw-type terminal each for 0.2 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	2 screw terminals for 0.2 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
• Output –	2 screw terminals for 0.2 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	70 × 125 × 125	50 × 125 × 125	50 × 125 × 125
Weight, approx.	1.2 kg	0.5 kg	0.5 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15
Accessories			
	Buffer module (6EP1961-3BA01) Signaling module (6EP1961-3BA10)	–	–

SITOP in SIMATIC design The S7-300 version	SITOP lite PSU100L	SITOP in SIMATIC design The outdoor version	Special design The flat design
5 A	5 A	5 A	5 A
6ES7 307-1EA01-0AA0	6EP1 333-1LB00	6ES7 307-1EA80-0AA0 [2]	6EP1 333-1AL12
Approx. 87 % Approx. 18 W	Approx. 86 % Approx. 17 W	Approx. 84 % Approx. 23 W	Approx. 88 % Approx. 17 W
Typ. ±0.1 % V_{out} Typ. ±1 % V_{out}	Typ. ±0.3 % V_{out} Typ. ±2 % V_{out} (I_{out}: 10/90/10 %)	Typ. ±0.3 % V_{out} Typ. ±3 % V_{out}	Typ. ±0.3 % V_{out} Typ. ±0.5 % V_{out}
Typ. 0.3 ms Typ. 0.3 ms	Typ. 0.4 ms (10 to 90 %) Typ. 0.4 ms (90 to 10 %)	< 5 ms (typ. 0.2 ms) < 5 ms (typ. 0.2 ms)	< 5 ms (typ. 0.1 ms) < 5 ms (typ. 0.1 ms)
Additional control loop, shutdown at < 28.8 V, automatic restart 5.5 ... 6.5 A	< 33 V Typically 5.25 A	Additional control loop, shutdown at approx. 30 V, automatic restart 5.5 ... 6.5 A	Additional control loop, shutdown at approx. 33 V, automatic restart 5.5 ... 6.5 A
Electronic shutdown, automatic restart < 7 A –	Constant current characteristic Approx. 8 A –	Electronic shutdown, automatic restart < 5 A –	Electronic shutdown, automatic restart < 5 A –
Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178, creepage distances and clearances > 8 mm Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
< 3.5 mA (typ. 0.5 mA) Notified Body Yes	< 3.5 mA (typ. 0.4 mA) Yes; CB Scheme in preparation Yes	< 3.5 mA (typ. 0.3 mA) Yes Yes	< 3.5 mA (typ. 0.26 mA) Yes Yes
cULus-listed (UL 508, CSA C22.2 No. 142) File E143289	cULus-Listed (UL 508, CSA C22.2 No. 107.1) in preparation	UL-listed (UL 508), file E143289, CSA (CSA 22.2 No. 142)	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259
ATEX (EX) II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group ABCD Class I Div. 2 Group ABCD, T 4 In S7-300 system IP20	– – – IP20	– – – IP20	– – – IP20
EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class A – EN 61000-6-2	EN 55011 Class A – EN 61000-6-2	EN 55022 Class B – EN 61000-6-2
0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	-25 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K5 acc to EN 60721, with transient condensation	0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 3 screw terminals for 0.5 ... 2.5 mm^2 3 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 2 screw terminals for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 3 screw terminals for 0.5 ... 2.5 mm^2 3 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 3 screw terminals for 0.5 ... 2.5 mm^2 3 screw terminals for 0.5 ... 2.5 mm^2
60 × 125 × 120 0.6 kg Can be mounted onto S7 rail	50 × 125 × 125 0.5 kg Snaps onto DIN rail EN 60715 35x7.5/15	80 × 125 × 120 0.57 kg Can be mounted onto S7 rail	160 × 130 × 60 0.6 kg Snaps onto DIN rail EN 60715 35x7.5/15
Mounting adapter for standard mounting rail (6EP1 971-1BA00)	–	Mounting adapter for standard mounting rail (6ES7390-6BA00-0AA0)	–

Output current 5 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
SITOP modular					
	**120-230/230-500 V AC**	**24 V DC**	5 A	**6EP1 333-3BA00** **6EP1 333-3BA00-8AC0**	
	Version with circuit board varnished for protection				
SITOP smart					
	**120/230 V AC**	**24 V DC**	5 A	**6EP1 333-2AA01**	
	120/230 V AC	**24 V DC**	5 A	**6EP1 333-2BA01**	
SITOP in SIMATIC design, The S7-300 version					
	**120/230 V AC**	**24 V DC**	5 A	**6ES7 307-1EA01-0AA0**	
SITOP lite, PSU100L NEW (Planned delivery date: November 2011)					
	**120/230 V AC**	**24 V DC**	5 A	**6EP1 333-1LB00**	
SITOP in SIMATIC design, The outdoor version					
	**120/230 V AC**	**24 V DC**	5 A	**6ES7 307-1EA80-0AA0**	
Special design, The flat design					
	**120/230 V AC**	**24 V DC**	5 A	**6EP1 333-1AL12**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool:
  www.siemens.com/sitop-selection-tool

SITOP 1-phase and 2-phase 24 V DC, 6 A

Export regulations AL and ECCN
see page 17/9

Output current 6 A

Overview

Product	Special design PSA100E	Special design PSU100D NEW
Power supply, type	6 A	6.2 A
Order No.	6EP1 233-1AA00	6EP1 333-1LD00

The product families are highlighted in the same color.

For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.

The power supply is optimally designed for standard requirements in the industrial environment; rugged metal enclosure; flexible mounting either on standard rails or directly on a wall; removable terminals.

The low-cost power supply in flat aluminum housing can be screwed directly on a wall in various mounting positions; with wide-range input for global use.

Technical specifications

Product	Special design PSA100E	Special design PSU100D
Input		
Rated voltage value $V_{in\ rated}$	1-phase AC **230 V AC**	1-phase AC **100-240 V AC** Wide-range input
Voltage range	187 ... 264 V	85 ... 264 V
Overvoltage resistance	–	
Mains buffering at $I_{out\ rated}$	> 10 ms	> 15 ms at V_{in} = 115/230 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	1.4 A	3.1-2.0 A
Switch-on current limit (+25 °C)	< 35 A	< 75 A
I^2t	< 1.2 A^2s	< 6.5 A^2s
Built-in incoming fuse	Internal	Internal
Recommended miniature circuit breaker (IEC 898) in the mains power input	10 A or higher, characteristic C	10 A or higher, characteristic C or 16 A, characteristic B
Output		
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance	±3 %	±2 %
• Static line compensation	Approx. 0.1 %	Approx. 0.5 %
• Static load compensation	Approx. 0.5 %	Approx. 1 %
Residual ripple	< 150 mV_{pp}	< 100 mV_{pp}
Spikes (bandwidth: 20 MHz)	< 250 mV_{pp}	< 100 mV_{pp}
Adjustment range	23 ... 26 V	22.0 ... 28.0 V
Status display	Green LED for 24 V OK	Green LED for 24 V OK
On/off behavior	Overshoot of V_{out} < 5 %	Overshoot of V_{out} < 2 %
Startup delay / voltage rise	< 0.3 s/< 500 ms	< 1 s/< 30 ms
Rated current value $I_{out\ rated}$	**6 A**	**6.2 A**
Current range		
• Up to + 60 °C	0 ... 6 A (up to +45 °C)	0 ... 6.2 A (up to +50 °C)
• Derating	0 ... 3 A (up to +70 °C)	0 ... 3.1 A (up to +70 °C)
Dynamic overcurrent on		
• Power-up on short circuit		
• Short circuit during operation		
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units

Technical specifications (continued)

Product	Special design PSA100E	Special design PSU100D
Power supply, type	**6 A**	**6.2 A**
Order No.	**6EP1 233-1AA00**	**6EP1 333-1LD00**
Efficiency		
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$ Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 87 % Approx. 22 W	Approx. 86 % Approx. 24 W
Closed-loop control		
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %) Dynamic load smoothing (I_{out}: 50/100/50 %)	<0.3 % V_{out} Typ. ±2.0 % V_{out}	Typ. ±0.5 % V_{out} Typ. ±5.0 % V_{out} (0 to 100 %)
Load step settling time • 50 at 100 % • 100 at 50 %	 Typ. 0.1 ms Typ. 0.1 ms	
Protection and monitoring		
Output overvoltage protection Current limitation	< 35 V Typ. 6.6 A	< 35 V 7.4 A
Short-circuit protection Sustained short-circuit current rms value Overload/short-circuit indicator	Electronic shutdown, automatic restart < 3.6 A –	Electronic shutdown, automatic restart 16 A –
Safety		
Primary/secondary isolation Protection class	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, safety extra low output voltage V_{out} according to EN 60950-1 Class I
Leakage current Safety test CE mark	< 3.5 mA (typ. 0.8 mA) Yes; CB Scheme Yes	< 3.5 mA (typ. 1 mA) Yes; CB Scheme in preparation Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No.107.1), File E197259	cULus-Listed (UL 508, CSA C22.2 No.107.1) in preparation; cURus (UL 60950-1, CSA C22.2 No. 60950-1) in preparation
Explosion protection FM approval Marine approval Degree of protection (EN 60529)	– – – IP20	– – – IP20
EMC		
Emitted interference Supply harmonics limitation Noise immunity	EN 55022 Class B – EN 61000-6-2	EN 55022 Class B – EN 61000-6-2
Operating data		
Ambient temperature range Transport/storage temperature range Humidity class	-10 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	-10 ... +70 °C with natural convection -25 ... +85 °C
Mechanics		
Connections • Supply input L, N, PE • Output + • Output –	 Removable screw terminal for 1 × 0.5 ... 2.5 mm^2 each Removable screw terminal for 1 × 0.5 ... 2.5 mm^2 Removable screw terminal for 1 × 0.5 ... 2.5 mm^2	 One screw-type terminal each for 0.3 ... 1.3 mm^2 solid/finely stranded 2 screw terminals for 0.3 ... 1.3 mm^2 2 screw terminals for 0.3 ... 1.3 mm^2
Dimensions (W x H x D) in mm Weight, approx. Installation	52 × 170 × 110 0.9 kg Snaps onto DIN rail EN 60715 35x7.5/15. Wall mounting	97 x 178 x 38 0.55 kg Wall mounting
Accessories		
	–	–

Output current 6 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
Special design, PSA100E					
	**230 V AC**	**24 V DC**	6 A	**6EP1 233-1AA00**	
Special design, PSU100D NEW (Planned delivery date: December 2011)					
	**100-240 V AC**	**24 V DC**	6.2 A	**6EP1 333-1LD00**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool:
  www.siemens.com/sitop-selection-tool

SITOP 1-phase and 2-phase 24 V DC, 10 A

7

Export regulations AL and ECCN
see page 17/9

Output current 10 A

Overview

Product	SITOP modular	SITOP smart	SITOP smart
Power supply, type	10 A	10 A	10 A
Order No.	6EP1 334-3BA00 [1)2)]	6EP1 334-2AA01	6EP1 334-2BA01 [1)]
The product families are highlighted in the same color. For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.			
	Modular power supply with 1-phase and 2-phase wide-range inputs for global use; with selectable output characteristic; functional expansion possible using add-on modules.	The single-phase power supply for universal use; complies with EU directive 94/9/EEC (ATEX 100a); slim design; with 50 % extra power for 5 s and 120 % rated power up to 45 °C; without limiting supply harmonics.	The single-phase power supply for universal use; complies with EU directive 94/9/EEC (ATEX 100a); slim design; with 50 % extra power for 5 s and 120 % rated power up to 45 °C.
Expansion possibilities	Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12)		

7

Technical data

Product	SITOP modular	SITOP smart	SITOP smart
Input			
Rated voltage value $V_{in\ rated}$	1-phase and 2-phase AC **120-230/230-500 V AC** Set by means of selector switch on device	1-phase AC **120/230 V AC** Set by means of selector switch on device	1-phase AC **120/230 V AC** Set by means of selector switch on device
Voltage range	85 ... 264/176 ... 550 V	85 ... 132 V/170 ... 264 V	85 ... 132 V/170 ... 264 V
Overvoltage strength Mains buffering at $I_{out\ rated}$ Rated line frequency; range	1300 V_{peak}, 1.3 ms > 25 ms at V_{in} = 120/230 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$ Switch-on current limit (+ 25 °C) I^2t	4.4-2.4/2.4-1.1 A < 35 A < 4.0 A^2s	4.1/2.4 A < 65 A, typ. 3 ms < 3.3 A^2s	4.1/2.0 A < 65 A, typ. 3 ms < 3.3 A^2s
Built-in incoming fuse Recommended miniature circuit breaker (IEC 898) in the mains power input	T 6.3 A (not accessible) From 6 A (10 A), Characteristic C (B); required for 2-phase operation: Miniature circuit-breaker 2-pole coupled or circuit-breaker 3RV2011-1EA10 (setting 3.8 A) or 3RV2711-1ED10 (UL 489) at 230 V; 3RV2011-1DA10 (setting 3 A) or 3RV2711-1DD10 (UL 489) at 400/500 V	T 6.3 A/250 V (not accessible) 10 A or higher, characteristic C	T 6.3 A/250 V (not accessible) 10 A or higher, characteristic C
Output			
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance • Static line compensation • Static load compensation	± 3 % Approx. 0.1 % Approx. 0.1 %	± 3 % Approx. 0.1 % Approx. 0.5 %	± 3 % Approx. 0.1 % Approx. 0.5 %
Residual ripple Spikes (bandwidth: 20 MHz)	< 50 mV_{pp} < 200 mV_{pp}	< 150 mV_{pp} (typ. 50 mV_{pp}) < 240 mV_{pp} (typ. 150 mV_{pp})	< 150 mV_{pp} (typ. 50 mV_{pp}) < 240 mV_{pp} (typ. 150 mV_{pp})
Adjustment range Status display On/off behavior	24 ... 28.8 V Green LED for 24 V OK Overshoot of V_{out} approx. 3 %	22.8 ... 28 V Green LED for 24 V OK Overshoot of V_{out} approx. 4 %	22.8 ... 28 V Green LED for 24 V OK Overshoot of V_{out} approx. 4 %
Startup delay/voltage rise Rated current value $I_{out\ rated}$	< 1 s/< 50 ms **10 A**	< 0.1 s at 230 V AC/typ. 50 ms **10 A**	< 0.1 s at 230 V AC/typ. 50 ms **10 A**
Current range • Up to +60 °C • Derating	0 ... 10 A > 60 °C	0 ... 10 A 0 ... 12 A (up to +45 °C)	0 ... 10 A 0 ... 12 A (up to +45 °C)
Dynamic overcurrent on • Power-up on short circuit • Short circuit during operation	Approx. 12 A constant current Typ. 30 A for 25 ms	Typ. 30 A for 100 ms Typ. 33 A for 200 ms	Typ. 30 A for 100 ms Typ. 33 A for 200 ms
Parallel switching for enhanced performance	Yes, 2 units (switchable characteristic)	Yes, 2 units	Yes, 2 units

1) SIPLUS module see page 15/3.

2) SITOP modular plus 6EP1 334-3BA00-8AB0, PCB with protective coating.

SITOP in SIMATIC design The S7-300 version	SITOP lite PSU100L NEW	Special design The flat design
10 A	**10 A**	**10 A**
6ES7 307-1KA02-0AA0 [1]	**6EP1 334-1LB00**	**6EP1 334-1AL12**
		
The proven power supply in SIMATIC S7-300 design; with PS-CPU connecting comb and for mounting direct on S7 rail.	The low-cost power supply for standard requirements in industrial environments; slim design; wide-range input with manual switchover.	The flat design is of great advantage where only low mounting depths are available, e.g. for use with distributed I/O, in machine benches or alcoves; design matched to SIMATIC ET 200B.

Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12)

7

SITOP in SIMATIC design The S7-300 version	SITOP lite PSU100L	Special design The flat design
1-phase AC **120/230 V AC** Automatic range switch-over 85 ... 132 V/170 ... 264 V	1-phase AC **120/230 V AC** Set by means of selector switch on device 85 ... 132 V/170 ... 264 V	1-phase AC **120/230 V AC** Set by means of selector switch on device 85 ... 132 V/170 ... 264 V
2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 93/187 V 50/60 Hz; 47 ... 63 Hz
4.2/1.9 A < 55 A, < 3 ms < 3.3 A^2s	4.1/2.4 A < 65 A, typ. 3 ms < 3.3 A^2s	4.0/2.5 A < 65 A, < 3 ms < 3.3 A^2s
T 6.3 A/250 V (not accessible) 10 A or higher, characteristic C	T 6.3 A/250 V (not accessible) 10 A or higher, characteristic C	T 6.3 A/250 V (not accessible) 10 A or higher, characteristic C
Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
±3 % Approx. 0.1 % Approx. 0.5 %	±3 % Approx. 0.1 % Approx. 0.5 %	±1 % Approx. 0.1 % Approx. 0.5 %
< 50 mV_{pp} (typ. 15 mV_{pp}) < 150 mV_{pp} (typ. 60 mV_{pp})	< 150 mV_{pp} (typ. 50 mV_{pp}) < 240 mV_{pp} (typ. 150 mV_{pp})	< 150 mV_{pp} (typ. 50 mV_{pp}) < 240 mV_{pp} (typ. 200 mV_{pp})
– Green LED for 24 V OK No overshoot of V_{out} (soft start)	22.8 ... 26.4 V Green LED for 24 V OK Overshoot of V_{out} approx. 4 %	22 ... 29 V Green LED for 24 V OK No overshoot of V_{out} (soft start)
< 2 s/typ. 10 ms **10 A**	< 1.5 s/typ. 170 ms **10 A**	< 2 s/typ. 40 ms **10 A**
0 ... 10 A –	0 ... 7 A 0 ... 10 A (up to +45 °C)	0 ... 10 A –
Typ. 38 A for 80 ms Typ. 38 A for 80 ms	– –	Typ. 35 A for 700 ms Typ. 35 A for 700 ms
Yes	Yes, 2 units	Yes, 2 units

[1] SIPLUS module see page 15/3.

Output current 10 A

Technical specifications (continued)

Product	SITOP modular	SITOP smart	SITOP smart
Power supply, type	**10 A**	**10 A**	**10 A**
Order No.	**6EP1 334-3BA00**	**6EP1 334-2AA01**	**6EP1 334-2BA01**
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 87 %	Approx. 90 %	Approx. 91 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 36 W	Approx. 27 W	Approx. 24 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	Typ. ± 0.1 % V_{out}	Typ. ± 0.3 % V_{out}	Typ. ± 0.3 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. + 3 % V_{out}	Typ. ± 1 % V_{out}	Typ. ± 1 % V_{out}
Load step settling time			
• 50 to 100 %	< 5 ms (typ. 2 ms)	Typ. 0.2 ms	Typ. 0.2 ms
• 100 to 50 %	< 5 ms (typ. 2 ms)	Typ. 0.2 ms	Typ. 0.2 ms
Protection and monitoring			
Output overvoltage protection	< 35 V	< 33 V	< 33 V
Current limitation	Typically 12 A	Typ. 12.5 ... 13.5 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min	Typ. 12.5 ... 13.5 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min
Short-circuit protection	Alternatively, constant current characteristic approx. 12 A or latching shutdown	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	Approx. 12 A	Approx. 16 A	Approx. 16 A
Overload/short-circuit indicator	LED yellow for "overload", LED red for "latching shutdown"	–	–
Safety			
Primary/secondary isolation	Safety extra low output voltage V_{out} according to EN 60950-1 and EN 50178	Safety extra low output voltage V_{out} according to EN 60950-1 and EN 50178	Safety extra low output voltage V_{out} according to EN 60950-1 and EN 50178
Protection class	Class I	Class I	Class I
Leakage current	< 3.5 mA (typ. 0.32 mA)	< 3.5 mA (typ. 0.8 mA)	< 3.5 mA (typ. 0.8 mA)
Safety test	Yes	Yes; CB Scheme	Yes; CB Scheme
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	Yes, cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259	Yes, cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	Yes, cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
Explosion protection	ATEX (available soon)	ATEX (EX) II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group ABCD	ATEX (EX) II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group ABCD
FM approval	–	–	–
Marine approval	GL and ABS available soon	GL	GL
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	EN 61000-3-2	–	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Ambient temperature range	-25 ... +70 °C with natural convection	0 ... +60 °C with natural convection	0 ... +60 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections			
• Supply input L, N, PE	One screw-type terminal each for 0.2 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	2 screw terminals for 0.2 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
• Output –	2 screw terminals for 0.2 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	90 × 125 × 125	70 × 125 × 125	70 × 125 × 125
Weight, approx.	1.4 kg	0.75 kg	0.8 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15
Accessories			
	Buffer module (6EP1961-3BA01) Signaling module (6EP1961-3BA10)	–	–

SITOP in SIMATIC design The S7-300 version	SITOP lite PSU100L	Special design The flat design
10 A	10 A	10 A
6ES7 307-1KA02-0AA0	6EP1 334-1LB00	6EP1 334-1AL12
Approx. 90 % Approx. 27 W	Approx. 89 % Approx. 34 W	Approx. 89 % Approx. 30 W
Typ. ±0.1 % V_{out} Typ. ±2 % V_{out}	Typ. ±0.3 % V_{out} Typ. ±2 % V_{out} (I_{out}: 10/90/10 %)	Typ. ±0.3 % V_{out} Typ. ±0.6 % V_{out}
< 0.1 ms < 0.1 ms	Typ. 0.5 ms (10 to 90 %) Typ. 0.7 ms (90 to 10 %)	< 5 ms (typ. 0.1 ms) < 5 ms (typ. 0.2 ms)
Additional control loop, shutdown at < 28.8 V, automatic restart 11 ... 12 A	<33 V Typically 10.5 A	Additional control loop, shutdown at approx. 33 V, automatic restart 11 ... 13 A
Electronic shutdown, automatic restart	Constant current characteristic	Electronic shutdown, automatic restart
< 12 A –	Approx. 16 A –	< 10 A –
Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Safety extra low output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
< 3.5 mA (typ. 0.6 mA) Yes Yes	< 3.5 mA (typ. 0.8 mA) Yes; CB Scheme in preparation Yes	< 3.5 mA (typ. 0.27 mA) Yes Yes
cULus-listed (UL 508, CSA C22.2 No. 142), File E143289	cULus-listed (UL 508, CSA C22.2 No. 107.1) available soon	cULus-Listed (UL 508, CSA C22.2 No. 107.1, File E197259
ATEX (EX) II 3G Ex nA II T4; UL 1604 Class I Div. 2 Group ABCD Class I Div. 2. Group ABCD, T4 in S7-300 system IP20	– – IP20	– – IP20
EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class A – EN 61000-6-2	EN 55022 Class B – EN 61000-6-2
0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 4 screw terminals for 0.5 ... 2.5 mm^2 4 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 2 screw terminals for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 3 screw terminals for 0.5 ... 2.5 mm^2 3 screw terminals for 0.5 ... 2.5 mm^2
80 × 125 × 120 0.8 kg Can be mounted onto S7 rail	70 × 125 × 125 0.75 kg Snaps onto DIN rail EN 60715 35x7.5/15	160 × 130 × 60 0.72 kg Snaps onto DIN rail EN 60715 35x7.5/15
Mounting adapter for standard mounting rail (6EP1 971-1BA00)	–	–

Output current 10 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
SITOP modular					
	**120-230/230-500 V AC**	**24 V DC**	10 A	**6EP1 334-3BA00** **6EP1 334-3BA00-8AB0**	
	Version with circuit board varnished for protection				
SITOP smart					
	**120/230 V AC**	**24 V DC**	10 A	**6EP1 334-2AA01**	
	120/230 V AC	**24 V DC**	10 A	**6EP1 334-2BA01**	
SITOP in SIMATIC design, The S7-300 version					
	**120/230 V AC**	**24 V DC**	10 A	**6ES7 307-1KA02-0AA0**	
SITOP lite, PSU100L NEW (Planned delivery date: November 2011)					
	**120/230 V AC**	**24 V DC**	10 A	**6EP1 334-1LB00**	
Special design, The flat design					
	**120/230 V AC**	**24 V DC**	10 A	**6EP1 334-1AL12**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool:
  www.siemens.com/sitop-selection-tool

SITOP 1-phase and 2-phase 24 V DC, 12 to 40 A

8

Export regulations AL and ECCN
see page 17/9

Output current 12 to 40 A

Overview

Product	Special design PSA100E	Special design PSU100D NEW	SITOP modular PSU100M NEW
Power supply, type	12 A	12.5 A	20 A
Order No.	6EP1 234-1AA00	6EP1 334-1LD00	6EP1 336-3BA10
			
	The power supply is optimally tailored to standard requirements in the industrial environment; rugged metal enclosure; flexible mounting either on standard rails or directly on a wall; removable terminals.	The low-cost power supply in flat aluminum housing can be screwed directly on a wall in various mounting positions; with wide-range input for global use.	Modular power supply with 1-phase and 2-phase input, for global use, slim design, with 50 % extra power for 5 s/min and switchable output characteristic; function expansion possible using additional modules
Expansion possibilities	Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12)		

The product families are highlighted in the same color.

For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.

Technical specifications

Product	Special design SITOP PSA100E	Special design PSU100D	SITOP modular PSU100M
Input			
Rated voltage value $V_{in\ rated}$	1-phase AC **230 V AC**	1-phase AC **100-240 V AC**	1-phase/2-phase AC **120-230 V AC**
Voltage range	187 ... 264 V	Wide-range input 85 ... 264 V	wide-range input AC 85 ... 275 V or DC 88 ... 350 V [1]
Overvoltage resistance	–		With internal varistors
Mains buffering at $I_{out\ rated}$	> 10 ms	> 15 ms at V_{in} = 115/230 V	> 20 ms at V_{in} = 230 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 45 ... 65 Hz
Rated current $I_{in\ rated}$	2.5 A	4.0-2.0 A	4.6/2.5 A
Switch-on current limit (+25 °C)	< 50 A	< 60 A	< 20 A
I^2t	< 3.3 A^2s	< 1.1 A^2s	< 5 A^2s
Built-in incoming fuse	Internal	Internal	Yes
Recommended miniature circuit breaker (IEC 898) in the mains power input	10 A or higher, characteristic C	10 A or higher, characteristic C or 16 A, characteristic B	10 A, char. C (2-pole-linked with 2-phase operation) or circuit breaker (8 or 4 A) according to UL489: 3RV2711-1HD10 (120 V) or 3RV2711-1ED10 (230 V)
Output			
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance	±3 %	±2 %	±3 %
• Static line compensation	Approx. 0.1 %	Approx. 0.5 %	Approx. 0.1 %
• Static load compensation	Approx. 0.5 %	Approx. 0.5 %	Approx. 0.3 %
Residual ripple	< 150 mV_{pp}	< 100 mV_{pp}	< 100 mV_{pp} (typ. 80 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 250 mV_{pp}	< 100 mV_{pp}	< 200 mV_{pp} (typ. 100 mV_{pp})
Adjustment range	23 ... 26 V	22.0 ... 28.0 V	24 ... 28.8 V
Status display	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK
Signaling	–		Relay contact (NO contact, rating 60 V DC/0.3 A) for 24 V OK
On/off behavior	Overshoot of V_{out} < 5 %	Overshoot of V_{out} < 2 %	No overshoot of V_{out} (soft start)
Startup delay/voltage rise	< 0.3 s/< 500 ms	1 s/< 30 ms	< 0.25 s/< 15 ms
Rated current value $I_{out\ rated}$	**12 A**	**12.5 A**	**20 A**

[1] At V_{in} < 100 V AC or DC: Temperature-derating to +50 °C required.

SITOP modular PSU400M NEW	SITOP modular	SITOP modular
20 A	**20 A**	**40 A**
6EP1 536-3AA00	**6EP1 336-3BA00** [2) 3)]	**6EP1 337-3BA00** [3)]
		
Power supply SITOP PSU400M with 600 V DC input constitutes an efficient DC/DC converter for drives and battery systems; wide input and temperature range, high efficiency, slim design; with 50 % extra power for 5 s/min, and with switchable output characteristics.	The modular power supply units with 1-phase and 2-phase inputs for global use; with switchable output characteristics; functional expansion possible using expansion modules.	The modular power supply units with 1-phase and 2-phase inputs for global use; with switchable output characteristics; functional expansion possible using expansion modules.

Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12)

SITOP modular PSU400M	SITOP modular	SITOP modular
DC voltage **600 V DC** 200 ... 900 V DC (startup from approx. 400 V DC) Derating: 200 ... 300 V DC and 820 ... 900 V DC Shutdown at V_{in} > DC 900 V – –	1-phase/2-phase AC **120/230 V AC** Set by means of wire jumper on the device 85 ... 132/176 ... 264 V (startup from V_{in} > 93/183 V) 2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 230 V 50/60 Hz; 47 ... 63 Hz	1-phase/2-phase AC **120/230 V AC** Set by means of wire jumper on the device 85 ... 132/176 ... 264 V (startup from V_{in} > 95/190 V) 2.3 × $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 230 V 50/60 Hz; 47 ... 63 Hz
0.85 A < 8 A (V_{in} slew rate 1 V/µs) < 0.02 A^2s	7.7/3.5 A < 60 A < 9.9 A^2s	15.0/8.0 A < 125 A < 26 A^2s
Yes, cut-off capacity 20 kA; L/R < 2 ms ("+" and "–" input)	Yes 10 A, characteristic C (2-pole-linked with 2-phase operation) or circuit breaker 3RV2411-1JA10 (120 V) or 3RV2411-1FA10 (230 V)	Yes 20 A, characteristic C (2-pole-linked with 2-phase operation) or circuit breaker 3RV2421-4BA10 (120 V) or 3RV2411-1JA10 (230 V)
Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
±3 % Approx. 0.3 % Approx. 0.3 %	±3 % Approx. 0.1 % Approx. 0.1 %	±3 % Approx. 0.1 % Approx. 0.1 %
< 150 mV_{pp} (typ. 30 mV_{pp}) < 200 mV_{pp} (typ. 100 mV_{pp})	< 100 mV_{pp} (typ. 30 mV_{pp}) < 200 mV_{pp} (typ. 60 mV_{pp})	< 100 mV_{pp} (typ. 60 mV_{pp}) < 200 mV_{pp} (typ. 120 mV_{pp})
24 ... 28.8 V Green LED for 24 V OK Green flashing LED for start delay Relay contact (NO, rating DC 60 V/0.3 A, 30 V DC/1 A) for 24 V OK No overshoot of V_{out} (soft start)	24 ... 28.8 V (max. 480 W) Green LED for 24 V OK Via signaling module (6EP1961-3BA10) Overshoot of V_{out} approx. 3 %	24 ... 28.8 V (max. 960 W) Green LED for 24 V OK Via signaling module (6EP1961-3BA10) Overshoot of V_{out} approx. 3 %
<100 ms; 10 s adjustable with selector switch/ < 150 ms **20 A**	< 0.1 s/< 50 ms **20 A**	< 0.1 s/< 50 ms **40 A**

[2)] SITOP modular plus 6EP1 336-3BA00-8AC0, PCB with protective coating.

[3)] SIPLUS module see page 15/3.

Output current 12 to 40 A

Technical specifications (continued)

Product	Special design PSA100E	Special design PSU100D	SITOP modular PSU100M
Power supply, type	**12 A**	**12.5 A**	**20 A**
Order No.	**6EP1 234-1AA00**	**6EP1 334-1LD00**	**6EP1 336-3BA10**
Output (continued)			
Current range • Up to +60 °C • Derating	 0 ... 12 A (up to +45 °C) 0 ... 6 A (up to +70 °C)	 0 ... 12.5 A (up to +50 °C) 0 ... 6.2 A (up to +70 °C)	 0 ... 20 A > 60 °C
Dynamic overcurrent on • Power-up on short circuit • Short circuit during operation			 30 A Typ. 60 A for 25 ms
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units	Yes, 2 units (with switchable characteristic)
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	ca. 88 %	Approx. 86%	Approx. 93 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 39 W	Approx. 48 W	Approx. 42 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	<0.3 % V_{out}	Typ. ±0.5 % V_{out}	<0.5 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±3.5 % V_{out}	Typ. ±5 % V_{out} (0 to 100 %)	Typ. ±1 % V_{out}
Load step settling time • 50 to 100 % • 100 to 50 %	 Typ. 0.1 ms Typ. 0.1 ms		 < 5 ms (typ. 1 ms) < 5 ms (typ. 1 ms)
Protection and monitoring			
Output overvoltage protection Current limitation	< 35 V Typically 13.2 A	< 35 V 15 A	< 33 V Typ. 21.5 A, overload capability 150 % $I_{out\ rated}$ to 5 s/min
Short-circuit protection	Electronic shutdown, automatic restart	Electronic shutdown, automatic restart	Alternatively, constant current characteristic approx. 23 A or latching shutdown
Sustained short-circuit current rms value	< 7.5 A	15 A	Approx. 23 A
Overload/short-circuit indicator	–	–	Yellow LED for „Overload“, Red LED for „latching shutdown“
Safety			
Primary/secondary isolation	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, safety extra low output voltage V_{out} according to EN 60950-1	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178
Protection class	Class I	Class I	Class I
Leakage current	< 3.5 mA (typ. 0.8 mA)	< 3.5 mA (typ. 1 mA)	< 3.5 mA
Safety test	Yes; CB scheme	Yes; CB Scheme in preparation	Yes
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259	cULus-Listed (UL 508, CSA C22.2 No. 107.1) in preparation; cURus (UL 60950-1, CSA C22.2 No. 60950-1) in preparation	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259
Explosion protection	–	–	ATEX (available soon)
Marine approval	–	–	GL and ABS available soon
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	–	EN 61000-3-2	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Ambient temperature range	-10 ... +70 °C with natural convection	-10 ... +70 °C with natural convection	-25 ... +70 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	-25 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation		Climate class 3K3 according to EN 60721, no condensation

SITOP modular PSU400M	SITOP modular	SITOP modular
20 A	20 A	40 A
6EP1 536-3AA00	6EP1 336-3BA00	6EP1 337-3BA00
0 ... 20 A 0 ... 9 A (up to +70 °C)	0 ... 20 A > 60 °C	0 ... 40 A > 60 °C
Approx. 40 A for 150 ms –	Approx. 23 A constant current Typ. 60 A for 25 ms	Approx. 46 A constant current Typ. 120 A for 25 ms
Yes, (switchable characteristic)	Yes, 2 units (switchable characteristic)	Yes, 2 units (switchable characteristic)
Approx. 95 % Approx. 25 W	Approx. 89 % Approx. 59 W	Approx. 88 % Approx. 131 W
<1.5 % V_{out} Typ. ±1.5 % V_{out}	<1% V_{out} Typ. ±2 % V_{out}	<1% V_{out} Typ. ±2 % V_{out}
< 5 ms (typ. 1 ms) < 5 ms (typ. 1 ms)	< 5 ms (typ. 2 ms) < 5 ms (typ. 2 ms)	< 5 ms (typ. 2 ms) < 5 ms (typ. 2 ms)
< 33 V Typ. 22 A, overload capability 150 % $I_{out\ rated}$ to 5 s/min	< 35 V Typ. 23 A	< 35 V Typically 46 A
Alternatively, constant current characteristic approx. 22 A or latching shutdown Approx. 22 A Yellow LED for „Overload“, red LED for „latching shutdown“, Red LED flashing for "overtemperature"	Alternatively, constant current characteristic approx. 23 A or latching shutdown Approx. 23 A Yellow LED for „Overload“, Red LED for „latching shutdown“	Alternatively, constant current characteristic approx. 46 A or latching shutdown Approx. 46 A Yellow LED for „Overload“, Red LED for „latching shutdown“
Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
– Yes Yes	< 3.5 mA (typ. 0.4 mA) Yes Yes	< 3.5 mA (typ. 0.4 mA) Yes Yes
cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259
IP20 – GL and ABS available soon	IP20 ATEX (available soon) GL and ABS available soon	IP20 – –
EN 55022 Class A (radiated emission) – EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class B – EN 61000-6-2
-25 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation

Output current 12 to 40 A

Technical specifications (continued)

Product	Special design PSA100E	Special design PSU100D	SITOP modular PSU100M
Power supply, type	**12 A**	**12.5 A**	**20 A**
Order No.	**6EP1 234-1AA00**	**6EP1 334-1LD00**	**6EP1 336-3BA10**
Mechanics			
Connections			
• DC input +, –, PE	–	–	–
• Supply input L, N, PE	Removable screw terminal for 1 × 0.5 ... 2.5 mm^2 each	One screw-type terminal each for 0.5 ... 1.3 mm^2 solid/finely stranded	One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded
• Output +	Removable screw terminal for 1 × 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 1.3 mm^2	2 screw terminals for 0.2 ... 4 mm^2
• Output –	Removable screw terminal for 1 × 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 1.3 mm^2	2 screw terminals for 0.2 ... 4 mm^2
• Alarm signals	–	–	2 screw terminals for 0.14 ... 1.5 mm^2
Dimensions (W x H x D) in mm	52 × 170 × 110	105 × 199 × 41	90 × 125 × 125
Weight, approx.	0.9 kg	0.81 kg	1.2 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15. Wall mounting	Wall mounting	Snaps onto DIN rail EN 60715 35x7.5/15
Accessories			
	–	–	Buffer module (6EP1961-3BA01) Device labeling plates (3RT1900-1SB20)

SITOP modular PSU400M	SITOP modular	SITOP modular
20 A	20 A	40 A
6EP1 536-3AA00	6EP1 336-3BA00	6EP1 337-3BA00
One screw-type terminal each for 0.2 ... 6/4 mm^2 solid/finely stranded	–	–
–	One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded	One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded
2 screw terminals for 0.2 ... 6/4 mm^2 solid/finely stranded 2 screw terminals for 0.2 ... 6/4 mm^2 solid/finely stranded 2 screw terminals for 0.14 ... 1.5 mm^2	2 screw terminals for 0.5 ... 4 mm^2 2 screw terminals for 0.5 ... 4 mm^2 –	2 screw terminals for 0.5 ... 10 mm^2 2 screw terminals for 0.5 ... 10 mm^2 –
90 × 125 × 125 1.2 kg Snaps onto DIN rail EN 60715 35×7.5/15	160 × 125 × 125 2.2 kg Snaps onto DIN rail EN 60715 35×7.5/15	240 × 125 × 125 2.9 kg Snaps onto DIN rail EN 60715 35×7.5/15
Unit labeling plates (3RT1900-1SB20)	Buffer module (6EP1961-3BA01) Signaling module (6EP1961-3BA10)	Buffer module (6EP1961-3BA01) Signaling module (6EP1961-3BA10)

Output current 12 to 40 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
Special design, PSA100E					
	**230 V AC**	**24 V DC**	12 A	**6EP1 234-1AA00**	
Special design, PSU100D NEW (Planned delivery date: December 2011)					
	**100-240 V AC**	**24 V DC**	12.5 A	**6EP1 334-1LD00**	
SITOP modular, PSU100M NEW					
	**120 - 230 V AC**	**24 V DC**	20 A	**6EP1 336-3BA10**	
SITOP modular, PSU400M NEW					
	**600 V DC**	**24 V DC**	20 A	**6EP1 536-3AA00**	
SITOP modular					
	**120/230 V AC** **Version with circuit board varnished for protection**	**24 V DC**	20 A	**6EP1 336-3BA00** **6EP1 336-3BA00-8AA0**	
SITOP modular					
	**120/230 V AC**	**24 V DC**	40 A	**6EP1 337-3BA00**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool:
  www.siemens.com/sitop-selection-tool

SITOP 3-phase
24 V DC, 5 to 20 A

9

Export regulations AL and ECCN
see page 17/9

Output current 5 to 20 A

Overview

Product	SITOP modular	Special design PSU300P	SITOP modular
Power supply, type	5 A	8 A	10 A
Order No.	6EP1 333-3BA00 [2]	6EP1 433-2CA00	6EP1 334-3BA00 [2]
The product families are highlighted in the same color. For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.	 The modular power supply units with wide-range input for 2-phase connection to three-phase supply networks; for global use; with switchable output characteristics; functional expansion possible using expansion modules.	 The power supplies with IP67 degree of protection, SITOP PSU300P and SIMATIC ET 200pro PS [1], serve as electronics/encoder and load power supplies for the new I/O device. With a signaling contact for "24 V OK" and "Overtemperature", and in the case of SIMATIC ET 200pro with a second plug-in connector for input voltage loop-through.	 The modular power supply units with wide-range input for 2-phase connection to three-phase supply networks; for global use; with switchable output characteristics; functional expansion possible using expansion modules.
Expansion possibilities	Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12).		

Technical specifications

Product	SITOP modular	Special design PSU300P	SITOP modular
Input			
Rated voltage value $V_{in\ rated}$	2-phase AC **120-230/230-500 V 2 AC**	3-phase AC **400-480 V 3 AC**	2-phase AC **120-230/230-500 V 2 AC**
Voltage range	Set with selector switch on device 85 ... 264/176 ... 550 V	Wide-range input 340 ... 550 V (320 ... 340 V for max. 1 min)	Set with selector switch on device 85 ... 264/176 ... 550 V
Overvoltage resistance	1300 V_{peak}, 1.3 ms	Internal, with varistors	1300 V_{peak}, 1.3 ms
Mains buffering at $I_{out\ rated}$	Typ. 150 ms at V_{in} = 400 V	> 15 ms at V_{in} = 400 V	Typ. 120 ms at V_{in} = 400 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 45 ... 66 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	2.2-1.2/1.2-0.61 A	0.5 A (at V_{in} 400 V)	4.4-2.4/2.4-1.1 A
Switch-on current limit (+25 °C)	< 35 A	< 40 A	< 35 A
I^2t	< 1.7 A^2s	< 3.5 A^2s	< 4.0 A^2s
Built-in incoming fuse Required protection in the main supply conductor	T 3.15 A From 6 A (10 A) characteristic C (B); required for two-phase operation: Miniature circuit-breaker 2-pole coupled or circuit-breaker 3RV2011-1EA10 (setting 3.8 A) or 3RV2711-1ED10 (UL 489) at 230 V; 3RV2011-1DA10 (setting 3 A) or 3RV2711-1DD10 (UL 489) at 400/500 V	Intern, 4 A Circuit breaker 2.2 ... 3.2 A 3RV2011-1DA10 or 3RV2711-1DD10 (UL 489)	T 6.3 A From 6 A (10 A) characteristic C (B); required for two-phase operation: Miniature circuit-breaker 2-pole coupled or circuit-breaker 3RV2011-1EA10 (setting 3.8 A) or 3RV2711-1ED10 (UL 489) at 230 V; 3RV2011-1DA10 (setting 3 A) or 3RV2711-1DD10 (UL 489) at 400/500 V
Output			
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance	±3 %	< ±3 ... -5 %	±3 %
• Static line compensation	Approx. 0.1 %	Approx. 0.5 %	Approx. 0.1 %
• Static load compensation	Approx. 0.1 %	Approx. 0.5 %	Approx. 0.1 %
Residual ripple	< 50 mV_{pp}	< 200 mV_{pp}	< 50 mV_{pp}
Spikes (bandwidth: 20 MHz)	< 200 mV_{pp}	< 250 mV_{pp}	< 200 mV_{pp}
Adjustment range	24 ... 28.8 V (max. 120 W)	–	24 ... 28.8 V (max. 240 W)
Status display	Green LED for 24 V OK	Green LED for 24 V OK	Green LED for 24 V OK
Signaling	Use signaling module (6EP1961-3BA10)	• Power Good (high level 1L+ for V_{out} in range 21.3 ... 29 V) • Overtemperature warning at least 30 s before switch-off (High level 1L+ when the max. internal temperature is exceeded)	Use signaling module (6EP1961-3BA10)
On/off behavior	Overshoot of V_{out} approx. 3 %	Overshoot of V_{out} <2 %	Overshoot of V_{out} approx. 3 %
Startup delay/voltage rise	< 1 s/< 50 ms	< 1.5 s/< 400 ms	< 1 s/< 50 ms
Rated current value $I_{out\ rated}$	**5 A**	**8 A**	**10 A**
Current range			
• Up to +60 °C	0 ... 5 A	0 ... 8 A (up to +55 °C)	0 ... 10 A
• Derating	> 60 °C	–	> 60 °C

[1] Available with a second plug connector for loop-through of the input voltage as SIMATIC ET 200pro PS (6ES7148-4PC00-0HA0), output "PELV".

2) SIPLUS module see page 15/4

SITOP smart PSU300S NEW	SITOP modular PSU300M	SITOP modular	SITOP smart PSU300S NEW
10 A	20 A	20 A	20 A
6EP1 434-2BA10	6EP1 436-3BA10	6EP1 436-3BA00 [2) 3)]	6EP1 436-2BA10
			
Powerful standard power supply with three-phase wide-range input for global use; high overload capability with 50 % extra power for 5 s/min. It also tolerates 1.2 times the rated current at ambient temperatures under +45 °C.	Modular power supply with three-phase wide-range input for global use; slim design; with 50 % extra power for 5 s/min and switchable output characteristic; expansion possible using additional modules.	Modular power supply with three-phase wide-range input for global use; with switchable output characteristic; expansion possible using additional modules.	Powerful standard power supply with three-phase wide-range input for global use; high overload capability with 50 % extra power for 5 s/min. It also tolerates 1.2 times the rated current at ambient temperatures under +45 °C. This power supply is shown on the title page of this catalog.

Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12).

SITOP smart PSU300S	SITOP modular PSU300M	SITOP modular	SITOP smart PSU300S
3-phase AC **400-500 V AC** Wide-range input 340 ... 550 V	3-phase AC **400-500 V 3 AC** Wide-range input 320 ... 575 V	3-phase AC **400-500 V 3 AC** wide-range input 320 ... 550 V (startup from V_{in} > 340 V)	3-phase AC **400-500 V AC** Wide-range input 340 ... 550 V
2.3 × $V_{in\ rated}$, 1.3 ms > 6 ms/typ. 14 ms at V_{in} = 400 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 15 ms at V_{in} = 400 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 6 ms at V_{in} = 400 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 6 ms at V_{in} = 400 V 50/60 Hz; 47 ... 63 Hz
0.7-0.5 A < 36 A < 0.9 A^2s	1.2-1.0 A < 18 A < 0.8 A^2s	1.1-0.9 A < 35 A < 0.7 A^2s	1.2-1.0 A < 36 A < 0.9 A^2s
None 3-pole connected miniature circuit breaker 6 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)	None 3-pole connected miniature circuit breaker 6 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)	None 3-pole connected miniature circuit breaker 6 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)	None 3-pole connected miniature circuit breaker 6 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)
Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
±3 % Approx. ±0.5 % Approx. ±1 %	±3 % Approx. ±0.1 % Approx. ±0.2 %	± 3 % Approx. 0.1 % Approx. 0.2 %	±3 % Approx. ±0.5 % Approx. ±1 %
< 150 mV_{pp} < 240 mV_{pp}	< 100 mV_{pp} < 200 mV_{pp}	< 100 mV_{pp} < 200 mV_{pp}	< 150 mV_{pp} < 240 mV_{pp}
24 ... 28.0 V (max. 240 W) Green LED for 24 V OK Relay contact (NO contact, contact rating 60 V DC/0.3 A) for 24 V OK	24 ... 28.8 V (max. 480 W) Green LED for 24 V OK Relay contact (NO contact, contact rating 60 V DC/0.3 A) for 24 V OK	24 ... 28.8 V (max. 480 W) Green LED for 24 V OK Use signaling module (6EP1961-3BA10)	24 ... 28.0 V (max. 480 W) Green LED for 24 V OK Relay contact (NO contact, contact rating 60 V DC/0.3 A) for 24 V OK
No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)
< 1.5 s/typ. 30 ms **10 A**	< 2.5 s/< 500 ms **20 A**	< 2.5 s/< 500 ms **20 A**	< 1.5 s/typ. 30 ms **20 A**
0 ... 10 A (up to +70 °C) 12 A (up to +45 °C)	0 ... 20 A 14 A (up to +70 °C)	0 ... 20 A > 60 °C	0 ... 20 A 24 A (up to +45 °C) 10 A (up to +70 °C)

[2)] SITOP modular plus 6EP1 436-3BA00-8AA0, PCB with protective coating.

[3)] SIPLUS module see page 15/4.

Output current 5 to 20 A

Product	SITOP modular	Special design PSU300P	SITOP modular
Power supply, type	**5 A**	**8 A**	**10 A**
Order No.	**6EP1 333-3BA00**	**6EP1 433-2CA00**	**6EP1 334-3BA00**
Output			
Dynamic overcurrent on • Power-up on short circuit • Short circuit during operation	 Approx. 5.5 A constant current Typ. 15 A for 25 ms	 Approx. 50 A for 100 ms Approx. 50 A for 100 ms	 Approx. 12 A constant current Typ. 30 A for 25 ms
Parallel switching for enhanced performance	Yes, 2 units (switchable characteristic)	No	Yes, 2 units (switchable characteristic)
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$ Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 87 % Approx. 18 W	Typically 88 % Typ. 25 W	Approx. 87 % Approx. 36 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %) Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. 0.1 % V_{out} Typ. +3 % V_{out}	Approx. 0.5 % V_{out} Typ. ± 1 % V_{out}	Typ. 0.1 % V_{out} Typ. +3 % V_{out}
Load step settling time • 50 to 100 % • 100 to 50 %	 < 5 ms (typ. 2 ms) < 5 ms (typ. 2 ms)	 < 2 ms < 2 ms	 < 5 ms (typ. 2 ms) < 5 ms (typ. 2 ms)
Protection and monitoring			
Output overvoltage protection Current limitation	< 35 V Typically 5.5 A	< 33 V Typically 9.4 A	< 35 V Typically 12 A
Short-circuit protection Sustained short-circuit rms value Overload/short-circuit indicator	Alternatively, constant current characteristic approx. 5.5 A or latching shutdown Approx. 5.5 A LED yellow for "overload", LED red for "latching shutdown"	Electronic shutdown, automatic restart < 10 A –	Alternatively, constant current characteristic approx. 12 A or latching shutdown Approx. 12 A LED yellow for "overload", LED red for "latching cutoff"
Safety			
Primary/secondary isolation Protection class	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
Leakage current	< 3.5 mA (typ. 0.25 mA)	< 3.5 mA	< 3.5 mA (typ. 0.32 mA)
Safety test CE mark	Yes Yes	Yes; CB scheme Yes	Yes Yes
UL/cUL (CSA) approval Explosion protection Marine approval Degree of protection (EN 60529)	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259 ATEX (available soon) GL and ABS available soon IP20	In preparation: UL-Listed (UL 508) – – IP67, enclosure type 4 indoor	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259 ATEX (available soon) GL and ABS available soon IP20
EMC			
Emitted interference Supply harmonics limitation Noise immunity	EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class A – EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2
Operating data			
Ambient temperature range Transport and storage temperature Humidity class	-25 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	-25 ... +55 °C with natural convection -40 ... +70 °C Climate class 3K3 according to EN 60721, no condensation	-25 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections • Supply input L1, L2. L3, PE • Output + • Output – • Alarm signals	 One screw-type terminal each for 0.2 ... 2.5 mm^2 solid/finely stranded 2 screw terminals for 0.2 ... 2.5 mm^2 2 screw terminals for 0.2 ... 2.5 mm^2 –	 Plug connector HAN Q4/2 1 × 2.5 mm^2 (2-pole cable for +/- with open, labeled ends, 2 × 2.5 mm^2) 1 × 2.5 mm^2 (2-pole cable for +/- with open, labeled ends, 2 × 2.5 mm^2) M12 plug-in connector, 5-pin	 One screw-type terminal each for 0.2 ... 2.5 mm^2 solid/finely stranded 2 screw terminals for 0.2 ... 2.5 mm^2 2 screw terminals for 0.2 ... 2.5 mm^2 –
Dimensions (W x H x D) in mm Weight, approx. Installation	70 × 125 × 125 1.2 kg Snaps onto DIN rail EN 60715 35x7.5/15	310 × 135 × 90 + additional height of connector 2.8 kg Can be mounted onto ET 200pro mounting rail	90 × 125 × 125 1.4 kg Snaps onto DIN rail EN 60715 35x7.5/15
Accessories			
	Buffer module (6EP1961-3BA01) Signaling module (6EP1961-3BA10)	Power connector (3RK1911-2BE50 (2.5 mm^2))	Buffer module (6EP1961-3BA01) Signaling module (6EP1961-3BA10)

SITOP smart PSU300S	SITOP modular PSU300M	SITOP modular	SITOP smart PSU300S
10 A	20 A	20 A	20 A
6EP1 434-2BA10	6EP1 436-3BA10	6EP1 436-3BA00	6EP1 436-2BA10
Approx. 16 A for 100 ms Approx. 16 A for 100 ms	Approx. 23 A constant current Typ. 60 A for 25 ms	Approx. 23 A constant current Typ. 60 A for 25 ms	Approx. 35 A for 100 ms Approx. 35 A for 100 ms
Yes, 2 units	Yes, 2 units (switchable characteristic)	Yes, 2 units (switchable characteristic)	Yes, 2 units
Approx. 91 % Approx. 24 W	Approx. 93 % Approx. 36 W	Approx. 90 % Approx. 53 W	Approx. 91 % Approx. 47 W
<3 % V_{out} Typ. ±3 % V_{out}	<1% V_{out} Typ. ±2 % V_{out}	<1% V_{out} Typ. ±2 % V_{out}	<3 % V_{out} Typ. ±3 % V_{out}
< 10 ms (typ. 2 ms) < 10 ms (typ. 2 ms	< 10 ms (typ. 2 ms) < 10 ms (typ. 2 ms)	< 10 ms (typ. 4 ms) < 10 ms (typ. 4 ms)	< 10 ms (typ. 2 ms) < 10 ms (typ. 2 ms
Yes, according to EN 60950 Typ. 11 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min	< 35 V Typ. 23 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min	< 35 V Typically 23 A	Yes, according to EN 60950 Typ. 25 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min
Electronic shutdown, automatic restart Approx. 3.2 A –	Alternatively, constant current characteristic approx. 23 A or latching shutdown Approx. 23 A LED yellow for "overload", LED red for "latching cutoff"	Alternatively, constant current characteristic approx. 23 A or latching shutdown Approx. 23 A LED yellow for "overload", LED red for "latching cutoff"	Electronic shutdown, automatic restart Approx. 7 A –
Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
< 3.5 mA (typ. 1 mA) Yes; CB scheme Yes	< 3.5 mA Yes Yes	< 3.5 mA Yes Yes	< 3.5 mA mA (typ. 1 mA) Yes; CB scheme Yes
cULus-Listed (UL 508, CSA C22.2 No. 107.1) File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1) ATEX (EX) II 3G Ex nAC IIC T4 GL in preparation IP20	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259 ATEX (available soon) GL and ABS available soon IP20	UL-listed (UL 508) File E197259, CSA (CSA C22.2 No. 14, CSA C22.2 No. 107.1) ATEX (available soon) GL and ABS available soon IP20	cULus-Listed (UL 508, CSA C22.2 No. 107.1) File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1) ATEX (EX) II 3G Ex nAC IIC T4 GL in preparation IP20
EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2
0 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	-25 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded 2 screw terminals for 0.2 ... 4 mm^2 2 screw terminals for 0.2 ... 4 mm^2 2 screw terminals for 0.14 ... 1.5 mm^2	One screw terminal each for 0.2 ... 4 mm^2 solid/finely stranded 2 screw terminals for 0.2 ... 4 mm^2 2 screw terminals for 0.2 ... 4 mm^2 2 screw terminals for 0.14 ... 1.5 mm^2	One screw terminal each for 0.2 ... 4 mm^2 single-core/finely stranded 2 screw terminals for 0.33 to 4 mm^2 2 screw terminals for 0.33 ... 4 mm^2 –	One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded 2 screw terminals for 0.2 ... 4 mm^2 2 screw terminals for 0.2 ... 4 mm^2 2 screw terminals for 0.14 ... 1.5 mm^2
90 × 145 × 150 1.6 kg Snaps onto DIN rail EN 60715 35x7.5/15	70 × 125 × 125 1.2 kg Snaps onto DIN rail EN 60715 35x7.5/15	160 × 125 × 125 2 kg Snaps onto DIN rail EN 60715 35x7.5/15	90 × 145 × 150 1.6 kg Snaps onto DIN rail EN 60715 35x7.5/15
Device labeling plates (3RT1900-1SB20)	Buffer module (6EP1961-3BA01) Device labeling plates (3RT1900-1SB20)	Buffer module (6EP1961-3BA01) Signaling module (6EP1961-3BA10)	Device labeling plates (3RT1900-1SB20)

Output current 5 to 20 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
SITOP modular					
	**120-230/230-500 V 2 AC**	**24 V DC**	5 A	**6EP1 333-3BA00**	
Special design, PSU300P					
	**400-480 V 3 AC**	**24 V DC**	8 A	**6EP1 433-2CA00**	
Special design, SIMATIC ET 200pro PS					
	**400-480 V 3 AC**	**24 V DC**	8 A	**6ES7 148-4PC00-0HA0**	
SITOP modular					
	**120-230/230-500 V 2 AC**	**24 V DC**	10 A	**6EP1 334-3BA00**	
SITOP smart, PSU300S NEW					
	**400-500 V 3 AC**	**24 V DC**	10 A	**6EP1 434-2BA10**	
SITOP modular, PSU300M					
	**400-500 V 3 AC** **Version with circuit board varnished for protection**	**24 V DC**	20 A	**6EP1 436-3BA10** **6EP1 436-3BA00-8AA0**	
SITOP modular					
	**400-500 V 3 AC**	**24 V DC**	20 A	**6EP1 436-3BA00**	
SITOP smart, PSU300S NEW					
	**400-500 V 3 AC**	**24 V DC**	20 A	**6EP1 436-2BA10**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros: www.siemens.com/sitop-cax
- Operating instructions: www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool: www.siemens.com/sitop-selection-tool

SITOP 3-phase
24 V DC, 30 to 40 A

10

Export regulations AL and ECCN
see page 17/9

Output current 30 to 40 A

Overview

Product	Special design PSU300B NEW	SITOP modular PSU300M
Power supply, type	30 A	40 A
Order No.	6EP1 437-3BA20	6EP1 437-3BA10 [1]
The product families are highlighted in the same color. For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.	 Power supply optimized for battery charging, with 3-phase wide-range input for use around the world; small frame size; with switchable output characteristic; functional expansion possible if expansion modules are used.	 Modular power supply with 3-phase wide-range input for use around the world; small frame size; with 50 % extra power for 5 s/min and switchable output characteristic; functional expansion possible if expansion modules are used.
Expansion possibilities	Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12).	

Technical data

Product	Special design PSU300B	SITOP modular PSU300M
Input		
Rated voltage value $V_{in\ rated}$	3-phase AC **400 to 500 V 3 AC**	3-phase AC **400 to 500 V 3 AC**
Voltage range	wide-range input 320 ... 575 V	wide-range input 320 ... 575 V
Overvoltage strength		
Mains buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 400 V	> 15 ms at V_{in} = 400 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	1.6-1.3 A	2.6-2.1 A
Switch-on current limit (+25 °C)	< 56 A	< 56 A
I^2t	< 2.24 A^2s	< 2.24 A^2s
Built-in incoming fuse	None	None
Required protection in the supply feeder	3-pole connected miniature circuit breaker 10 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)	3-pole connected miniature circuit breaker 10 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)
Output		
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Total tolerance	± 3 %	± 3 %
• Static line compensation	< ±0.1 %	< ±0.1 %
• Static load compensation	< ±0.1 %	< ±0.1 %
Residual ripple	< 100 mV_{pp}	< 100 mV_{pp}
Spikes (bandwidth: 20 MHz)	< 200 mV_{pp}	< 200 mV_{pp}
Adjustment range	24 ... 28.8 V	24 ... 28.8 V (max. 960 W)
Status display	Green LED for 24 V OK	Green LED for 24 V OK
Signaling	Relay contact (NO contact, contact rating DC 60 V/0.3 A) for 24 V OK	Relay contact (NO contact, contact rating DC 60 V/0.3 A) for 24 V OK
On/off behavior	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)
Startup delay/voltage rise	< 2.5 s/< 500 ms	< 2.5 s/< 500 ms
Rated current value $I_{out\ rated}$	**30 A**	**40 A**
Current range		
• Up to +60 °C	0 ... 30 A	0 ... 40 A
• Derating	25 A (up to +70 °C)	25 A (up to +70 °C)
Dynamic overcurrent on		
• Power-up on short-circuit	Approx. 32 A constant current	Approx. 44 A constant current
• Short circuit during operation	Approx. 32 A constant current	Typ. 120 A for 25 ms
Parallel switching for enhanced performance	Yes, 2 units (switchable characteristic)	Yes, 2 units (switchable characteristic)

[1] SIPLUS module see page 15/4.

SITOP modular	SITOP smart PSU300S NEW
40 A	**40 A**
6EP1 437-3BA00[1)2)]	**6EP1 437-2BA20**
	
Modular power supply with 3-phase wide-range input for use around the world; small frame size; with switchable output characteristic; functional expansion possible if expansion modules are used.	Powerful standard power supply with 3-phase wide-range input for use around the world; high overload capability with 50 % extra power for 5 s/min and 1.2 times the rated current continuously up to +45 °C ambient temperature.

Expansion modules, such as redundancy modules or selectivity modules for protecting 24 V feeds (chapter 11) and DC UPS for additional protection against mains failures (chapter 12).

SITOP modular	SITOP smart PSU300S
3-phase AC **400-500 V 3 AC** Wide-range input 320 ... 550 V (startup from V_{in} > 340 V)	3-phase AC **400-500 V AC** Wide-range input 340 ... 550 V
2.3 × $V_{in\ rated}$, 1.3 ms > 6 ms at V_{in} = 400 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 6 ms at V_{in} = 400 V 50/60 Hz; 47 ... 63 Hz
2.2 A (V_{in} = 400 V) < 70 A < 2.8 A^2s	1.7-1.5 A < 60 A < 3.4 A^2s
None 3-pole connected miniature circuit breaker 10 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)	None 3-pole connected miniature circuit breaker 10 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)
Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
± 3 % Approx. 0.1 % Approx. 0.2 %	±3 % Approx. ±1 % Approx. ±2 %
< 100 mV_{pp} < 200 mV_{pp}	< 150 mV_{pp} < 240 mV_{pp}
24 ... 28.8 V (max. 960 W) Green LED for 24 V OK Use signaling module (6EP1961-3BA10) No overshoot of V_{out} (soft start)	24 ... 28.0 V (max. 960 W) Green LED for 24 V OK Relay contact (NO contact, contact rating DC 60 V/0.3 A) for 24 V OK No overshoot of V_{out} (soft start)
< 2.5 s/< 500 ms **40 A**	< 1.5 s/typ. 15 ms **40 A**
0 ... 40 A > 60 °C	0 ... 40 A 48 A (up to +45 °C)/30 A (up to +70 °C)
Approx. 46 A constant current Typ. 120 A for 25 ms	Approx. 65 A for 120 ms Approx. 65 A for 120 ms
Yes, 2 units (switchable characteristic)	Yes, 2 units

1) SIPLUS module see page 15/4.

2) SITOP modular plus 6EP1 437-3BA00-8AA0 with circuit board varnished for protection

Output current 30 to 40 A

Technical specifications (continued)

Product	Special design PSU300B	SITOP modular PSU300M
Power supply, type	**30 A**	**40 A**
Order No.	**6EP1 437-3BA20**	**6EP1 437-3BA10**
Efficiency		
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 93 %	Approx. 92 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 50 W	Approx. 83 W
Closed-loop control		
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	<1 % V_{out}	<1 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±3 % V_{out}	Typ. ±3 % V_{out}
Load-step settling time		
• 50 to 100 %	< 10 ms	< 10 ms
• 100 to 50 %	< 10 ms	< 10 ms
Protection and monitoring		
Output overvoltage protection	< 35 V	< 35 V
Current limitation	Typically 32 A	Typ. 44 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min
Short-circuit protection	Alternatively, constant current characteristic approx. 32 A or latching shutdown	Alternatively, constant current characteristic approx. 44 A or latching shutdown
Sustained short-circuit current rms value	Approx. 32 A	Approx. 44 A
Overload/short-circuit indicator	LED yellow for "overload", LED red for "latching cutoff"	LED yellow for "overload", LED red for "latching cutoff"
Safety		
Primary/secondary isolation	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178
Protection class	Class I	Class I
Leakage current	< 3.5 mA	< 3.5 mA
Safety test	Yes	Yes
CE mark	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1) File E197259	cULus-Listed (UL 508, CSA C22.2 No. 107.1) File E197259
Explosion protection	–	ATEX (available soon)
Marine approval	–	GL and ABS available soon
Degree of protection (EN 60529)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	EN 61000-3-2	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Ambient temperature range	-25 ... +70 °C with natural convection	-25 ... +70 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics		
Connections		
• Supply input L1, L2. L3, PE	One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded	One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded
• Output +	2 screw terminals for 0.33 ... 10 mm^2	2 screw terminals for 0.33 ... 10 mm^2
• Output –	2 screw terminals for 0.33 ... 10 mm^2	2 screw terminals for 0.33 ... 10 mm^2
Alarm signal	2 screw terminals for 0.14 ... 1.5 mm^2	2 screw terminals for 0.14 ... 1.5 mm^2
Dimensions (W x H x D) in mm	150 × 125 × 150	150 × 125 × 150
Weight, approx.	3.4 kg	3.4 kg
Installation	Snaps onto DIN rail EN 60715 35x15	Snaps onto DIN rail EN 60715 35x15
Accessories		
	Buffer module (6EP1961-3BA01) Device labeling plates (3RT1900-1SB20)	Buffer module (6EP1961-3BA01) Device labeling plates (3RT1900-1SB20)

SITOP modular	SITOP smart PSU300S
40 A	40 A
6EP1 437-3BA00	6EP1437-2BA20
Approx. 90 % Approx. 106 W	Approx. 91.5 % Approx. 89 W
<1 % V_{out} Typ. ±2 % V_{out}	<3 % V_{out} Typ. ± 1.5 % V_{out}
< 10 ms (typ. 4 ms) < 10 ms (typ. 4 ms)	< 10 ms (typ. 1 ms) < 10 ms (typ. 1 ms
< 35 V Typically 46 A	Yes, according to EN 60950 Typ. 50 A, overload capability 150% $I_{out\ rated}$ up to 5 s/min
Alternatively, constant current characteristic approx. 46 A or latching shutdown Approx. 46 A LED yellow for "overload", LED red for "latching cutoff"	Electronic shutdown, automatic restart Approx. 14 A –
Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
< 3.5 mA Yes Yes	< 3.5 mA mA (typ. 1 mA) Yes Yes; CB scheme
UL-listed (UL 508) File E197259, CSA (CSA C22.2 No. 14, CSA C22.2 No. 107.1) – – IP20	cULus-Listed (UL 508, CSA C22.2 No. 107.1) ATEX (EX) II 3G Ex nA nC IIC T3 GL in preparation IP20
EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2
0 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded 2 screw terminals for 0.33 ... 10 mm^2 2 screw terminals for 0.33 ... 10 mm^2 –	One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded 2 screw terminals for 0.5 ... 10 mm^2 2 screw terminals for 0.5 ... 10 mm^2 2 screw terminals for 0.14 ... 1.5 mm^2
240 × 125 × 125 3.2 kg Snaps onto DIN rail EN 60715 35×15	150 × 145 × 150 3.7 kg Snaps onto DIN rail EN 60715 35×15
Buffer module (6EP1961-3BA01) Signaling module (6EP1961-3BA10)	–

Output current 30 to 40 A

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
Special design, PSU300B NEW (Planned delivery date: December 2011)					
	**400-500 V 3 AC**	**24 V DC**	30 A	**6EP1 437-3BA20**	
SITOP modular, PSU300M					
	**400-500 V 3 AC**	**24 V DC**	40 A	**6EP1 437-3BA10**	
SITOP modular					
	**400-500 V 3 AC**	**24 V DC**	40 A	**6EP1 437-3BA00** **6EP1 437-3BA00-8AA0**	
	Version with circuit board varnished for protection				
SITOP smart, PSU300S NEW					
	**400-500 V 3 AC**	**24 V DC**	40 A	**6EP1437-2BA20**	

10

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool:
  www.siemens.com/sitop-selection-tool

SITOP expansion modules 24 V DC

Export regulations AL and ECCN see page 17/9

Signaling module, redundancy module, buffer module

Overview

Product	SITOP modular signaling module	PSE202U redundancy module	SITOP modular buffer module
Type		20 A	40 A
Order No.	6EP1 961-3BA10 [1]	6EP1 961-3BA21 [1]	6EP1 961-3BA01 [1]
The product families are highlighted in the same color. For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.			
	The signaling module, in combination with a SITOP modular (6EP1 .3.-3BA00) regulated power supply, can furnish annunciation signals describing the operational status of the power supply. It can also switch the power supply on and off by remote operation. It hooks up to the power supply automatically.	The SITOP PSE202U redundancy module is used to decouple two SITOP regulated power supplies in parallel operation. The 24 V supply is reliably maintained when one power supply fails.	With short-term power failures, the load current can be backed up without interruption via the buffer module in combination with a SITOP modular regulated power supply. The buffer module is connected in parallel to the output of the power supply.

Technical specifications

Product	SITOP modular signaling module	PSE202U redundancy module	SITOP modular buffer module
Type		20 A	40 A
Order No.	6EP1 961-3BA10 [1]	6EP1 961-3BA21	6EP1 961-3BA01
Input			
Rated voltage value $V_{in\ rated}$	–	Controlled, isolated DC voltage **24 V DC**	Controlled, isolated DC voltage **24 V DC**
Voltage range	–	24 ... 28.8 V	24 ... 28.8 V
Control input	Non-isolated input for remote ON/OFF switching of the power supply	–	–
Power I_{in} / 1st connection	–	20 A	–
Power I_{in} / 2nd connection	–	20 A	–
Output			
Rated voltage $V_{out\ rated}$	–	V_{in} – approx. 0.5 V	V_{in} – approx. 1 V
Rated current value $I_{out\ rated}$	–	Max. 40 A	40 A
Mains buffering	–	–	Backup time: • At 40 A load current: 200 ms • At 20 A load current: 400 ms • At 10 A load current: 800 ms • At 5 A load current: 1.6 s In combination with 6EP1 437-3BA10 the buffer time is reduced by 100 ms.
Buffering time, max.	–	–	10 s
Protection and monitoring			
Current limiting, static	–	No	Typically 40 A
Short-circuit protection	–	No	Electronically
Signaling/alarm signals			
Status display	–	Green LED for „both input voltages > switching threshold“ Red LED for „at least one input voltage < switching threshold“	Green LED for „Supply voltage > 20.5 V“
Signaling	Isolated relay contacts (changeover contacts, contact rating 6 A/240 V AC) for "Output voltage OK" and "Power supply availability OK"	solated relay contacts (changeover contacts, contact rating 8 A/240 V AC, 24 V DC): signals OK if both input voltages > switching threshold (adjustable)	–

[1] SIPLUS module see page 15/4.

Technical specifications (continued)

Product	SITOP modular signaling module	PSE202U redundancy module	SITOP modular buffer module
Type		**20 A**	**40 A**
Order No.	**6EP1 961-3BA10** [1]	**6EP1 961-3BA21**	**6EP1 961-3BA01**
Safety			
Galvanic isolation	Yes, safety extra low voltage acc. to EN 60950-1 (relay contacts)	Yes, safety extra low voltage acc. to EN 60950-1 (relay contact)	Yes, SELV acc. to EN 60950-1
Protection class	Class I	Class II	Class I
Safety test	Yes	Yes	Yes
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	UL-listed (UL 508) File E197259, CSA (CSA C22.2 No. 14, CSA C22.2 No. 107.1)	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259	UL-listed (UL 508) File E197259, CSA (CSA C22.2 No. 14, CSA C22.2 No. 107.1)
Explosion protection	–	ATEX (EX) II 3G Ex nAC IIC T4 cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Groups ABCD	–
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Ambient temperature range	0 ... +60 °C with natural convection	0 ... +60 °C with natural convection	0 ... +60 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections	Screw terminals for 0.14 ... 2.5 mm^2 single-core/finely stranded	Input, output, and ground: one screw terminal each, with 0.33 ... 10 mm^2 solid/finely stranded; Relay contact: 1 screw terminal each for 0.5 ... 2.5 mm^2 single-core/finely stranded	One screw terminal each for + and – for 0.5 ... 10 mm^2 single-core/finely stranded
Dimensions (W × H × D) in mm	26 × 125 × 116	70 × 125 × 125	70 × 125 × 125
Weight, approx.	0.15 kg	0.5 kg	1.2 kg
Installation	Can be snapped directly on the side of the basic unit (6EP1 .3.-3BA00)	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15

PSE200U selectivity module, SITOP select diagnostics module

Overview

Product	PSE200U selectivity module		SITOP select diagnostics module
Type	4 x 3 A	4 x 10 A	4 x 10 A
Order No.	6EP1 961-2BA11	6EP1 961-2BA21	6EP1 961-2BA00
			
	The selectivity module is used in conjunction with 24 V power supplies to distribute the load current over several current circuits and to monitor the individual currents. Faults in individual circuits caused by overload or short-circuit are detected and selectively switched off so that further load current paths remain unaffected by the fault. This achieves fast fault diagnostics and minimizes standstill times.	The selectivity module is used in conjunction with 24 V power supplies to distribute the load current over several current circuits and to monitor the individual currents. Faults in individual circuits caused by overload or short-circuit are detected and selectively switched off so that further load current paths remain unaffected by the fault. This achieves fast fault diagnostics and minimizes standstill times.	The diagnostics module is used in conjunction with 24 V power supplies to distribute the load current over several current circuits and to monitor the individual currents. Faults in individual circuits caused by overload or short-circuit are detected and selectively switched off so that further load current paths remain unaffected by the fault. This achieves fast fault diagnostics and minimizes standstill times.

Technical specifications

Product	PSE200U selectivity module		SITOP select diagnostics module
Type	4 x 3 A	4 x 10 A	4 x 10 A
Order No.	6EP1 961-2BA11	6EP1 961-2BA21	6EP1 961-2BA00
Input			
Rated voltage value $V_{in\ rated}$	Controlled DC voltage **24 V DC**	Controlled DC voltage **24 V DC**	Controlled DC voltage [1] **24 V DC**
Voltage range	22 ... 30 V	22 ... 30 V	22 ... 30 V
Overvoltage resistance	35 V	35 V	35 V; 100 ms
Rated current $I_{in\ rated}$	12 A	40 A	40 A
Output			
Rated voltage $V_{out\ rated}$	Controlled DC voltage **V_{in} – approx. 0.2 V**	Controlled DC voltage **V_{in} – approx. 0.2 V**	Controlled DC voltage **V_{in} – approx. 0.3 V**
Total tolerance	In accordance with the supplying input voltage	In accordance with the supplying input voltage	In accordance with the supplying input voltage
Number of output channels	4	4	4
Rated current value $I_{out\ rated}$	**3 A per channel**	**10 A per channel**	**10 A per channel**
Adjustment range	0.5 ... 3 A per channel via potentiometer	3 ... 10 A per channel via potentiometer	2 ... 10 A per channel via potentiometer
Parallel switching of several channels	Not permitted	Not permitted	Not permitted
Channel connection	Simultaneous connection of all channels after power up of the supply voltage > 20 V, delay time of 25 ms, 100 ms or adjustable "load optimized" via DIP switch for sequential connection	Simultaneous connection of all channels after power up of the supply voltage > 20 V, delay time of 25 ms, 100 ms or adjustable "load optimized" via DIP switch for sequential connection	Simultaneous connection of all channels after power up of the supply voltage, delay time of 24 ms or 100 ms programmable for sequential connection
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 97 %	Approx. 97 % (typ. 99 %)	Approx. 97 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 9 W	Approx. 30 W (typ. 10 W)	Approx. 30 W
Switch-off characteristic per channel			
Overcurrent switch-off	I_{out} = 1.0 ... 1.3 × set value, switch-off after approx. 5 s	I_{out} = 1.0 ... 1.3 × set value, switch-off after approx. 5 s	I_{out} = 1.0 ... 1.3 × set value, switch-off after approx. 5 s
Current limitation	I_a = 1.3 × set value, switch-off not before typ. 100 ms	I_a = 1.3 × set value, switch-off not before typ. 100 ms	I_{out} = 1.35 × set value, switch-off after approx. 50 ...100 ms
Immediate switch-off	I_{out} > set value and V_{in} < 20 V, switch-off after approx. 0.5 ms	I_{out} > set value and V_{in} < 20 V, switch-off after approx. 0.5 ms	I_{out} > set value and V_{in} < 20 V, switch-off after approx. 0.5 ms
Residual current at switch-off	–	–	Typ. 20 mA
Reset	Using keys for each channel	Using keys for each channel	Using keys on the module
Remote reset	Non-isolated 24 V input (signal level "high" at >15 V)	Non-isolated 24 V input (signal level "high" at >15 V)	–

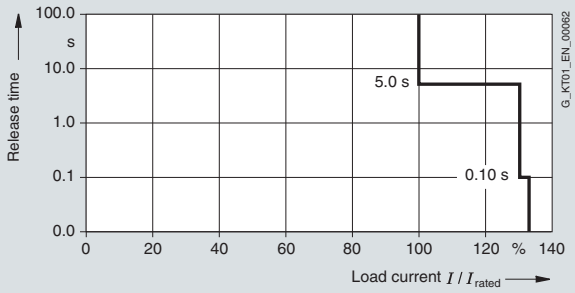
[1] SITOP select is not designed for operation with DC UPS module 40 A (6EP1 931-2FC21/-2FC42).

Technical specifications (continued)

Product	PSE200U selectivity module		SITOP select diagnostics module
Type	4 x 3 A	4 x 10 A	4 x 10 A
Order No.	6EP1 961-2BA11	6EP1 961-2BA21	6EP1 961-2BA00
Protection and monitoring			
Device/line protection	Internal fuse 5 A per channel (not accessible)	Internal fuse 15 A per channel (not accessible)	FKS blade-type fuse per channel (equipped with 15 A fuse in as-delivered state)
Status displays	Three-color LED per channel: • Green LED for "Output switched through" • Yellow LED for "Output turned off manually" • Red LED for "Output turned off because of overcurrent"	Three-color LED per channel: • Green LED for "Output switched through" • Yellow LED for "Output turned off manually" • Red LED for "Output turned off because of overcurrent"	Two-color LED per channel: • Green LED for "Output switched through" • Red LED for "Output turned off because of overcurrent"
Signaling	Common signal contact (changeover contact, rating 0.1 A/24 V DC)	Common signal contact (changeover contact, rating 0.1 A/24 V DC)	Common signal contact (NO contact, rating 0.5 A/24 V DC)
Safety			
Protection class	In accordance with EN 60950-1 and EN 50178 Class III	In accordance with EN 60950-1 and EN 50178 Class III	In accordance with EN 60950-1 and EN 50178 Class III
Degree of protection (EN 60529)	IP20	IP20	IP20
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	UL-recognized (UL 2367) File E328600; cURus (UL 508, CSA22.2 No. 107.1), File E197259	UL-recognized (UL 2367) File E328600; cURus (UL 508, CSA22.2 No. 107.1), File E197259	UL-Recognized (UL 2367) File E328600; cURus (UL 508, CSA C22.2 No. 107.1) File E197259; cURus (UL 60950, CSA C22.2 No. 60950), File E151273
Explosion protection	ATEX (EX) II 3G Ex nAC II T4; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Gr ABCD T4	ATEX (EX) II 3G Ex nAC II T4; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Gr ABCD T4	ATEX (EX) II 3G Ex nAC IIC T4 U; cCSAus (CSA C22.2 No. 60079, UL 60079), Class I, Div. 2. Gr ABCD T4
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Permitted ambient temperature	0 ... +60 °C with natural convection	0 ... +60 °C with natural convection	0 ... +60 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections			
• Input +24 V	2 screw terminals for 0.5 ... 10 mm^2	2 screw terminals for 0.5 ... 10 mm^2	2 screw terminals for 0.33 ... 10 mm^2
• Input 0 V	2 screw terminals for 0.5 ... 4 mm^2	2 screw terminals for 0.5 ... 4 mm^2	2 screw terminals for 0.22 ... 4 mm^2
• Output 1 ... 4	1 screw terminal each for 0.5 ... 4 mm^2	1 screw terminal each for 0.5 ... 4 mm^2	1 screw terminal each for 0.22 ... 4 mm^2
• Signaling contact	3 screw terminals for 0.5 ... 4 mm^2	3 screw terminals for 0.5 ... 4 mm^2	2 screw terminals for 0.22 ... 4 mm^2
• Remote reset	1 screw terminal for 0.5 ... 4 mm^2	1 screw terminal for 0.5 ... 4 mm^2	–
Dimensions (W × H × D) in mm	72 × 80 × 72	72 × 80 × 72	72 × 90 × 90
Weight, approx.	0.2 kg	0.2 kg	0.4 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15

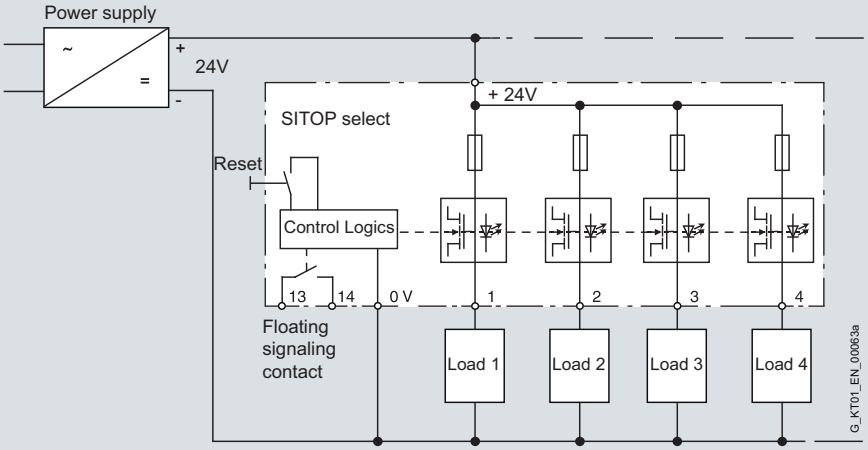
PSE200U selectivity module, SITOP select diagnostics module

Characteristics

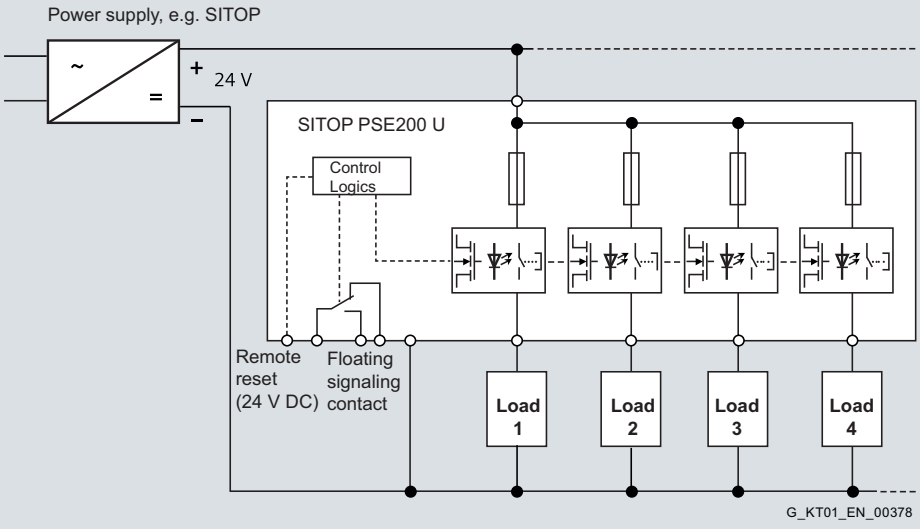


Switch-off characteristic

Circuit diagrams



Switching principle SITOP select



Switching principle SITOP PSE200U

Overview

Product	SITOP inrush current limiter
Order No.	6EP1 967-2AA00

The SITOP inrush current limiter module is used to reliably reduce the starting currents that are caused, for example, by capacitors or with pulse-controlled power supplies by the rectifier circuit on the input side with capacitor charging

In 1-phase AC networks, it is supplied with rated voltages of 100 V, 120 V or 230 V and in 2-phase and 3-phase AC networks with 208 V to 480 V on the line side upstream of capacitors and power supplies and it limits the inrush current temperature-independently up to e. g. < 10 A at 230 V. In static operation the limit resistance is bypassed after approx. 120 ms and the resulting power loss is reduced.

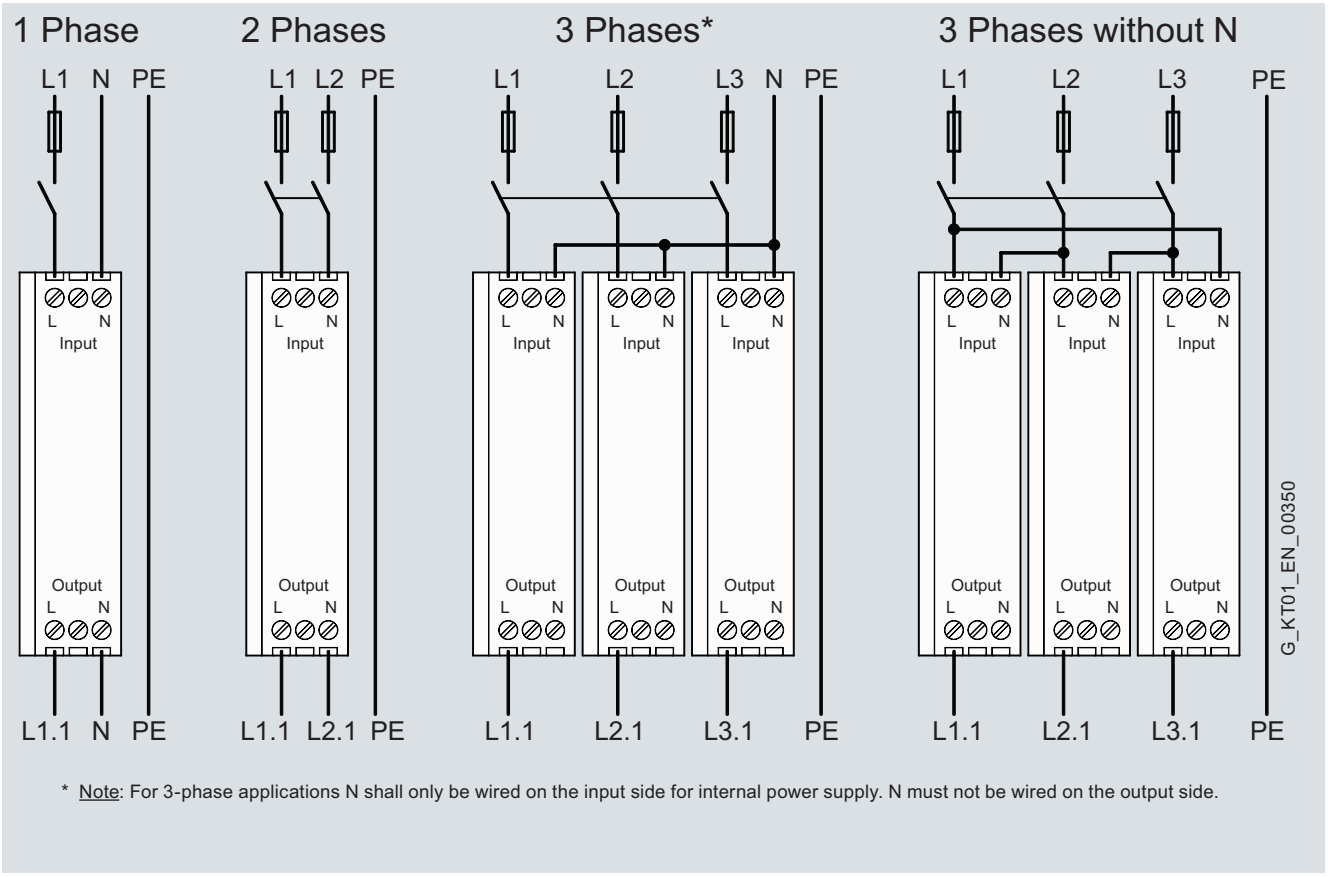
Technical specifications

Product	SITOP inrush current limiter
Order No.	6EP1 967-2AA00
Input	
Rated voltage value $V_{in\ rated}$	AC voltage 1-phase, 2-phase, 50/60 Hz
Voltage range	100 ... 480 V AC
Overvoltage resistance	85 ... 575 V
Input current $I_{in\ rated}$	–
	–
Output	
Rated voltage $V_{out\ rated}$	In accordance with the supply voltage
Rated current value $I_{out\ rated}$	Max. 10 A
Mains buffering	–
Buffering time, max.	–
Parallel switching for enhanced performance	No
Protection and monitoring	
Current limiting, static	–
Short-circuit protection	Must be ensured with an upstream protective device
Signaling/alarm signals	
Status display	Green LED
Alarm signals	–

Product	SITOP inrush current limiter
Order No.	6EP1 967-2AA00
Safety	
	In accordance with EN 60950-1 and EN 50178
Galvanic isolation	No
Protection class	Class II
CE mark	Yes
UL/cUL (CSA) approval	Yes, cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference	EN 61000-6-3
Noise immunity	EN 61000-6-2
Operating data	
Permitted ambient temperature	0 ... +60 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	Input and output (L1, N): One screw terminal each for 0.2 ... 2.5 mm^2 single-core/finely stranded;
Dimensions (W × H × D) in mm	22.5 × 80 × 91
Weight, approx.	0.12 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15

SITOP inrush current limiter

Circuit diagrams



* Note: For 3-phase applications N shall only be wired on the input side for internal power supply. N must not be wired on the output side.

SITOP inrush current limiter connection diagram

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
SITOP modular signaling module					
	–	–	–	**6EP1 961-3BA10**	
PSE202U redundancy module					
	**24 V DC**	**V_{in} – approx. 0.5 V**	20 A	**6EP1 961-3BA21**	
SITOP modular buffer module					
	**24 V DC**	**V_{in} – approx. 1 V**	40 A	**6EP1 961-3BA01**	
SITOP PSE200U selectivity module					
	**24 V DC**	**V_{in} – approx. 0.2 V**	4 x 3 A 4 x 10 A	**6EP1 961-2BA11** **6EP1 961-2BA21**	
SITOP select diagnostics module					
	**24 V DC**	**V_{in} – approx. 0.3 V**	4 x 10 A	**6EP1 961-2BA00**	
SITOP inrush current limiter					
	**100-480 V AC**	**100-480 V AC**	10 A	**6EP1 967-2AA00**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals

Notes

SITOP Uninterruptible power supplies UPS 24 V DC

12

Export regulations AL and ECCN
see page 17/9

Overview

Overview

Buffer module

Expansion module with electrolyte capacitors for bridging temporary power failures. Can be combined with SITOP modular. See also under „Buffer module“, chapter 11.

Selection criteria:

- Low-cost protection against power failures for max. 10 seconds
- Supports the power supply unit when there is a temporarily increased power demand
- High load current up to 40 A

SITOP DC UPS module

DC UPS module with maintenance-free lead batteries for energy storage. Bridging of power failures even for hours.

Selection criteria:

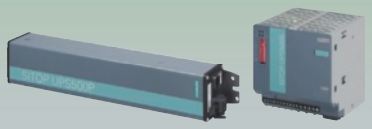
- The 24 V power supply is maintained for a long time, e.g. in order to continue processes.
- High load current up to 40 A

SITOP UPS500

DC UPS with high-capacity double-layer capacitors. Bridging of power failures for several minutes.

Selection criteria:

- Backup of data and closing of applications within minutes.
- Absolutely maintenance-free
- High ambient temperatures up to 60 °C
- No ventilation is required since no gas is emitted
- For distributed applications without control cabinet



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The uninterruptible power supply DC with battery modules consists of DC UPS modules with 6 A, 15 A, or 40 A output current and the battery modules 1.2 Ah, 3.2 Ah, 7 Ah and 12 Ah (contains lead-acid batteries with corrosion-resistant lead-calcium high-performance grid plates and fiber-glass mat) and 2.5 Ah (contains high-purity lead-acid "high-temperature batteries").

The maintenance-free SITOP UPS500 with capacitors as energy storage units is especially well suited for use at high ambient temperatures. Another advantage of these high-capacity double-layer capacitors is the shorter charge times.

For flexible use, there is the SITOP UPS500S - 15 A basic unit in 2.5 kW and 5 kW versions. A maximum of 3 SITOP UPS501S expansion modules with 5 kW can be connected in parallel to increase the buffer times. The IP65 version SITOP UPS500P disposes of capacitors for 5 or 10 kW and provides up to 7 A of output current.

Overview (continued)

SITOP power supply

24 V DC

AC or 3 AC

DC UPS module with battery module

SITOP UPS500S basic unit 15 A
maintanance-free with capacitor, optionally with expansion module as additional energy storage

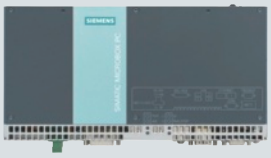
G_KT01_EN_00357

Load

Messages
- Mains or buffer operation
- Buffer ready or alarm
- Charging status >85 % or <85 %

via USB interface or floating relay contacts

24 V DC



USB interface for data exchange with industrial PC

12

DC UPS software

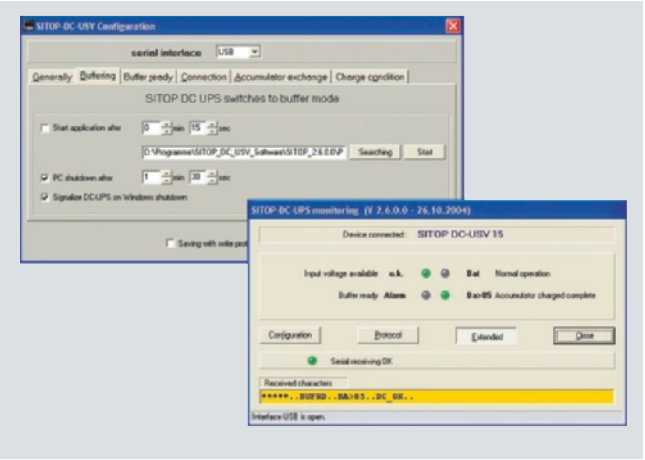
Overview

The uninterruptible DC power supplies are optionally available with USB interface or serial interface. All relevant messages about the status of the uninterruptible DC power supply can be transferred to a PC (e.g. SIMATIC IPC) via this interface.

SITOP DC UPS software provides the user with a very easy to use software tool with which the signals sent by the uninterruptible DC power supply can be further processed on the PC. In monitoring mode, the statuses of the uninterruptible DC power supply are visualized on the PC.

Safe shutdown in the event of a power failure and automatic PC restart are supported. It is also possible to freely define responses to the different operating states of the uninterruptible DC power supply, so that extremely flexible integration into a wide variety of applications is possible.

The software runs under the operating systems, Windows 2000, Windows XP, Windows Vista and Windows 7. It is available as freeware on the SITOP homepage and can be downloaded free of charge.
http://www.siemens.com/sitop-ups



Monitoring and configuration window of software V3 for SITOP DC UPS

12

Overview

Uninterruptible power supplies normally store the electrical energy in lead-acid batteries. Temperatures such as those prevalent in control cabinets considerably shorten the service life of the battery, however, and the batteries must be replaced on a regular basis – annually at an ambient temperature of 40 °C, for example. The innovative SITOP UPS500, however, is based on absolutely maintenance-free capacitors with a long service life. Even at temperatures of 50 °C they still have more than 80 % of their capacity after 8 years, so there is no need to replace the energy stores. Because the capacitors do not emit any gas, the control cabinet does not have to be ventilated.

Another advantage is the significantly shorter charging times of the double-layer capacitors, which ensure that the buffer is ready very quickly after loss of power.

The IP65 version SITOP UPS500P has capacitors for 5 or 10 kW and provides up to 7 A of output current. The oblong metal enclosure is also suitable for installing on support arm systems.

Selection table SITOP UPS500 (optional with SITOP UPS501S expansion module) and mains buffering times

Buffering and charging times										
SITOP UPS500S/501S configurations									**UPS500P**	
Basic unit	2.5 kW	5 kW	2.5 kW	5 kW	2.5 kW	5 kW	2.5 kW	5 kW	5 kW	10 kW
Expansion modules	–	–	1 × 5 KWs	1 × 5 KWs	2 × 5 KWs	2 × 5 KWs	3 × 5 KWs	3 × 5 KWs	–	–
Total energy	2.5 kW	5 kW	7.5 kW	10 kW	12.5 kW	15 kW	17.5 kW	20 kW	5 kW	10 kW
Load current	**Buffer times**									
0.5 A	134 s	236 s	390 s	478 s	632 s	748 s	851 s	1007 s	284 s	647 s
0.8 A	90 s	167 s	266 s	346 s	440 s	527 s	580 s	706 s	190 s	435 s
1 A	75 s	138 s	219 s	296 s	365 s	414 s	490 s	572 s	153 s	351 s
2 A	38 s	76 s	122 s	156 s	203 s	230 s	265 s	306 s	80 s	152 s
3 A	26 s	52 s	82 s	106 s	136 s	159 s	186 s	213 s	53 s	108 s
4 A	19 s	39 s	61 s	81 s	101 s	120 s	139 s	160 s	40 s	84 s
5 A	15 s	31 s	49 s	65 s	81 s	95 s	111 s	130 s	30 s	68 s
6 A	12 s	26 s	40 s	55 s	67 s	80 s	94 s	106 s	25 s	57 s
7 A	10 s	21 s	34 s	47 s	58 s	69 s	81 s	82 s	21 s	49 s
8 A	8 s	18 s	29 s	40 s	50 s	59 s	69 s	79 s	–	–
10 A	6 s	15 s	23 s	32 s	39 s	47 s	54 s	62 s	–	–
12 A	4 s	12 s	19 s	26 s	32 s	38 s	44 s	52 s	–	–
15 A	3 s	9 s	14 s	20 s	25 s	30 s	35 s	40 s	–	–
Charging current	**Charging times**									
2 A	54 s	120 s	158 s	223 s	263 s	318 s	355 s	417 s	130 s	360 s
1 A	110 s	205 s	311 s	425 s	503 s	625 s	695 s	816 s	-	-

Important information for selecting the energy storage units:

When the mains buffering times were determined, the discharge period of new or non-aged, completely charged capacitors was used as a basis. At a continuous ambient temperature of +50 °C, a loss of capacity of approx. 20% must be considered after a service life of 8 years.

24 V DC

DC UPS with capacitors SITOP UPS500

Overview

Product	SITOP UPS500S 15 A	SITOP UPS500P 7 A
Power supply, type	Basic unit 15 A	Basic unit 7 A, IP65
Order No.	**6EP1 933-2EC41** (with USB interface and 2.5 kWs) **6EP1 933-2EC51** (with USB interface and 5 kWs)	**6EP1 933-2NC01** (with USB interface and 5 kWs) **6EP1 933-2NC11** (with USB interface and 10 kWs)
		
	• Compact design, only 120 mm wide • Two versions with integrated energy storage units: 2.5 kWs or 5 kWs • Can be expanded easily using a user-friendly plug-in system with the expansion module 5 kWs • Absolutely uninterruptible bridging of power failures, as soon as the DC UPS input voltage falls below the value set by the DIP switches • High level of safety and availability through monitoring of operational readiness, and monitoring of the capacitor charge (message "> 85 % charged") • Support for automatic warm restart of industrial PCs through selectable shutdown characteristics • With USB interface	• Compact design, degree of protection IP65 • For distributed use, e.g. on support arms • Integrated energy storage: 5 kW or 10 kW • Ambient temperature range for operation: 0 to +55 °C • High degree of efficiency 96.9 % or or low power loss, approx. 6 W with 7 A load current • USB interface • Indication of the operating states "normal operation", "buffer mode", alarm message "Buffer not ready" and capacitor charge > 85 %

Technical specifications

Product	SITOP UPS500S 15 A	SITOP UPS500P 7 A
Input L+/M in normal operation		
	Controlled DC voltage	Controlled DC voltage
Rated voltage $V_{in\ rated}$ [1]	**24 V DC**	**24 V DC**
Voltage range	22 ... 29 V	22.5 ... 29 V
Connection threshold for buffering	22.5 V DC ± 0.1 V (factory setting), adjustable in the range 22 ... 25.5 V DC (in 0.5 V increments)	22.5 V DC ±0.1 V
Rated current $I_{in\ rated}$	15.2 A + approx. 2.3 A with empty energy storage (capacitor)	7 A + approx. 2 A with empty energy storage (capacitor)
Mains buffering		
Mains buffering or buffering times without add-on modules	6EP1 933-2EC41: 15 A for 3 s or 10 A for 6 s or 5 A for 15 s or 2 A for 38 s 6EP1 933-2EC51: 15 A for 9 s or 10 A for 15 s or 5 A for 31 s or 2 A for 76 s	7 A for 49 s or 5 A for 68 s or 3 A for 108 s or 1 A for 351 s
Mains buffering or buffering times with expansion modules	For longer buffering times, see table	not applicable
On/off control circuit	External isolated NO contact required (loading max. 15 V DC/max. 10 mA). Buffering is terminated by disconnecting the control circuit.	not applicable
Methods of setting the buffering time	Adjustable using DIP switches to a maximum buffering time up to forced shutdown at approx. 7 V internal capacitor voltage (output remains constant at 24 V up to that point) or to a time limit of 5 ... 315 s (in 10 s increments) if the energy content is sufficient for the required current	not applicable
Interruption	Adjustable with DIP switch, either: • Interruption of the output voltage despite returning input voltage for 5 s following expiry of set buffering time to support automatic restarting of industrial PCs Or • No forced interruption at the end of the set buffer time	not applicable

[1] All SITOP 24 V DC power supplies are permissible without restriction.

Technical specifications (continued)

Product	SITOP UPS500S 15 A	SITOP UPS500P 7 A
Power supply, type	**Basic unit 15 A**	**Basic unit 7 A, IP65**
Order No.	**6EP1 933-2EC41** (with USB interface and 2.5 kWs) **6EP1 933-2EC51** (with USB interface and 5 kWs)	**6EP1 933-2NC01** (with USB interface and 5 kWs) **6EP1 933-2NC11** (with USB interface and 10 kWs)
Output L+/M in normal operation		
Rated voltage $V_{out\ rated}$	24 V DC (controlled)	24 V DC (controlled)
Voltage range	23.3 ... 24.7 V DC or 24 V DC ±3%	23.3 ... 24.7 V DC or 24 V DC ±3%
Startup delay	Approx. 600 ms	Approx. 600 ms
Voltage rise	Approx. 25 ms	Approx. 25 ms
Output current I_{out}	**0 ... 15 A**	**0 ... 7 A**
Dynamic current with overload	Electronic current limitation to typically 25 A for approx. 200 ms, then electronic shutdown of the output with automatic restart attempts (approx. 20 s intervals between restart attempts).	Electronic shutdown at typ. 30 A, automatic restart after 20 s
Dynamic current with short-circuit	Electronic current limitation to typically 25 A for approx. 110 ms, then electronic shutdown of the output with automatic restart attempts (approx. 20 s intervals between restart attempts).	Electronic shutdown at typ. 30 A, automatic restart after 20 s
Output L+/M with buffer mode		
Rated voltage $V_{out\ rated}$	24 V DC	24 V DC
Approximate voltage range	23.3 ... 24.7 V DC or 24 V DC ±3%	23.3 ... 24.7 V DC or 24 V DC ±3%
Output current I_{out}	0 ... 15 A	0 ... 7 A
Dynamic current with overload	Electronic current limitation to typically 25 A for approx. 200 ms, then electronic shutdown of the output (restarts after normal operation is resumed).	Electronic shutdown at typ. 30 A, automatic restart after 20 s
Dynamic current with short-circuit	Electronic current limitation to typically 25 A for approx. 110 ms, then electronic shutdown of the output (restarts after normal operation is resumed).	Electronic shutdown at typ. 30 A, automatic restart after 20 s
Charging current	Approx. 1 A (factory setting), adjustable to 1 A or 2 A (charging is carried out with closed and open on/off circuit).	2 A set permanently
Charge time after a discharge	6EP1 933-2EC41: 110 s with 1 A, 54 s with 2 A 6EP1 933-2EC51: 205 s with 1 A, 120 s with 2 A	approx. 300 s
Charging time with add-on modules	For longer charging times, see table	not applicable
Efficiency/heat loss		
At $V_{out\ rated}$, $I_{out\ rated}$ approx.	97.5 % / 9 W	96.5 % / 5.2 W
Protection and monitoring		
Reverse polarity protection	against polarity reversal on input voltage	against polarity reversal on input voltage
Overload protection	Electronic shutdown of the output in accordance with "dynamic current with overload" in normal operation (automatic restart attempts) or in buffer mode (restart following return to normal operation).	Electronic shutdown of the output in accordance with "dynamic current with overload" in normal operation (automatic restart attempts) or in buffer mode (restart following return to normal operation). With thermal overload protection
Short-circuit protection	Electronic shutdown of the output in accordance with "dynamic current with overload" in normal operation (automatic restart attempts) or in buffer mode (restart following return to normal operation), built-in (unaccessible) fuse rated at 20 A.	Electronic shutdown of the output in accordance with "dynamic current with overload" in normal operation (automatic restart attempts) or in buffer mode (restart following return to normal operation). With thermal overload protection

Technical specifications (continued)

Product	SITOP UPS500S 15 A	SITOP UPS500P 7 A
Power supply, type	**Basic unit 15 A**	**Basic unit 7 A, IP65**
Order No.	**6EP1 933-2EC41** (with USB interface and 2.5 kWs) **6EP1 933-2EC51** (with USB interface and 5 kWs)	**6EP1 933-2NC01** (with USB interface and 5 kWs) **6EP1 933-2NC11** (with USB interface and 10 kWs)
Signaling		
Normal operation	Green LED (OK) and isolated relay contact (changeover contact) [2]	Green LED (OK)
Buffer mode (capacitor supplies load alone or in addition to the PS in the case of overload)	Yellow LED (Bat) and isolated relay contact (changeover contact) [2]	Yellow LED (Bat)
Alarm (buffer not ready, or pre-warning from < 12 V capacitor voltage)	Red LED (Alarm) and isolated relay contact (changeover contact) [2]	Red LED (Alarm)
"Capacitor charged > 85 %" [1]	Second green LED (Bat > 85 %) and isolated NO contact (rest position = open)	Second green LED (Bat > 85 %)
USB interface		
	Output of all alarm signals and receipt of the "Remote Timer start" signal. Technical design: Specification 2.0 with Full Speed, ie. 2 Mbit/s, supplied by DC UPS with +5 V ("self powered") Required connection to the PC: Commercially available 4-core shielded cable, 90 ohms, max. 5 m, USB series "A" connector to PC and USB series "B" connector to DC UPS	Output of all alarm signals and receipt of the "Remote Timer start" signal. Technical design: Specification 2.0 with Full Speed, ie. 2 Mbit/s, supplied by DC UPS with +5 V ("self powered") Required connection to the PC: see connector set
Software	A software tool (executable under Windows 2000, Windows XP, Windows Vista and Windows 7) for reading and processing the signals can be downloaded from http://www.siemens.com/sitop-ups Additional information on the interface is also available at this site.	A software tool (executable under Windows 2000, Windows XP, Windows Vista and Windows 7) for reading and processing the signals can be downloaded from http://www.siemens.com/sitop-ups Additional information on the interface is also available at this site.
Control signals		
On/off control signal	Buffering is terminated by opening the control circuit or by means of DIP switches on the device (DIP switch must be in "Off" position). All other functions are retained.	not applicable
"Remote Timer start" via USB interface	Starts mains buffering for the set buffer time	Starts mains buffering for the set buffer time
Safety		
Primary/secondary isolation	No	No
Protection class	Class III (ext. circuit and power-supply unit: SELV in accordance with EN 60950 required)	Class III (ext. circuit and power-supply unit: SELV in accordance with EN 60950 required)
EMC		
Emitted interference	Radio interference suppression according to EN 55022. Limit-value curve B	Radio interference suppression according to EN 55022. Limit-value curve B
Noise immunity	according to EN 61000-6-2	according to EN 61000-6-2
Ambient conditions		
Ambient temperature during operation	0 ... +60 °C with natural convection	0 ... +55 °C with natural convection
Transport/storage temperature	-40 ... +70 °C	-40 ... +70 °C
Degree of protection (EN 60529)	IP20	IP65
Humidity class	Rated conditions in accordance with EN 60721, climate class 3K3 (relative humidity 5 % ... 85 % and absolute humidity 1 g/m^3 ... 25 g/m^3; no condensation)	Rated conditions in accordance with EN 60721, climate class 3K3 (relative humidity 5 % ... 85 % and absolute humidity 1 g/m^3 ... 25 g/m^3; no condensation)

[1] 85 % with regard to residual capacity still available depending on aging. The original capacity (= capacity when new) reduces by only approx. 20 % within 8 years of operation even at a high ambient temperature of the device of +50 °C, for example, so that 80 % residual capacity still remains. The backup times also reduce by approximately 20 % in 8 years (at +50 °C) with small currents (up to approximately 5 A), and by approximately 30 % with high load currents (over 10 A).
Note: The lower the ambient temperature, the smaller the capacity reduction (approximately one half per 10 °C lower ambient temperature, that is at +40 °C, for example, only 10 % capacity reduction in 8 years).

[2] Permissible contact rating: 60 V DC/1 A or 30 V AC/1 A.

Technical specifications (continued)

Product	SITOP UPS500S 15 A	SITOP UPS500P 7 A
Power supply, type	**Basic unit 15 A**	**Basic unit 7 A, IP65**
Order No.	**6EP1 933-2EC41** (with USB interface and 2.5 kWs) **6EP1 933-2EC51** (with USB interface and 5 kWs)	**6EP1 933-2NC01** (with USB interface and 5 kWs) **6EP1 933-2NC11** (with USB interface and 10 kWs)
Approvals		
CE	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1) File E197259	–
Mechanics		
Input connections 24 V DC	2 screw terminals for 1 ... 4 mm^2/17 ... 11 AWG	See connector set [1]
Output connections 24 V DC	4 screw terminals for 1 ... 4 mm^2/17 ... 11 AWG	See connector set [1]
Connections for control circuit and alarm signals	10 screw terminals for 0.5 ... 2.5 mm^2/20 ... 13 AWG	not applicable
USB port	Yes	Yes
Dimensions (W x H x D) in mm	120 × 125 × ca. 125	400 (without connector) × 80 × 80 470 (without connector) × 80 × 80
Required clearances	50 mm above and 50 mm underneath unit	50 mm above and 50 mm underneath unit
Weight	Approx. 1.0 kg	Approx. 1.9 kg Approx. 2.2 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Screw mounting

[1] The connector set contains connection plugs for input and output and pre-assembled USB cables, 2 m long (connector set not included in the scope of supply SITOP UPS500P!) MLFB: 6EP1 975-2ES00.

Overview

Product	SITOP UPS501S
Power supply, type	**Expansion module**
Order No.	**6EP1 935-5PG01**

- Additional energy storage (5 kW)
- Up to 3 expansion modules can be connected to a SITOP UPS500S to extend the buffer times
- Complete with balancing and safety circuits

Technical specifications

Product	SITOP UPS501S
Power supply, type	**Expansion module**
Order No.	**6EP1 935-5PG01**
Mechanics	
Connections	Can be easily connected to SITOP UPS500S via a user-friendly plug-in system
Dimensions (W × H × D) in mm	Approx. 70 × 125 × 125
Weight	Approx. 0.7 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15

Overview

By combining a DC UPS module with at least one 24 V battery module and a SITOP power supply unit, longer power failures can be bridged without any interruption.

The combination is used for example in machine-tool building, in the textile industry, on all types of production lines and filling plants, and in conjunction with 24 V industrial PCs. This prevents the negative effects which often result from power failures.

DC-UPS modules: 6 A, 15 A, 40 A

Battery modules:
- 1.2 Ah (contains lead-acid batteries with corrosion-resistant lead-calcium, high-capacity grid plates and fiberglass mat)
- 3.2 Ah (contains lead-acid batteries with corrosion-resistant lead-calcium, high-capacity grid plates and fiberglass mat)
- 7 Ah (contains lead-acid batteries with corrosion-resistant lead-calcium, high-capacity grid plates and fiberglass mat)
- 12 Ah (contains lead-acid batteries with corrosion-resistant lead-calcium, high-capacity grid plates and fiberglass mat)
- 2.5 Ah (contains "high-temperature battery" lead-acid type)

Selection table for battery modules and mains buffering times

Load current	Battery module 1.2 Ah (6EP1935-6MC01)	Battery module 3.2 Ah (6EP1935-6MD11)	Battery module 7 Ah (6EP1935-6ME21)	Battery module 12 Ah (6EP1935-6MF01)	Battery module 2.5 Ah (6EP1935-6MD31)
1 A	30 min	2.5 h	6 h	11 h	2 h
2 A	11 min	45 min	2.5 h	5 h	45 min
3 A	4 min	25 min	1.5 h	3 h	30 min
4 A	2 min	20 min	45 min	2 h	20 min
6 A	1 min	10 min	30 min	1 h	13 min
8 A	–	4 min	20 min	40 min	9 min
10 A	–	1.5 min	15 min	30 min	7 min
12 A	–	1 min	10 min	25 min	5.5 min
14 A	–	50 s	8 min	20 min	4.5 min
16 A	–	40 s	6 min	15 min	4 min
20 A	–	–	2 min	11 min	–

Important information for selecting the battery capacity:

- The mains buffering times are based on the discharge period of new or non-aged, fully charged battery modules at a battery temperature of not less than +25 °C down to a battery voltage of 21 V (with voltage drops in the DC UPS, approximately 20.4 V DC still remain for the load).

  Battery aging reduces the still available battery capacity up to the end of the service life to typically around 50 % of the original capacity value when new (1.2 Ah or 3.2 Ah or 7 Ah, etc.) and the internal resistance increases. When the message "Battery charge > 85 %" appears, only around 50 % × 85 % = approx. 43 % of the originally available capacity can be assumed at the end of the battery service life.

  At battery temperatures below +25 °C, the available capacity drops by another 30 % at +5 °C battery temperature from approx. 43 % to approx. 70 %. There is then only around 30 % of the original capacity available.

  A significantly larger battery capacity must therefore be selected when configuring the plant: A drop to approx. 50 % is compensated for by selecting 1 / approx. 0.5 = approx. double the battery capacity (required as per the table for the relevant load current and the relevant buffering time). Available capacity of approx. 43 % is compensated for by selecting 1 / approx. 0.43 = approx. 2.33 times battery capacity. Available capacity of approx. 30 % is compensated for by selecting 1 / approx. 0.3 = approx. 3.33 times battery capacity.

Recommendation:

- Instead of installing double the battery capacity to cope with battery aging, regular battery replacement midway through the expected service life (reduction of capacity to approx. 50 %) can be more advisable for the following reasons: Until the halfway point of the expected battery service life (or slightly beyond), capacity does not drop below 100 %. With regular replacement after halfway through expected service life, only single battery capacity (instead of double capacity) must be installed regarding aging (→ neutral in price with regard to battery module costs but requires only half the space).
- Replacing after half the service life dispenses in particular with the large scatter range of the residual capacity at the end of the service life, which is not accurately defined by battery manufacturers (after the full time, many batteries are above, but many are also below the average of 50 % residual capacity, that is, even if double the capacity is installed, the influence of aging at the end of service life is not reliably compensated for, but only typically) → In the case of replacement after half the expected service life, the configured buffering time is maintained significantly more reliably.

Overview (continued)

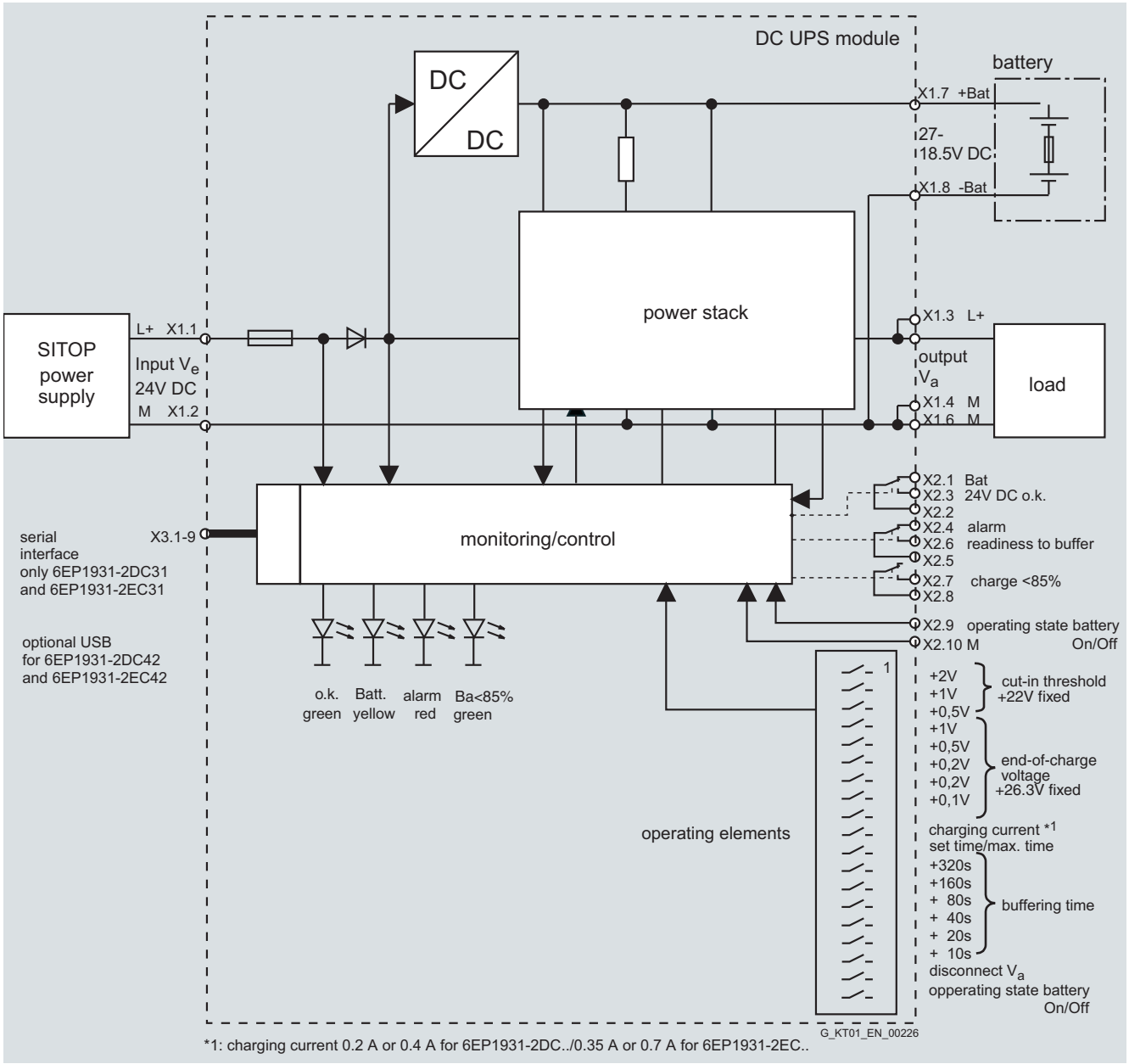
In the case of batteries stored in cool conditions (not exceeding +25 °C) and for not longer than approximately 4 months, the following service life can be assumed, strongly dependent on battery temperature:

Battery temperature	Drop to approx. 50 % of residual capacity	Recommendation: Replace all (with 100 % residual capacity)	Alternative recommendation
+20 °C	4 years	2 years	
+30 °C	2 years	1 year	
+40 °C	1 year	0.5 years	Install double capacity and replace (1 × per year)

In normal cases (installation in the coolest location in the control cabinet at approx. +30 °C), the battery with single installed battery capacity should be replaced in accordance with the selection table after 1 year of operation!

- On the DC UPS module 40 A, at least 2 battery modules of 7 Ah or higher must be connected in parallel for output currents > 30 A. When connecting battery modules in parallel, you must ensure identical capacity and aging.
- After a power failure, the battery module is disconnected from the loads at the end of the selected buffering time either automatically or electronically by opening the On/Off control circuit, and as soon as the 24 V input voltage is available again, it is quickly re-charged with the charge current of the relevant DC UPS module (with I-V charge characteristic: First constant current I for fast charging, and changeover to constant voltage V to maintain the charge when the battery is almost full).

Integration



*1: charging current 0.2 A or 0.4 A for 6EP1931-2DC../0.35 A or 0.7 A for 6EP1931-2EC..

Function

The following timing diagrams show examples of the characteristic of the input and output voltage at the terminals of the DC UPS module as well as the signal characteristic of the signals (relays) and of the remote signal (port).

"Long" power failure with DC UPS without serial or USB port (Fig. 12/1)

Power restoration only once buffer time tp has expired (t3 follows t4):

Upon failure of the input voltage on the DC UPS module (time t1), the battery "Bat" immediately takes over the DC supply, and the output voltage V_{out} is then retained absolutely without interruption.

The isolated changeover contact "OK/Bat" switches over to its off position "Bat".

At the same point in time t1, the buffer time tp set on the DIP switches is started automatically.

The fact that the DIP switch is set to "Interruption output V_{out}" in this example has no effect because the input voltage returns at time t3 only once the set buffer time (time t4) has expired.

"Short" power failure with DC UPS without serial or USB port (Fig. 12/2)

Power restoration before buffer time tp has expired (t3 before t4):

Upon failure of the input voltage on the DC UPS module (time t1), the battery "Bat" immediately takes over the DC supply, and the output voltage V_{out} is then retained absolutely without interruption.

The isolated changeover contact "OK/Bat" switches over to its off position "Bat".

At the same point in time t1, the buffer time tp set on the DIP switches is started automatically.

With the DIP switch set to "Interruption output V_{out}", the output voltage V_{out} is automatically interrupted for 5 s once the set buffer time tp (time t4) has expired.

The battery has already been disconnected because the input voltage has returned at the time t3.

If the DIP switch is not set to "Interruption output V_{out}", there is no interruption in this example because the input voltage has already returned at time t3 prior to expiry of the set buffer time (time t4).

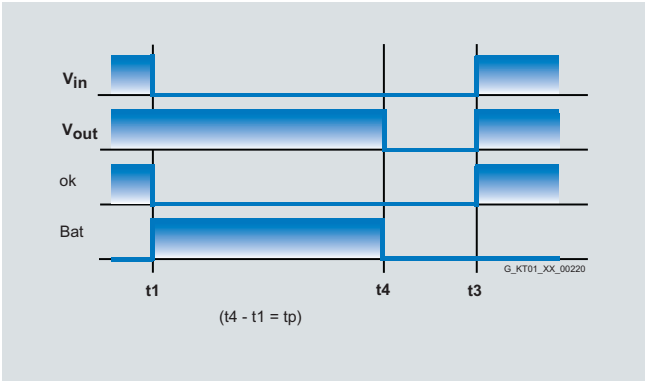


Figure 12/1 "Long power failure"

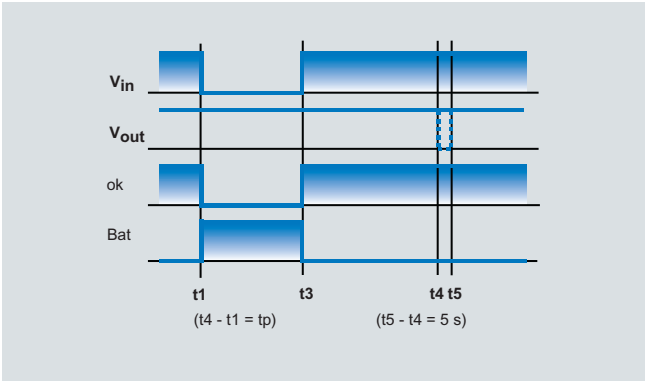


Figure 12/2 "Short power failure"

DC UPS without serial or USB port (6EP1931-2DC21/-2EC21/-2FC21)

DIP switch settings on device: buffer time tp (from 5 s to 635 s with bottom row nos. 2 to 7) / / t = according to setting (with bottom row no. 1 to left) / ⋮ = with setting for interruption V_{out} (with bottom row no. 8 to left)

Legend:

V_{in}:	Input voltage at terminals X1.1 – X1.2
V_{out}:	Output voltage at terminals X1.3 – X1.4 and X1.5 - X1.6
ok:	Signal for input voltage V_{in} OK or above the set battery connection threshold
Bat:	Signal for battery operation (batteries connected to output, batteries supply the load)
Remote:	Signal for remote timer start with signal level = 0 at pin 7 of 9-pin serial interface (pin 7 is usually the positive power supply for the interface)
t1:	Input voltage V_{in} missing or falls below the set connection threshold
t2:	Buffer time set on DIP switches is started by remote timer start (signal level = 0)
t3:	Input voltage V_{in} rises above set connection threshold
t4:	End of set buffer time (output is switched off and/or battery is disconnected)
t5:	Output is connected again 5 s after shutdown
tp:	Buffer time set on the DIP switches (bottom row nos. 2 to 7)

Function (continued)

"Long" power failure with DC UPS with serial or USB port (Fig. 12/3)

Power restoration only once buffer time tp (t3 follows t4) has expired:

Upon failure of the input voltage on the DC UPS module (time t1), the battery "Bat" immediately takes over the DC supply, and the output voltage V_{out} is then retained absolutely without interruption.

The isolated changeover contact "OK/Bat" switches over to its off position "Bat".

The buffer time tp set on the DIP switches is started at the user-selectable time t2 by means of the signal "Remote timer start" (signal level = 0 at pin 7 of the 9-pin serial port following previous signal chart according to operating instructions).

The fact that the DIP switch is set to "Interruption output V_{out}" in this example has no effect because the input voltage returns at time t3 only once the set buffer time (time t4) has expired.

Note: Without a remote signal level = 0 with a setting t = max. duration, there is no interruption to the output voltage in this case because the set buffer time is not started (or interruption only if the exhaustive discharge protection disconnects the accumulator and the input voltage has not returned by then).

"Short" power failure with DC UPS with serial or USB port (Fig. 12/4)

Power restoration before buffer time tp (t3 before t4) has expired:

Upon failure of the input voltage on the DC UPS module (time t1), the battery "Bat" immediately takes over the DC supply, and the output voltage V_{out} is then retained absolutely without interruption.

The isolated changeover contact "OK/Bat" switches over to its off position "Bat".

The buffer time tp set on the DIP switches is started at the user-selectable time t2 by means of the signal "Remote timer start" (signal level = 0 at pin 7 of the 9-pin serial port following previous signal chart according to operating instructions).

With the DIP switch set to "Interruption output V_{out}", the output voltage V_{out} is automatically interrupted for 5 s once the set buffer time tp (time t4) has expired.

The battery has already been disconnected because the input voltage has returned at the time t3.

The interruption to the output voltage V_{out} for 5 s permits an automatic restart for many industrial PCs, even if the line voltage (or the input voltage V_{in} on the DC UPS module) returns during shutdown of the PC, as in this example.

Note: Without a remote signal level=0 with a setting t = max. duration, there is no interruption in the output voltage here because the set buffer time is not started.

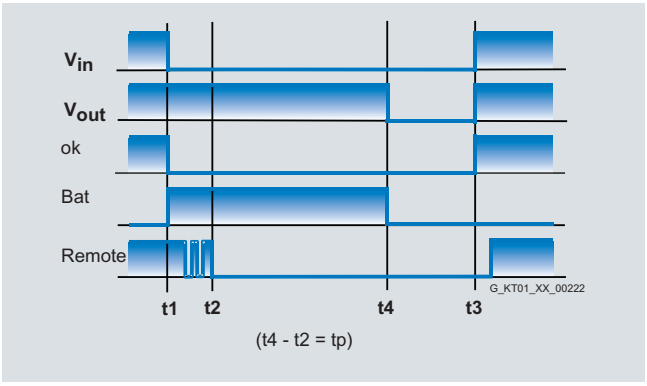


Figure 12/3 "Long power failure"

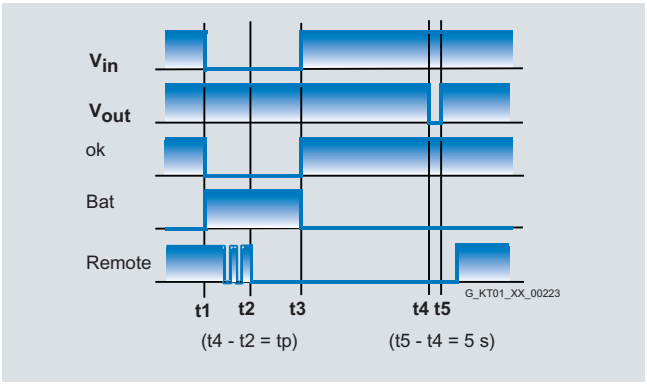


Figure 12/4 "Short power failure"

DC UPS with serial or USB port (6EP1931-2DC31/-2DC42/-2EC31/-2EC42/-2FC42)

DIP switch settings on device: buffer time tp (from 5 s to 635 s with bottom row nos. 2 to 7) / / t = max. time (with bottom row no. 1 to right) / interruption of V_{out} (with bottom row no. 8 to left)

Legend:

V_{in}:	Input voltage at terminals X1.1 – X1.2
V_{out}:	Output voltage at terminals X1.3 – X1.4 and X1.5 - X1.6
ok:	Signal for input voltage V_{in} OK or above the set battery connection threshold
Bat:	Signal for battery operation (batteries connected to output, batteries supply the load)
Remote:	Signal for remote timer start with signal level = 0 at pin 7 of 9-pin serial interface (pin 7 is usually the positive power supply for the interface)
t1:	Input voltage V_{in} missing or falls below the set connection threshold
t2:	Buffer time set on DIP switches is started by remote timer start (signal level = 0)
t3:	Input voltage V_{in} rises above set connection threshold
t4:	End of set buffer time (output is switched off and/or battery is disconnected)
t5:	Output is connected again 5 s after shutdown
tp:	Buffer time set on the DIP switches (bottom row nos. 2 to 7)

24 V DC

DC UPS with battery modules
DC UPS modules 6 A, 15 A, 40 A

Overview

Product	DC UPS module	DC UPS module	DC UPS module
Power supply, type	6 A	15 A	40 A
Order No.	**6EP1 931-2DC21** **6EP1 931-2DC31** (with serial interface) **6EP1 931-2DC42** (with USB interface)	**6EP1 931-2EC21** [1] **6EP1 931-2EC31** (with serial interface) **6EP1 931-2EC42** (with USB interface)	**6EP1 931-2FC21** [1] **6EP1 931-2FC42** (with USB interface)
			

Technical specifications

Product	DC UPS module	DC UPS module	DC UPS module
Power supply, type	6 A	15 A	40 A
Input L+/M in normal operation			
Rated voltage value $V_{in\ rated}$ [2] Voltage range	Controlled DC voltage **24 V DC** 22 ... 29 V DC	Controlled DC voltage **24 V DC** 22 ... 29 V DC	Controlled DC voltage **24 V DC** 22 ... 29 V DC
Connection threshold for battery	22.5 V DC ±0.1 V (factory setting), **adjustable in the range 22 to 25.5 V DC** (in 0.5 V increments)	22.5 V DC ±0.1 V (factory setting), **adjustable in the range 22 to 25.5 V DC** (in 0.5 V increments)	22.5 V DC ±0.1 V (factory setting), **adjustable in the range 22 to 25.5 V DC** (in 0.5 V increments)
Rated current value $I_{in\ rated}$	6 A + approx. 0.6 A with empty battery	15 A + approx. 1 A with empty battery	40 A + approx. 2.6 A with empty battery
Mains buffering			
Mains buffering or buffer time	Dependent on connected battery and load current, see selection table battery module and mains buffering times as well as the relevant important information notes!		
On/off control circuit	External isolated NO contact required (max. load 15 V DC / max. 10 mA). With an open control circuit, the battery is isolated from output L+, thus canceling mains buffering. If there is no input voltage, a quiescent current of approximately 0.3 mA is drawn from the battery disconnected from the output.		
Methods of setting the buffering time	**Adjustable** using DIP switches to a maximum buffering time up to forced shutdown due to exhaustive discharge protection (at approx. 19 V) or to a time limit **of 5 ... 635 s** (in 10 s steps)		
Interruption	**Adjustable** using DIP switch, **either:** • Interruption in output voltage despite returning input voltage for min. 5 s following expiry of set buffer time to support automatic restarting of industrial PCs or • No forced interruption on expiry of the set buffer time		
Output L+/M in normal operation			
Rated voltage $V_{out\ rated}$	**24 V DC** (output voltage of SITOP power supply)	**24 V DC** (output voltage of SITOP power supply)	**24 V DC** (output voltage of SITOP power supply)
Voltage range	Input voltage V_{in} less approx. 0.5 V DC	Input voltage V_{in} less approx. 0.5 V DC	Input voltage V_{in} less approx. 0.5 V DC
Startup delay	Approx. 1 s	Approx. 1 s	Approx. 1 s
Voltage rise	Typ. 60 ms	Typ. 60 ms	Typ. 360 ms
Output current I_{out}	**0 ... 6 A**	**0 ... 15 A**	**0 ... 40 A**
Dynamic current with overload	Electronic current limitation to 1.05 ... 1.4 × $I_{out\ rated}$ for approx. 80 ms, then electronic shutdown of the output with automatic restart attempts (approx. 20 s intervals between restart attempts)		
Dynamic current with short-circuit	Electronic current limitation to 1.5 ... 3 × $I_{out\ rated}$ for approx. 20 ms, then electronic shutdown of the output with automatic restart attempts (approx. 20 s intervals between restart attempts)		
Output L+/M with battery operation			
Rated voltage $V_{out\ rated}$	**24 V DC** (from battery module)	**24 V DC** (from battery module)	**24 V DC** (from battery module)
Approximate voltage range	27 ... 19 V DC at I_{out} = 0.05 × C × 1/h or 24 V at I_{out} = 1 × C × 1/h or 23 V at I_{out} = 2 × C × 1/h (C = total connected battery capacity in Ah), 19 V switch-off threshold for deep discharge protection		
Output current I_{out} [3]	**0 ... 6 A** (permanently permissible)	**0 ... 15 A** (permanently permissible)	**0 ... 40 A** (permanently permissible)
Dynamic current with overload	Electronic current limitation to 1.05 ... 1.4 × $I_{out\ rated}$ for approx. 80 ms, then latching switch-off of output (restart following return to normal operation)		
Dynamic current with short-circuit	Electronic current limitation to 1.5 ... 3 × $I_{out\ rated}$ for approx. 20 ms, then latching switch-off of output (restart following return to normal operation)		

[1] SIPLUS modules see page 15/4.

[2] All SITOP 24 V DC power supplies are permissible without restriction.

[3] In order to implement more than 30 A up to max. 40 A output current for the DC-UPS module 40 A, two 7 Ah or 12 Ah battery modules connected in parallel are required.

Technical specifications (continued)

Product	DC UPS module	DC UPS module	DC UPS module
Power supply, type	**6 A**	**15 A**	**40 A**
Order No.	**6EP1 931-2DC21** **6EP1 931-2DC31** (with serial interface) **6EP1 931-2DC42** (with USB interface)	**6EP1 931-2EC21** [1] **6EP1 931-2EC31** (with serial interface) **6EP1 931-2EC42** (with USB interface)	**6EP1 931-2FC21** **6EP1 931-2FC42** (with USB interface)
Output + Bat / – Bat in normal operation			
Output +Bat/-Bat in normal operation	***I-V* charging characteristic** (first constant current *I*, then constant voltage *V*)	***I-V* charging characteristic** (first constant current *I*, then constant voltage *V*)	***I-V* charging characteristic** (first constant current *I*, then constant voltage *V*)
End-of-charge voltage *V*	26.6 V DC ±0.1 V (factory setting for +40 °C battery temperature), **adjustable in the range 26.3 to 29.3 V** (in 0.1 V increments)	26.6 V DC ±0.1 V (factory setting for +40 °C battery temperature), **adjustable in the range 26.3 to 29.3 V** (in 0.1 V increments)	26.6 V DC ±0.1 V (factory setting for +40 °C battery temperature), **adjustable in the range 26.3 to 29.3 V** (in 0.1 V increments)
Charging current *I*	Approx. 0.4 A (factory setting), **adjustable to 0.2 A or 0.4 A** (charging is carried out with closed and open on/off circuit) At a battery voltage of < 6 V (batteries defective), charging is not carried out as a protective measure.	Approx. 0.7 A (factory setting), **adjustable to 0.35 A or 0.7 A** (charging is carried out with closed and open on/off circuit) At a battery voltage of < 6 V (batteries defective), charging is not carried out as a protective measure.	Approx. 2 A (factory setting), **adjustable to 1 A or 2 A** (charging is carried out with closed and open on/off circuit) At a battery voltage of < 6 V (batteries defective), charging is not carried out as a protective measure.
Efficiency/heat loss			
At $V_{out\ rated}$, $I_{out\ rated}$ approx.	95 % / 7 W	96.2 % / 14 W	97.2 % / 28.6 W
With battery operation, approx.	94.5 % / 8 W	96 % / 15 W	96 V_{in} % / 33.6 W
Protection and monitoring			
Reverse polarity protection	Against polarity reversal on input voltage and batteries	Against polarity reversal on input voltage and batteries	Against polarity reversal on input voltage and batteries
Overload protection	In accordance with "dynamic current with overload" in normal operation (automatic restart attempts) or in battery mode (restart following return to normal operation)		
Short-circuit protection	In accordance with "dynamic current with short-circuit" in normal operation (automatic restart attempts) or in battery mode (restart following return to normal operation). Built-in (not accessible) 16 A fuse (6 A and 15 A on DC UPS module) or 64 A fuse (40 A on DC UPS module).		
Exhaustive discharge protection	Automatic shutdown when battery voltage falls below approx. 19 V. At a battery voltage of < 6 V (batteries defective), charging is not carried out as a protective measure.		
Monitoring "Wire breakage in battery circuit"	Alarm signal if battery circuit not closed or if it opens during operation (cyclic test approximately every 20 s)		
Monitoring "Battery replacement required"	Alarm signal flashing at approx. 0.25 Hz repetition frequency (approx. 2 s alarm, approx. 2 s no alarm, approx. 2 s alarm, etc.). Check every 4 hours with 6 ohm load for 1 s if no buffer mode or switch-off has taken place within 4 hours.	Alarm signal flashing at approx. 0.25 Hz repetition frequency (approx. 2 s alarm, approx. 2 s no alarm, approx. 2 s alarm, etc.). Check every 4 hours with 3 ohm load for 1 s if no buffer mode or switch-off has taken place within 4 hours.	Alarm signal flashing at approx. 0.25 Hz repetition frequency (approx. 2 s alarm, approx. 2 s no alarm, approx. 2 s alarm, etc.). Check every 4 hours with 1 ohm load for 1 s if no buffer mode or switch-off has taken place within 4 hours. No monitoring if switch position of compatibility switch is "On"!
Monitoring "Battery charge > 85 %"	Indication whether batteries are charged to at least 85 % of residual capacity still available depending on aging		
Signaling [4]			
Normal operation	Green LED (OK) and isolated changeover contact "24 V DC OK / Bat" at setting "24 V DC OK" [5]		
Buffer or battery mode (battery supplies load alone or in addition to PS in the case of overload)	Yellow LED (Bat) and isolated changeover contact "24 V DC OK / Bat" at setting "Bat" (= de-energized position)		
Alarm (buffer not ready or pre-warning from < 20.4 V battery voltage)	Red LED (Alarm) and isolated changeover contact at setting "Alarm" (= de-energized position). Causes of the buffer not being ready during normal operation can include: Off status or open on/off control circuit, battery module not connected, polarity reversal or defective battery (battery voltage< 18.5 V) or wire breakage between battery and UPS module. Scanning and thus updating of the signal every 20 s. Causes of the buffer not being available during buffer operation can include: Accumulator voltage has dropped below 20.4 V DC (= pre-warning before shutdown through exhaustive discharge protection) and shutdown of the accumulator due to overload, short-circuit, exhaustive discharge protection or expired buffer time. The red LED then goes out.		
"Battery replacement required"	Red LED (alarm) flashing at 0.25 Hz and floating changeover contact (alarm) switching at approx. 0.25 Hz		
"Battery charge > 85 %"	Second green LED (Bat > 85 %) and floating NO contact closed (de-energized position = open)		

[4] Permissible contact rating: 60 V DC/1 A or 30 V AC/1 A.

[5] "24 V DC OK" means: Voltage of the power supply unit is greater than the battery connection threshold set on the DC UPS module.

Technical specifications (continued)

Product	DC UPS module	DC UPS module	DC UPS module
	6 A	15 A	40 A
Power supply, type	6EP1 931-2DC21 6EP1 931-2DC31 (with serial interface) 6EP1 931-2DC42 (with USB interface)	6EP1 931-2EC21 [1] 6EP1 931-2EC31 (with serial interface) 6EP1 931-2EC42 (with USB interface)	6EP1 931-2FC21 6EP1 931-2FC42 (with USB interface)
Order No.	6 A	15 A	40 A
Signaling [4]			
Compatibility switch	Only on **6EP1 931-2FC21** The following can be selected using DIP switches: Switch position "Off" - "significant properties analogous to new DC UPS range" or "On" switch position - "analogous to previous DC UPS module 40 (6EP1931-2FC01)". With compatibility switch in "On" position: Output of the Alarm signal changes: - The red LED flashes on wire-break between rechargeable battery and UPS DC module with $^1/_3$ Hz and isolated changeover contact (alarm) switching at approx. $^1/_3$ Hz. A battery test does not take place.		
Optional port and software			
Serial interface	Only on **6EP1 931-2.C31** Output of all alarm signals and receipt of the "Remote timer start" signal. Technical design: PC-compatible. 8N1 send and receive, 9600 baud, 8 data bits, 1 stop bit, no parity bit. Required connection to the PC: 1 : 1 interconnected 9-pole sub D extension cable (connector/socket); only pin 2 (RXD), pin 3 (TDX) and pin 7 (RTS) are required.		
USB interface	Only on **6EP1 931-2.C42** Output of all alarm signals and receipt of the "Remote timer start" signal. Technical design: Specification 2.0 with full speed, i.e. 2 Mbit/s. Supplied with +5 V by DC UPS ("self powered"). Required connection to the PC: Commercially available 4-core shielded cable, 90 ohm, max. 5 m, USB series "A" connector to PC and USB series "B" connector to DC UPS		
Software	A software tool for reading out and processing the signals (can run under Windows 2000, Windows XP, Windows Vista and Windows 7) is available for downloading from the Internet at http://www.siemens.com/sitop-ups. This site also provides more information on the interface.		
Control signals			
On/off control signal	Buffering is terminated or the battery is disconnected from the output by opening the control circuit or by means of DIP switches on the device (DIP switch must be in "Off" position). All other functions are retained.		
"Remote Timer start" via serial interface or USB	Starts mains buffering for the set buffer time	Starts mains buffering for the set buffer time	Starts mains buffering for the set buffer time
Safety			
Primary/secondary isolation	No	No	No
Protection class	Class III (ext. circuit and power-supply unit: SELV in accordance with EN 60950 required)	Class III (ext. circuit and power-supply unit: SELV in accordance with EN 60950 required)	Class III (ext. circuit and power-supply unit: SELV in accordance with EN 60950 required)
EMC			
Emitted interference	according to EN 55022. Class B	according to EN 55022. Class B	according to EN 55022. Class B
Noise immunity	according to EN 61000-6-2	according to EN 61000-6-2	according to EN 61000-6-2
Ambient conditions			
Ambient temperature during operation	-25 ... +60 °C with natural convection	-25 ... +60 °C with natural convection	-25 ... +60 °C with natural convection
Transport/storage temperature	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Degree of protection (EN 60529)	IP20	IP20	IP20
Humidity class	Conditions of use in accordance with EN 60721, climate class 3K3 (relative humidity 5 % to 85 % and absolute humidity 1 g/m^3 to 25 g/m^3; no condensation)	Conditions of use in accordance with EN 60721, climate class 3K3 (relative humidity 5 % to 85 % and absolute humidity 1 g/m^3 to 25 g/m^3; no condensation)	Conditions of use in accordance with EN 60721, climate class 3K3 (relative humidity 5 % to 85 % and absolute humidity 1 g/m^3 to 25 g/m^3; no condensation)

Technical specifications (continued)

Product	DC UPS module	DC UPS module	DC UPS module
	6 A	15 A	40 A
Power supply, type	**6EP1 931-2DC21** **6EP1 931-2DC31** (with serial interface) **6EP1 931-2DC42** (with USB interface)	**6EP1 931-2EC21** [1)] **6EP1 931-2EC31** (with serial interface) **6EP1 931-2EC42** (with USB interface)	**6EP1 931-2FC21** **6EP1 931-2FC42** (with USB interface)
Order No.	6 A	15 A	40 A
Approvals			
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No.107.1), File E197259	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259
Mechanics			
Input connections 24 V DC	2 screw terminals for 1 ... 4 mm^2/17 ... 11 AWG	2 screw terminals for 1 ... 4 mm^2/17 ... 11 AWG	2 screw terminals for 0.33 ... 10 mm^2/22 ... 7 AWG
Output connections 24 V DC	4 screw terminals for 1 ... 4 mm^2/17 ... 11 AWG	4 screw terminals for 1 ... 4 mm^2/17 ... 11 AWG	4 screw terminals for 0.33 ... 10 mm^2/22 ... 7 AWG
Connections for rechargeable battery 24 V DC	2 screw terminals for 1 ... 4 mm^2/17 ... 11 AWG	2 screw terminals for 1 ... 4 mm^2/17 ... 11 AWG	2 screw terminals for 0.33 ... 10 mm^2/22 ... 7 AWG
Connections for control circuit and alarm signals	10 screw terminals for 0.5 ... 2.5 mm^2/20 ... 13 AWG	10 screw terminals for 0.5 ... 2.5 mm^2/20 ... 13 AWG	10 screw terminals for 0.5 ... 2.5 mm^2/20 ... 13 AWG
Dimensions (W × H × D) in mm	50 × 125 × approx. 125	50 × 125 × approx. 125	102 × 125 × 125
Weight, approx.	0.4 kg (with serial or USB interface: 0.45 kg)	0.4 kg (with serial or USB interface: 0.45 kg)	1.1 kg (with serial or USB interface: 1.1 kg)
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15

Battery modules

Overview

Product	Battery module 1.2 Ah	Battery module 2.5 Ah	Battery module 3.2 Ah
Battery type	Maintenance-free lead-acid batteries	Maintenance-free pure lead batteries	Maintenance-free, sealed lead-acid batteries
Order No.	6EP1 935-6MC01	6EP1 935-6MD31	6EP1 935-6MD11
			
	Battery module for DC UPS module 6 A It has two maintenance-free, closed lead-acid batteries (from the same lot) which are installed in a holder and connected in series with corrosion-resistant lead-calcium high-performance grid plates and glass fiber. Completely prewired with battery retainer and terminals Low self-discharge rate of approximately 3 % per month (at +20 °C)	High-temperature battery module for DC UPS module 6 A and 15 A It has two maintenance-free, closed pure lead-acid batteries (from the same lot), which are installed in a holder and connected in series. Completely prewired with battery retainer and terminals Low self-discharge rate of approximately 3 % per month (at +20 °C)	Battery module for DC UPS module 6 A and 15 A It has two maintenance-free, closed lead-acid batteries (from the same lot) which are installed in a holder and connected in series with corrosion-resistant lead-calcium high-performance grid plates and glass fiber. Complete with battery retainer and terminals Low self-discharge rate of approximately 3 % per month (at +20 °C)

Technical specifications

Product	Battery module 1.2 Ah	Battery module 2.5 Ah	Battery module 3.2 Ah
Battery type	Maintenance-free lead-acid batteries	Maintenance-free pure lead batteries	Maintenance-free, sealed lead-acid batteries
Order No.	6EP1 935-6MC01	6EP1 935-6MD31	6EP1 935-6MD11
Charging current/charging voltage			
	Maintenance-free, sealed lead-acid batteries	**Maintenance-free pure lead-acid batteries**	**Maintenance-free, sealed lead-acid batteries**
Recommended end-of-charge voltage (stand-by use), dependent on battery temperature	27.8 V at +10 °C 27.3 V at +20 °C 26.8 V at +30 °C 26.6 V at +40 °C	29.0 V at −10 °C 28.6 V at 0 °C 28.3 V at +10 °C 27.9 V at +20 °C 27.5 V at +30 °C 27.2 V at +40 °C 26.8 V at +50 °C 26.4 V at +60 °C	27.8 V at +10 °C 27.3 V at +20 °C 26.8 V at +30 °C 26.6 V at +40 °C
Recommended charging current	Max. 0.3 A	Max. 5 A	Max. 0.8 A
Protection			
Short-circuit protection	Battery fuse 7.5 A/32 V (solid-state circuitry blade-type fuse + support)	Battery fuse 15 A/32 V (solid-state circuitry blade-type fuse + support)	Battery fuse 15 A/32 V (solid-state circuitry blade-type fuse + support)
Battery protection	Valve control	Valve control	Valve control
Safety			
Protection class	Class III	Class III	Class III
UL/cUL (CSA) approval	cURus-recognized (UL 1778, CSA C22.2 No. 107.1), File E219627	cURus-recognized (UL 1778, CSA C22.2 No. 107.1), File E219627	cURus-recognized (UL 1778, CSA C22.2 No. 107.1), File E219627
Degree of protection (EN 60529)	IP00	IP00	IP00
Operating data [1]			
Ambient temperature range	0 ... +40 °C	-40 ... +60 °C with natural convection	0 ... +40 °C with natural convection
Transport/storage temperature range	-20 ... +50 °C	-40 ... +60 °C	-20 ... +50 °C
Self-discharge rate	Approx. 3 % per month at 20 °C battery temperature (increases with temperature)	Approx. 3 % per month at 20 °C battery temperature (increases with temperature)	Approx. 3 % per month at 20 °C battery temperature (increases with temperature)

[1] For storage, mounting and operation of lead-acid batteries, the relevant DIN/VDE regulations or country-specific regulations (e.g. VDE 0510 Part 2/EN 50272-2) must be observed. You must ensure that the battery site is sufficiently ventilated. Possible sources of ignition must be at least 50 cm away.

Battery module 7 Ah	Battery module 12 Ah
Maintenance-free, sealed lead-acid batteries	Maintenance-free, sealed lead-acid batteries
6EP1 935-6ME21	6EP1 935-6MF01
	
Battery module for DC UPS module 6 A, 15 A, and 40 A (for > 20 to 40 A, 2 modules are required in parallel). It has two maintenance-free, closed lead-acid batteries (from the same lot) which are installed in a holder and connected in series with corrosion-resistant lead-calcium high-performance grid plates and glass fiber. Completely pre-wired with terminals and battery retainer Low self-discharge rate of approximately 3 % per month (at +20 °C)	Battery module for DC UPS module 6 A and 15 A and DC UPS module 40 A (for > 20 to 40 A, 2 modules are required in parallel) It has two maintenance-free, closed lead-acid batteries (from the same lot) which are installed in a holder and connected in series with corrosion-resistant lead-calcium high-performance grid plates and glass fiber. Completely pre-wired with terminals and battery retainer Low self-discharge rate of approximately 3 % per month (at +20 °C).

Battery module 7 Ah	Battery module 12 Ah
Maintenance-free, sealed lead-acid batteries	Maintenance-free, sealed lead-acid batteries
6EP1 935-6ME21	6EP1 935-6MF01
Maintenance-free, sealed lead-acid batteries	**Maintenance-free, closed lead-acid batteries**
27.8 V at +10 °C 27.3 V at +20 °C 26.8 V at +30 °C 26.6 V at +40 °C	27.8 V at +10 °C 27.3 V at +20 °C 26.8 V at +30 °C 26.6 V at +40 °C
Max. 1.75 A	Max. 3 A
Battery fuse 30 A/32 V (solid-state circuitry blade-type fuse + support)	Battery fuse 30 A/32 V (solid-state circuitry blade-type fuse + support)
Valve control	Valve control
Class III	Class III
UL/cUL-Recognized (UL 1778, CSA C22.2 No. 107.1), File E219627	cURus-recognized (UL 1778, CSA C22.2 No. 107.1), File E219627
IP00	IP00
0 ... +40 °C	0 ... +40 °C
−20 ... +50 °C	−20 ... +50 °C
Approx. 3 % per month at 20 °C battery temperature	Approx. 3 % per month at 20 °C battery temperature

Battery modules

Technical specifications (continued)

Product	Battery module 1.2 Ah	Battery module 2.5 Ah	Battery module 3.2 Ah
Battery type	**Maintenance-free lead-acid batteries**	**Maintenance-free pure lead batteries**	**Maintenance-free, sealed lead-acid batteries**
Order No.	**6EP1 935-6MC01**	**6EP1 935-6MD31**	**6EP1 935-6MD11**
Battery life [1]			
The service life of the lead-acid batteries (when capacity falls to 50 % of original capacity) depends on the battery temperature as follows:	Approx. 4 years at +20 °C Approx. 2 years at +30 °C Approx. 1 year at +40 °C	Approx. >10 years at +20 °C Approx. 7 years at +30 °C Approx. 3 years at +40 °C Approx. 1.5 years at +50 °C Approx. 1 year at +60 °C	Approx. 4 years at +20 °C Approx. 2 years at +30 °C Approx. 1 year at +40 °C
Mechanics			
Connection	1 screw terminal each for 0.08 to 2.5 mm^2 for +BAT and –BAT	1 screw terminal each for 0.08 to 2.5 mm^2 for +BAT and –BAT	1 screw terminal each for 0.08 to 2.5 mm^2 for +BAT and –BAT
Accessories, included	Accessories pack with solid-state circuitry fuse 7.5 A	Accessories pack with solid-state circuitry fuse 15 A	Accessories pack with solid-state circuitry fuse 15 A
Dimensions (W × H × D) in mm	96 × 106 × 108	265 × 151 × 91	190 × 151 × 82
Weight, approx.	1.8 kg	3.8 kg	3.2 kg
Installation	Snaps onto DIN rail EN 60715 35×7.5/15 or keyhole mounting for hooking in to M4 screws	Snaps onto DIN rail EN 60715 35×7.5/15 or keyhole mounting for hooking in to M4 screws	Snaps onto DIN rail EN 60715 35×7.5/15 or keyhole mounting for hooking in to M4 screws

[1] Along with the storage and operating temperature, other factors such as the duration of the storage period and the charge status during storage have a decisive influence on the possible useful life. Batteries should therefore be stored as briefly as possible, always fully charged, and within the temperature range 0 to +20 °C.

Battery module 7 Ah	Battery module 12 Ah
Maintenance-free, sealed lead-acid batteries	Maintenance-free, sealed lead-acid batteries
6EP1 935-6ME21	6EP1 935-6MF01
Approx. 4 years at +20 °C Approx. 2 years at +30 °C Approx. 1 year at +40 °C	Approx. 4 years at +20 °C Approx. 2 years at +30 °C Approx. 1 year at +40 °C
1 screw terminal each for 0.08 to 4 mm^2 for +BAT and –BAT	1 screw terminal each for 0.08 to 4 mm^2 for +BAT and –BAT
Accessories pack with spare solid-state circuitry fuse 15 A and 30 A	Accessories pack with spare solid-state circuitry fuse 15 A and 30 A
186 × 168 × 121	253 × 168 × 121
6.0 kg	9.0 kg
Can be screwed onto flat surface ("keyhole mounting" for hooking onto M4 screws)	Can be screwed onto flat surface ("keyhole mounting" for hooking onto M4 screws)

DC UPS

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output; Energy Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
SITOP UPS500S					
	**24 V DC**	**24 V DC; 2.5 kWs**	15 A	**6EP1 933-2EC41**	
	24 V DC	**24 V DC; 5 kWs**	15 A	**6EP1 933-2EC51**	
SITOP UPS501S					
	**24 V DC**	**24 V DC; 5 kWs**	15 A	**6EP1 935-5PG01**	
SITOP UPS500P					
	**24 V DC**	**24 V DC; 5 kWs**	7 A	**6EP1 933-2NC01**	
	24 V DC	**24 V DC; 10 kWs**	7 A	**6EP1 933-2NC11**	
Connector set					
	Connector set with connector for input and output with pre-assembled USB cable (2 m long)			**6EP1 975-2ES00**	
DC UPS module					
	**24 V DC**	**24 V DC**	6 A	**6EP1 931-2DC21**	
	24 V DC	**24 V DC, with serial interface**	6 A	**6EP1 931-2DC31**	
	24 V DC	**24 V DC, with USB interface**	6 A	**6EP1 931-2DC42**	
	**24 V DC**	**24 V DC**	15 A	**6EP1 931-2EC21**	
	24 V DC	**24 V DC, with serial interface**	15 A	**6EP1 931-2EC31**	
	24 V DC	**24 V DC, with USB interface**	15 A	**6EP1 931-2EC42**	
	24 V DC	**24 V DC**	40 A	**6EP1 931-2FC21**	
	24 V DC	**24 V DC, with USB interface**	40 A	**6EP1 931-2FC42**	
Battery modules					
	**Capacity:**				
	• 1.2 Ah			**6EP1 935-6MC01**	
	• 2.5 Ah, high-temperature battery module			**6EP1 935-6MD31**	
	• 3.2 Ah			**6EP1 935-6MD11**	
	• 7 Ah			**6EP1 935-6ME21**	
	• 12 Ah			**6EP1 935-6MF01**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals

SITOP
Alternative voltages

13

Export regulations AL and ECCN
see page 17/9

Output voltages 3 - 52 V

Overview

Product	Special design SITOP flexi
Power supply, type	3-52 V/2-10 A
Order No.	6EP1 353-2BA00

The power supply with flexible output voltage from 3 to 52 V; suitable for all application areas requiring a special voltage other than 24 V.

Technical specifications

Product	Special design SITOP flexi
Input	
Rated voltage value $V_{in\ rated}$	1-phase AC **120/230 V AC**
Voltage range	Set via wire jumper 85 ... 132 V/170 ... 264 V
Overvoltage resistance	2.3 × $V_{in\ rated}$ 1.3 ms
Mains buffering at $I_{out\ rated}$	> 10 ms at V_{in} = 93/187 V (P_a = 120 W)
Rated line frequency value; range	50/60 Hz, 47 ... 63 Hz
Rated current $I_{in\ rated}$	2.2/0.9 A
Switch-on current limit (+25 °C)	< 32 A
I^2t	< 0.8 A^2s
Built-in incoming fuse	T 3.15 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 6 A, characteristic C
Output	
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **3-52 V DC**
Total tolerance	±1 %
• Static line compensation	Approx. 0.1 %
• Static load compensation	Approx. 0.2 %
Sense line connection	Yes, maximum voltage control 0.5 V per line
Residual ripple	< 50 mV_{pp} (typ. 20 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 100 mV_{pp} (typ. 80 mV_{pp})
Adjustment range	3 ... 52 V, via potentiometer or analog control voltage signal 0 ... 2.5 V
Status display	Green LED for 24 V OK
Signaling	Power good via relay contact, current monitor signal 0 ... 2.5 V
On/off behavior	No overshoot of V_{out} (soft start)
Startup delay / voltage rise	< 3 s/typ. 80 ms
Rated current value $I_{out\ rated}$	**2 to 10 A** (max. 120 W)
Current range	
• Up to +60 °C	0 ... 10 A (max. 120 W)
• Derating	–
Dynamic overcurrent on	
• Power-up on short-circuit	Constant current 2 ... 10 A
• Short circuit during operation	Constant current 2 ... 10 A
Parallel switching for enhanced performance	Yes, 2 units

Technical specifications (continued)

Product	Special design SITOP flexi
Power supply, type	**3-52 V/2-10 A**
Order No.	**6EP1 353-2BA00**
Efficiency	
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$ Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 84 % (at 24 V/5 A) Approx. 23 W (at 24 V/5 A)
Protection and monitoring	
Output overvoltage protection Current limitation	Yes, according to EN 60950 2 ... 10 A, adjustable by potentiometer or with analog control voltage signal 0 ... 2.5 V
Short-circuit protection	Electronic current limitation (2 ... 10 A) in the range 3 ... 12 V or power limitation (120 W) in the range 12 ... 52 V
Sustained short-circuit current rms value	matching the set current limitation 2 ...10 A
Overload/short-circuit indicator	Red LED for current or power limiting
Safety	
Primary/secondary isolation Protection class	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
Leakage current Safety test CE mark	< 3.5 mA Yes Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289
Degree of protection (EN 60529)	IP20
EMC	
Emitted interference Supply harmonics limitation Noise immunity	EN 55022 Class B EN 61000-3-2 EN 61000-6-2
Operating data	
Permitted ambient temperature Transport/storage temperature range Humidity class	0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L1, N, PE • Output + • Output - • Alarm signals, control inputs	One screw-type terminal each for 0.5 mm to 2.5 mm^2 1 screw terminal for 0.5 ... 2.5 mm^2 (L+) und 2 screw-type terminals for 0.5 ... 2.5 mm^2 (M) Screw terminals for 0.14 ... 1.5 mm^2
Dimensions (W x H x D) in mm Weight, approx. Installation	75 × 125 × 125 0.9 kg Snaps onto DIN rail EN 60715 35x7.5/15
Accessories	
	–

Alternative voltages

Output voltage 5 V

Overview

Product	LOGO!Power NEW	LOGO!Power NEW
Power supply, type	5 V/3 A	5 V/6.3 A
Order No.	6EP1 311-1SH03	6EP1 311-1SH13
		

LOGO!Power supplies are optimally matched in design and functionality to the LOGO! logic modules; with wide-range input 85 V to 264 V AC and option for installing in built-in miniature distribution boards, they can be used universally in the low-end performance range.
It is also possible to operate them with 110 V DC to 300 V DC.

Technical specifications

Product	LOGO!Power	LOGO!Power
Input		
Rated voltage value $V_{in\ rated}$	1-phase AC or DC **100-240 V AC**	1-phase AC or DC **100-240 V AC**
Voltage range	Wide-range input AC 85 ... 264 V DC 110 ... 300 V	Wide-range input AC 85 ... 264 V DC 110 ... 300 V
Overvoltage resistance Line buffering at $I_{out\ rated}$ Rated line frequency value; range	2.3 × $V_{in\ rated}$, 1.3 ms > 40 ms at V_{in} = 187 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 40 ms at V_{in} = 187 V 50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$ Switch-on current limit (+25 °C) I^2t	0.36-0.22 A < 26 A < 0.8 A^2s	0.71-0.37 A < 50 A < 3 A^2s
Built-in incoming fuse Recommended miniature circuit breaker (IEC 898) in the mains power input	Internal 16 A or higher, characteristic B or 10 A or higher, characteristic C	Internal 16 A or higher, characteristic B or 10 A or higher, characteristic C
Output		
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **5 V DC**	Controlled, isolated DC voltage **5 V DC**
Total tolerance, static • Static mains compensation • Static load balancing	±3 % Approx. 0.2 % Approx. 1.5 %	±3 % Approx. 0.1 % Approx. 2 %
Residual ripple Spikes (bandwidth approx. 20 MHz)	< 100 mV_{pp} (typ. 10 mV_{pp}) < 100 mV_{pp} (typ. 20 mV_{pp})	< 100 mV_{pp} (typ. 15 mV_{pp}) < 100 mV_{pp} (typ. 70 mV_{pp})
Adjustment range Status display On/off behavior	4.6 ... 5.4 V Green LED for 5 V OK No overshoot of V_{out} (soft start)	4.6 ... 5.4 V Green LED for 5 V OK No overshoot of V_{out} (soft start)
Startup delay / voltage rise Rated current value $I_{out\ rated}$ Current range • Up to +55 °C • Derating	< 0.5 s/typ. 15 ms **3 A** 0 ... 3 A 0 ... 2.1 A (up to +70 °C)	< 0.5 s/typ. 10 ms **6.3 A** 0 ... 6.3 A 0 ... 4.4 A (up to +70 °C)
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units

Technical specifications (continued)

Product	LOGO!Power	LOGO!Power
Power supply, type	**5 V/3 A**	**5 V/6.3 A**
Order No.	**6EP1 311-1SH03**	**6EP1 311-1SH13**
Efficiency		
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 77 %	Approx. 83 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 4 W	Approx. 6 W
Closed-loop control		
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	<0.2 % V_{out}	<0.2 % V_{out}
Dynamic load smoothing (I_{out}: 10/90/10 %)	Typ. ±3 % V_{out}	Typ. ±3 % V_{out}
Load-step settling time		
• 10 at 90 %	Typ. 2 ms	Typ. 2 ms
• 90 at 10 %	Typ. 2 ms	Typ. 2 ms
Protection and monitoring		
Current limitation	Typically 3.8 A	Typically 8.2 A
Short-circuit protection	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	< 5 A	< 10 A
Overload/short-circuit indicator	–	–
Safety		
Primary/secondary isolation	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178
Protection class	Class II (without protective conductor))	Class II (without protective conductor))
Safety test	Yes; CB Scheme	Yes; CB Scheme
CE mark	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E197259	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File 197259
Explosion protection	ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABCD, T4	ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABCD, T4
FM approval	Class I, Div. 2. Group ABCD, T4	Class I, Div. 2. Group ABCD, T4
Marine approval	GL	GL
Degree of protection (EN 60529)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	Not applicable	Not applicable
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Permitted ambient temperature	-20 ... +70 °C with natural convection	-20 ... +70 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics		
Supply-input connections L1, N	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded
Connections		
• Output +	2 screw terminals for 0.5 to 2.5 mm^2	2 screw terminals for 0.5 to 2.5 mm^2
• Output –		
Dimensions (W × H × D) in mm	54 × 90 × 55	72 × 90 × 55
Weight, approx.	0.17 kg	0.25 kg
Installation	Snaps onto DIN rail EN 60715 35×7.5/15	Snaps onto DIN rail EN 60715 35×7.5/15

Alternative voltages

Output voltage 12 V

Overview

Product	LOGO!Power NEW	SITOP compact PSU100C NEW	Special design SITOP DC/DC
Power supply, type	12 V/1.9 A	12 V/2 A	12 V/2.5 A
Order No.	6EP1 321-1SH03	6EP1 321-5BA00	6EP1 621-2BA00
			
	LOGO!Power supplies are optimally matched in design and functionality to the LOGO! logic modules; with wide-range input 85 V to 264 V AC and option for installing in built-in miniature distribution boards, they can be used universally in the low-end performance range. It is also possible to operate them with 110 V DC to 300 V DC.	Narrow power supply suitable for the lower performance range, e.g. for distributed use in switching cubicles. Low energy consumption thanks to a high degree of efficiency across the entire power range and minimum power loss in no-load operation.	DC/DC converter for connection to 24 V DC networks over permanent wiring. Output voltage 12 V DC, isolated, short-circuit proof, and no-load resistant.

The product families are highlighted in the same color.

For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.

Technical specifications

Product	LOGO!Power	SITOP compact PSU100C	Special design SITOP DC/DC
Input			
Rated voltage value $V_{in\ rated}$	1-phase AC or DC **100-240 V AC**	1-phase AC or DC **100 - 230 V AC**	DC voltage (SELV or PELV) **24 V DC** [1]
Voltage range	Wide-range input 85 ... 264 V AC 110 ... 300 V DC	Wide-range input 85 ... 264 V AC or 110 ... 300 V DC	18.5 ... 30.2 V
Overvoltage resistance	2.3 × $V_{in\ rated}$, 1.3 ms	2.3 x $V_{in\ rated}$, 1.3 ms	–
Mains buffering at $I_{out\ rated}$	> 40 ms at V_{in} = 187 V	> 20 ms at V_{in} = 230 V	–
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz	–
Rated current $I_{in\ rated}$	0.53-0.3	0.63-0.31 A	2.5 A
Switch-on current limit (+25 °C)	< 25 A	< 33 A	< 20 A
I^2t	< 0.8 A^2s	< 1.2 A^2s	
Built-in incoming fuse	Internal	Internal	(not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, characteristic B or 10 A or higher, characteristic C	16 A or higher, characteristic B or 10 A or higher, characteristic C	10 A, characteristic B
Output			
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **12 V DC**	Controlled, isolated DC voltage **12 V DC**	Controlled, isolated DC voltage **12 V DC**
Total tolerance	±3 %	±3 %	±3 %
• Static line compensation	Approx. 0.1 %		ca. 0.1 %
• Static load compensation	Approx. 1.5 %		ca. 0.4 %
Residual ripple	< 200 mV_{pp} (typ. 10 mV_{pp})	< 200 mV_{pp} (typ. 40 mV_{pp})	< 100 mV_{pp}
Spikes (bandwidth: 20 MHz)	< 300 mV_{pp} (typ. 20 mV_{pp})	< 300 mV_{pp} (typ. 55 mV_{pp})	< 200 mV_{pp}
Adjustment range	10.5 ... 16.1 V	10.5 ... 12.9 V	12 ... 14 V
Status display	Green LED for 12 V OK	Green LED for 12 V OK	Green LED for 12 V OK
On/off behavior	No overshoot of V_{out} (soft start)	Overshoot of V_{out} approx. 5 %	
Startup delay / voltage rise	< 0.5 s/typ. 10 ms	< 0.6 s/typ. 10 ms	< 0.5 s/typ. 300 ms
Rated current value $I_{out\ rated}$	**1.9 A**	**2 A**	**2.5 A**
Current range			
• Up to +60 °C	0 ... 1.9 A (up to +55 °C)	0 ... 2.0 A (up to +55 °C)	0 ... 2.5 A
• Derating	0 ... 1.3 A (up to +70 °C)	0 ... 1.1 A (up to +70 °C)	–
Dynamic overcurrent on			
• Power-up on short-circuit			3.3 A
• Short circuit during operation			3.3 A

[1] The supply voltage must be securely isolated (SELV or PELV) from the feeding AC mains.

Special design PSU100D NEW	LOGO!Power NEW	SITOP compact PSU100C NEW
12 V/3 A	**12 V/4.5 A**	**12 V/6.5 A**
6EP1 321-1LD00	**6EP1 322-1SH03**	**6EP1 322-5BA10**
		
This cost-effective power supply features a flat aluminium housing and can be fastened to a wall in several mounting positions; with wide-range input for global use.	LOGO!Power supplies are optimally matched in design and functionality to the LOGO! logic modules; with wide-range input 85 V to 264 V AC and option for installing in built-in miniature distribution boards, they can be used universally in the low-end performance range. Can also run with DC voltage 110 V to 300 V DC.	Narrow power supply for the lower performance range, e.g. for distributed use in switching cubicles. Low energy consumption thanks to a high degree of efficiency across the entire power range and minimum power loss in no-load operation.

Special design PSU100D	LOGO!Power	SITOP compact PSU100C
1-phase AC **100-240 V AC** Wide-range input 85 ... 264 V	1-phase AC or DC **100-240 V AC** Wide-range input 85 ... 264 V AC 110 ... 300 V DC	1-phase AC or DC **100 - 230 V AC** Wide-range input 85 ... 264 V AC or 110 ... 300 V DC
> 15 ms at V_{in} = 115/230 V 50/60 Hz; 47 ... 63 Hz	2.3 × $V_{in\ rated}$, 1.3 ms > 40 ms at V_{in} = 187 V 50/60 Hz; 47 ... 63 Hz	2.3 x $V_{in\ rated}$, 1.3 ms > 20 ms at V_{in} = 230 V 50/60 Hz; 47 ... 63 Hz
0.75 to 0.5 A < 60 A < 1.2 A^2s	1.13-0.61 A < 55 A < 3 A^2s	1.6-0.8 A < 31 A < 3 A^2s
Internal 10 A or higher, characteristic C or 16 A or higher, characteristic B	Internal 10 A or higher, characteristic C or 16 A or higher, characteristic B	Internal 10 A or higher, characteristic C or 16 A or higher, characteristic B
Controlled, isolated DC voltage **12 V DC**	Controlled, isolated DC voltage **12 V DC**	Controlled, isolated DC voltage **12 V DC**
±2 % Approx. 0.5 % Approx. 1.0 %	±3 % Approx. 0.1 % Approx. 1.5 %	±3 %
< 100 mV_{pp} < 100 mV_{pp}	< 200 mV_{pp} (typ. 10 mV_{pp}) < 300 mV_{pp} (typ. 70 mV_{pp})	< 200 mV_{pp} (typ. 80 mV_{pp}) < 300 mV_{pp} (typ. 80 mV_{pp})
11.0 ... 14.0 V Green LED for 12 V OK Overshoot of V_{out} < 2 %	10.5 ... 16.1 V Green LED for 12 V OK No overshoot of V_{out} (soft start)	10.5 ... 12.9 V Green LED for 12 V OK Overshoot of V_{out} approx. 1 %
< 2.5 s/< 30 ms	< 0.5 s/typ. 10 ms	< 1 s/typ. 500 ms
3 A	**4.5 A**	**6.5 A**
0 ... 3 A (up to +50 °C) 0 ... 1.5 A (up to +70 °C)	0 ... 4.5 A (up to +55 °C) 0 ... 3.1 A (up to +70 °C)	0 ... 6.5 A (up to +55 °C) 0 ... 1.95 A (up to +70 °C)

Alternative voltages

Output voltage 12 V

Product	LOGO!Power	SITOP compact PSU100C	Special design SITOP DC/DC
Power supply, type	**12 V/1.9 A**	**12 V/2 A**	**12 V/2.5 A**
Order No.	**6EP1 321-1SH03**	**6EP1 321-5BA00**	**6EP1 621-2BA00**
Output (continued)			
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units	Yes, 2 units
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	ca. 80 %	Approx. 82 %	Approx. 83 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 5 W	5.8 W	Approx. 6.1 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ±15 %)	<0.2 % V_{out}	<0.1 % V_{out}	
Dynamic load compensation (I_{out}: 10/90/10 %)	Typ. ±3 % V_{out}	Typ. ±3 % V_{out}	
Load-step settling time			
• 10 at 90 %	Approx. 1 ms	Approx. 4 ms	
• 90 at 10 %	Approx. 1 ms	Approx. 3 ms	
Protection and monitoring			
Output overvoltage protection		< 24 V	< 24 V
Current limitation	Typically 2.8 A	2.4 A	3.0 ... 3.6 A
Short-circuit protection	Constant current characteristic	Electronic shutdown, automatic restart	Electronic shutdown, auto restart
Sustained short-circuit rms value	< 3.6 A	Approx. 4.5 A	Approx. 3.6 A
Overload/short-circuit indicator	–	–	Red LED
Safety			
Primary/secondary isolation	Yes, SELV output V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output V_{out} according to EN 60950-1 and EN 50178	Yes, safety extra low output V_{out} according to EN 60950-1
Protection class	Class II (without protective conductor))	Class I	Class II
Leakage current		< 3.5 mA (typ. 0.4 mA)	–
Safety test	Yes; CB Scheme	Yes; CB Scheme	Yes
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	cCSAus (UL 508, CSA22.2-107, UL 60950-1, CSA22.2-60950-1)
Explosion protection	ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABCD, T4	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	–
FM approval	Class I, Div. 2. Group ABCD, T4	–	–
Marine approval	GL, ABS	GL and ABS available soon	–
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	Not applicable	Not applicable	–
Noise immunity	EN 61000-6-2	EN 61000-3-2	EN 61000-6-2
Operating data			
Permitted ambient temperature	-20 ... +70 °C with natural convection	-20 ... +70 °C with natural convection	0 ... +60 °C with natural convection
Transport, storage temp range	- 40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections			
• Supply input L1, N, PE	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded	Removable screw terminals, one each 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm^2 (L+, N, PE)
• Output +	2 screw terminals for 0.5 to 2.5 mm^2	One screw terminal for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 to 2.5 mm^2
• Output -	2 screw terminals for 0.5 to 2.5 mm^2	2 screw-type terminals for 0.5 mm to 2.5 mm^2	2 screw terminals for 0.5 to 2.5 mm^2
Dimensions (W x H x D) in mm	54 × 90 × 55	30 x 80 x 100	32.5 × 125 × 125
Weight, approx.	0.17 kg	0.17 kg	0.32 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15
Accessories			
	–	Removable spring-loaded terminals (6EP1971-5BA00)	–

Output voltage 12 V

Special design PSU100D	LOGO!Power	SITOP compact PSU100C
12 V/3 A	12 V/4.5 A	12 V/6.5 A
6EP1 321-1LD00	6EP1 322-1SH03	6EP1 322-5BA10
Yes, 2 units	Yes, 2 units	Yes, 2 units
Approx. 84 % Approx. 6.5 W	Approx. 85 % Approx. 10 W	Approx. 86 % Approx. 12.5 W
Typ. ±0.5 % V_{out}	<0.2 % V_{out}	
Typ. ±5 % V_{out} (0 to 100 %)	Typ. ±4 % V_{out}	
Typ. 100 ms (0 to 100 %) Typ. 100 ms (0 to 100 %)	Approx. 1 ms Approx. 1 ms	
< 17.6 V 3.6 A	Typically 5.8 A	Yes, according to EN 60950
Electronic shutdown, automatic restart	Constant current characteristic	Electronic shutdown, automatic restart
6 A	< 7 A	
–	–	–
Yes, SELV output voltage V_{out} according to EN 60950-1 Class I	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class II (without protective conductor))	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I
< 3.5 mA (typ. 1 mA) Yes; CB Scheme in preparation Yes	Yes; CB Scheme Yes	< 3.5 mA (typ. 0.4 mA) Yes; CB Scheme Yes
cULus-Listed (UL 508, CSA C22.2 No. 107.1 in preparation, UL 60950-1, CSA C22.2 No. 60950-1 in preparation)	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
–	ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABCD, T4	ATEX (EX) II 3G Ex nA IIC T4
–	Class I, Div. 2. Group ABCD, T4	–
–	GL, ABS	GL and ABS available soon
IP20	IP20	IP20
EN 55022 Class B Not applicable EN 61000-6-2	EN 55022 Class B Not applicable EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-3-2
-10 ... +70 °C with natural convection -25 ... +85 °C	-20 ... +70 °C with natural convection - 40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	-20 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
One screw-type terminal each for 0.3 ... 1.3 mm^2 solid/finely stranded 1 screw terminal for 0.3 ... 1.3 mm^2 1 screw terminal for 0.3 ... 1.3 mm^2	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded 2 screw terminals for 0.5 ... 2.5 mm^2 2 screw terminals for 0.5 ... 2.5 mm^2	Removable screw terminals, one each 0.5 ... 2.5 mm^2 solid/finely stranded 1 screw terminal for 0.5 ... 2.5 mm^2 2 screw-type terminals for 0.5 mm to 2.5 mm^2
97 x 98 x 38 0.37 kg Wall mounting	72 × 90 × 55 0.25 kg Snaps onto DIN rail EN 60715 35×7.5/15	52.5 x 80 x 100 0.32 kg Snaps onto DIN rail EN 60715 35×7.5/15
–	–	Removable spring-loaded terminals (6EP1971-5BA00)

Alternative voltages

Output voltage 12 V

Overview

Product	Special design PSU100D NEW	Special design PSU300B NEW
Power supply, type	12 V/8.3 A	12 V/20 A
Order No.	6EP1 322-1LD00	6EP1 424-3BA00
		
	The low-cost power supply in flat aluminum housing can be screwed directly on a wall in various mounting positions; with wide-range input for global use.	This power supply is optimized for battery charging, it features a 3-phase wide-range input suitable for world-wide use; slim design; with switchable output characteristic, function expansion is possible in conjunction with expansion modules.

Technical specifications

Product	Special design PSU100D	Special design PSU300B
Input		
Rated voltage value $V_{in\ rated}$	1-phase AC **100-240 V AC** Wide-range input	3-phase AC **400-500 V 3 AC** Wide-range input
Voltage range	85 ... 264 V	320 ... 575 V
Overvoltage resistance		2.3 x $V_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 15 ms at V_{in} = 115/230 V	> 20 ms at V_{in} = 400 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	2.0-1.1 A	0.7-0.6 A
Switch-on current limit (+ 25 °C)	< 75 A	< 18 A
I^2t	< 5.5 A^2s	< 0.8 A^2s
Built-in incoming fuse	Internal	None
Recommended miniature circuit breaker (IEC 898) in the mains power input	10 A or higher, characteristic C or 16 A, characteristic B	Required: 3-pole connected miniature circuit breaker 6 ... 16 A, characteristic C or circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)
Output		
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **12 V DC**	Controlled, isolated DC voltage **12 V DC**
Total tolerance	±2 %	±3 %
• Static line compensation	Approx. 0.5 %	Approx. 0.2 %
• Static load compensation	Approx. 1.0 %	Approx. 0.4 %
Residual ripple	< 100 mV_{pp}	< 100 mV_{pp}
Spikes (bandwidth: 20 MHz)	< 100 mV_{pp}	< 200 mV_{pp}
Adjustment range	11 ... 14 V	12 ... 14 V
Status display	Green LED for 12 V O. K	Green LED for 12 V OK
Signaling		Relay contact (NO contact, contact rating DC 60 V/0.3 A) for 12 V OK
On/off behavior	Overshoot of V_{out} <2 %	No overshoot of V_{out} (soft start)
Startup delay/voltage rise	< 1 s/< 30 ms	< 2.5 s/< 500 ms
Rated current value $I_{out\ rated}$	**8.3 A**	**20 A**
Current range		
• Up to + 60 °C	0 ... 8.3 A (up to +50 °C)	0 ... 20 A
• Derating	0 ... 4.1 A (up to +70 °C)	20 A (up to +70 °C)
Dynamic overcurrent on		
• Power-up on short-circuit		Approx. 22 A constant current
• Short circuit during operation		Typ. 60 A for 25 ms
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units (switchable characteristic)

Technical specifications (continued)

Product	Special design PSU100D	Special design PSU300B
Power supply, type	**12 V/8.3 A**	**12 V/20 A**
Order No.	**6EP1 322-1LD00**	**6EP1 424-3BA00**
Efficiency		
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 84 %	Approx. 90 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 19 W	Approx. 20 W
Closed-loop control		
Dyn. mains compensation ($V_{in\ rated}$ ± 15 %)	Typ. ± 0.5 %	<2 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ± 5.0 % V_{out} (0 to 100%)	Typ. ± 4.0 % V_{out}
Load-step settling time		
• 50 at 100 %		< 10 ms (typ. 2 ms)
• 100 at 50 %		< 10 ms (typ. 2 ms)
Protection and monitoring		
Output overvoltage protection	< 17.6 V	< 35 V
Current limitation	9.9 A	Typ. 22 A, overload capability 150% $I_{out\ rated}$ up to 5 s/min
Short-circuit protection	Electronic shutdown, automatic restart	Alternatively, constant current characteristic approx. 22 A or latching shutdown
Sustained short-circuit current rms value	10 A	Approx. 22 A
Overload/short-circuit indicator	–	Yellow LED for "Overload", red LED for "latching shutdown"
Safety		
Primary/secondary isolation	Yes, safety extra low output voltage V_{out} according to EN 60950-1	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178
Protection class	Class I	Class I
Leakage current	< 3.5 mA (typ. 1 mA)	< 3.5 mA
Safety test	Yes; CB Scheme in preparation	Yes
CE mark	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1) in preparation; cURus (UL 60950-1, CSA C22.2 No. 60950-1) in preparation	Available soon
Explosion protection	–	–
FM approval	–	–
Marine approval	–	–
Degree of protection (EN 60529)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply harmonics limitation	EN 61000-3-2	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Permitted ambient temperature	-10 ... +70 °C with natural convection	-25 ... +60 °C with natural convection
Transport/storage temperature range	-25 ... +85 °C	-40 ... +85 °C
Humidity class		Climate class 3K3 according to EN 60721, no condensation
Mechanics		
Connections		
• Mains input	One screw-type terminal each for 0.3 ... 1.3 mm^2 solid/finely stranded	One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded
• Output +	2 screw terminals for 0.3 ... 1.3 mm^2	2 screw terminals for 0.2 ... 4 mm^2
• Output –	2 screw terminals for 0.3 ... 1.3 mm^2	2 screw terminals for 0.2 ... 4 mm^2
• Annunciation signals		2 screw terminals for 0.14 ... 1.5 mm^2
Dimensions (W x H x D) in mm	97 x 158 x 38	70 x 125 x 125
Weight, approx.	0.57 kg	1.2 kg
Installation	Wall mounting	Snaps onto DIN rail EN 60715 35×7.5/15
Accessories		
	–	Unit labeling plates (3RT1 900-1SB20)

Alternative voltages

Output voltage 15 V

Overview

Product	LOGO!Power NEW	LOGO!Power NEW	Special design SITOP dual
Power supply, type	15 V/1.9 A	15 V/4 A	2 x 15 V/3.5 A
Order No.	6EP1 351-1SH03	6EP1 352-1SH03	6EP1 353-0AA00
			
	The power supplies of the LOGO!Power range are optimally matched to the LOGO! logic modules in their functionality and design; with the wide-range input 85 V to 264 V AC and option for installing in built-in miniature distribution boards, they can be used universally in the low-end performance range. They can also operate with DC 110 V to 300 V.		The industrial power supply with two 15 V outputs that can be switched in parallel and in series; can be used, for example, to supply electronic loads with ±15 V.

The product families are highlighted in the same color.

For an explanation of the product families, see chapter 1, pages 1/8 through 1/12.

Technical specifications

Product	LOGO!Power	LOGO!Power	Special design SITOP dual
Input			
Rated voltage value $V_{in\ rated}$	1-phase AC or DC **100-240 V AC**	1-phase AC or DC **100-240 V AC**	1-phase AC **120-230 V AC**
Voltage range	Wide-range input AC 85 ... 264 V DC 110 ... 300 V	Wide-range input AC 85 ... 264 V DC 110 ... 300 V	Wide-range input 93 ... 264 V
Overvoltage resistance	2.3 × $V_{in\ rated}$, 1.3 ms	2.3 × $V_{in\ rated}$, 1.3 ms	Surge voltage in accordance with EN 61000-6-2 Table 4
Mains buffering at $I_{out\ rated}$	> 40 ms at V_{in} = 187 V	> 40 ms at V_{in} = 187 V	> 10/40 ms at V_{in} = 120/187 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	0.63-0.33 A	1.24-0.68 A	1.9-1.15 A
Switch-on current limit (+25 °C)	< 25 A	< 55 A	< 30 A, typ. 3 ms
I^2t	< 0.8 A^2s	< 3 A^2s	< 3 A^2s
Built-in incoming fuse	Internal	Internal	T4 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	16 A or higher, characteristic B or 10 A or higher, characteristic C	16 A or higher, characteristic B or 10 A or higher, characteristic C	16 A or higher, characteristic B or 10 A or higher, characteristic C
Output			
	Controlled, isolated DC voltage	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $V_{out\ rated}$	**15 V DC**	**15 V DC**	**2 × 15 V DC**
Total tolerance	±3 %	±3 %	±2 %
• Static line compensation	Approx. 0.1 %	Approx. 0.1 %	ca. 0.2 %
• Static load compensation	Approx. 1.5 %	Approx. 1.5 %	ca. 0.2 %
Residual ripple	< 200 mV_{pp} (typ. 10 mV_{pp})	< 200 mV_{pp} (typ. 10 mV_{pp})	< 50 mV_{pp} (typ. 20 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 300 mV_{pp} (typ. 30 mV_{pp})	< 300 mV_{pp} (typ. 70 mV_{pp})	< 150 mV_{pp}
Adjustment range	10.5 ... 16.1 V	10.5 ... 16.1 V	14.5 ... 17 V
Status display	Green LED for 15 V OK	Green LED for 15 V OK	Green LED for V_{out} >10 V (summation display)
Signaling			–
On/off behavior	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)	Overshoot of V_{out} < 3 %
Startup delay / voltage rise	< 0.5 s/typ. 15 ms	< 0.5 s/typ. 15 ms	< 1 s/–
Rated current value $I_{out\ rated}$	**1.9 A**	**4 A**	**2 × 3.5 A**
Current range			
• Up to +60 °C	0 ... 1.9 A (up to +55 °C)	0 ... 4 A (up to +55 °C)	2 × 0 ... 2.5 A
• Derating	0 ... 1.3 A (up to +70 °C)	0 ... 2.8 A (up to +70 °C)	2 × 0 ... 3.5 A (up to +45 °C)
Dynamic overcurrent on			
• Power-up on short-circuit			–
• Short circuit during operation			–
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units	Yes, 2 units

Technical specifications (continued)

Product	LOGO!Power	LOGO!Power	Special design SITOP dual
Power supply, type	**15 V/1.9 A**	**15 V/4 A**	**2 x 15 V/3.5 A**
Order No.	**6EP1 351-1SH03**	**6EP1 352-1SH03**	**6EP1 353-0AA00**
Efficiency			
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 81 %	Approx. 85 %	Approx. 80 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 7 W	Approx. 11 W	Approx. 27 W
Closed-loop control			
Dyn. mains compensation ($V_{in\ rated}$ ±15 %)	<0.2 % V_{out}	<0.2 % V_{out}	
Dynamic load compensation (I_{out}: 10/90/10 %)	Typ. ±2.8 % V_{out}	Typ. ±3 % V_{out}	
Load-step settling time			
• 10 at 90 %	Typ. 1 ms	Typ. 1 ms	
• 90 at 10 %	Typ. 1 ms	Typ. 1 ms	
Protection and monitoring			
Output overvoltage protection			Yes, according to EN 60950
Current limitation	Typically 2.7 A	Typically 5.7 A	Limit point < 4.9 A; switch-off point < 6 A
Short-circuit protection	Constant current characteristic	Constant current characteristic	Electronic shutdown, automatic restart
Sustained short-circuit current rms value	< 3.6 A	< 7 A	–
Overload/short-circuit indicator	–	–	–
Safety			
Primary/secondary isolation	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178	Yes, safety extra low output voltage V_{out} according to EN 60950-1
Protection class	Class II (without protective conductor)	Class II (without protective conductor)	Class I
Leakage current			< 3.5 mA
Safety test	Yes; CB Scheme	Yes; CB Scheme	Yes
CE mark	Yes	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cURus-Recognized (UL 60950, CSA C22.2 No. 60950), File E151273	cULus-listed (UL 508, CSA C22.2 No. 142), File E179336
Explosion protection	ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABCD, T4	ATEX (EX) II 3G Ex nA IIC T3; cCSAus (CSA E60079, UL 60079), Class I, Div. 2. Group ABCD, T4	–
FM approval	Class I, Div. 2. Group ABCD, T4	Class I, Div. 2. Group ABCD, T4	–
Marine approval	GL	GL	–
Degree of protection (EN 60529)	IP20	IP20	IP20
EMC			
Emitted interference	EN 55022 Class B	EN 55022 Class B	EN 55011 Class A
Supply harmonics limitation	Not applicable	Not applicable	–
Noise immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Operating data			
Permitted ambient temperature	-20 ... +70 °C with natural convection	-20 ... +70 °C with natural convection	0 ... +60 °C with natural convection, derated above +45 °C
Transport/storage temperature range	-40 ... +85 °C	-40 ... +85 °C	-40 ... +70 °C
Humidity class	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation	Climate class 3K3 according to EN 60721, no condensation
Mechanics			
Connections			
• Supply input L1, N, PE	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded	One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded
• Output +	2 screw terminals for 0.5 to 2.5 mm^2	2 screw terminals for 0.5 to 2.5 mm^2	1 screw terminal each for 0.5 ... 2.5 mm^2 (P15_1, GND1, GDN2)
• Output -	2 screw terminals for 0.5 to 2.5 mm^2	2 screw terminals for 0.5 to 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2 (P15_2)
Dimensions (W x H x D) in mm	54 × 90 × 55	72 × 90 × 55	75 × 125 × 125
Weight, approx.	0.17 kg	0.25 kg	0.75 kg
Installation	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15	Snaps onto DIN rail EN 60715 35x7.5/15

Output voltage 48 V

Overview

Product	SITOP modular PSU300M	SITOP modular
Power supply, type	48 V/10 A	48 V/20 A
Order No.	6EP1 456-3BA00	6EP1 457-3BA00
		
	The three-phase 48 V power supply for powerful loads that are supplied with double the usual 24 V; with wide-range input; slim design; with 50 % extra power for 5 s/min.	The modular 48 V power supply for powerful loads that are supplied with double the usual 24 V; with wide-range input and switchable output characteristic; function expansion possible with add-on module.

Technical specifications

Product	SITOP modular PSU300M	SITOP modular
Input		
Rated voltage value $V_{in\ rated}$	3-phase AC **400-500 V 3 AC**	3-phase AC **400 to 500 V 3 AC**
Voltage range	Wide-range input 320 ... 575 V	Wide-range input 320 ... 550 V (startup from V_{in} > 340 V)
Overvoltage resistance	2.3 × $V_{in\ rated}$, 1.3 ms	2.3 × $V_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 15 ms at V_{in} = 400 V	> 6 ms at V_{in} = 400 V
Rated line frequency value; range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	1.2-1.0 A	2.2 A (V_{in} = 400 V)
Switch-on current limit (+25 °C)	< 18 A	< 70 A
I^2t	< 0.8 A^2s	< 2.8 A^2s
Built-in incoming fuse	None	None
Recommended miniature circuit breaker (IEC 898) in the mains power input	3-pole connected miniature circuit breaker 6 ... 16 A, characteristic C or motor circuit breaker 3RV2011-1DA10 (set to 3 A) or 3RV2711-1DD10 (UL 489)	3-pole connected miniature circuit breaker 10 ... 16 A, characteristic C or motor circuit breaker 3RV2011-1DA10 (set to 3 A) 3RV2711-1DD10 (UL 489)
Output		
Rated voltage $V_{out\ rated}$	Controlled, isolated DC voltage **48 V DC**	Controlled, isolated DC voltage **48 V DC**
Total tolerance	±3 %	±3 %
• Static line compensation	Approx. ±0.1 %	ca. 0.1 %
• Static load compensation	Approx. ±0.2 %	ca. 0.2 %
Residual ripple	< 100 mV_{pp}	< 100 mV_{pp} (typ. 10 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 200 mV_{pp}	< 200 mV_{pp} (typ. 80 mV_{pp})
Adjustment range	42 ... 56 V (max. 480 W)	42 ... 56 V (max. 960 W)
Status display	Green LED for 48 V OK	Green LED for 48 V OK
Signaling	Power good via relay contact (NO contact, rating 60 V/0.3 A) for output voltage OK	Possible via signaling module (6EP1 961-3BA10)
On/off behavior	No overshoot of V_{out} (soft start)	No overshoot of V_{out} (soft start)
Startup delay / voltage rise	< 2.5 s/< 500 ms (typ. 150 ms)	< 2.5 s/typ. 20 ms
Rated current value $I_{out\ rated}$	**10 A**	**20 A**
Current range		
• Up to +60 °C	0 ... 10 A	0 ... 20 A
• Derating	0 ... 7 A (up to +70 °C)	–

Technical specifications (continued)

Product	SITOP modular PSU300M	SITOP modular
Power supply, type	**48 V/10 A**	**48 V/20 A**
Order No.	**6EP1 456-3BA00**	**6EP1 457-3BA00**
Output (continued)		
Dynamic overcurrent on • Power-up on short-circuit • Short circuit during operation	 Constant current approx. 11 A Typ. 23 A for 25 ms	 Constant current approx. 23 A Typ. 60 A for 25 ms
Parallel switching for enhanced performance	Yes, 2 units (switchable characteristic)	Yes, 2 units (switchable characteristic)
Efficiency		
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$ Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 93 % Approx. 36 W	Approx. 90 % Approx. 106 W
Protection and monitoring		
Output overvoltage protection Current limitation	Yes, according to EN 60950 Typ. 11 A, overload capability 150% $I_{out\ rated}$ up to 5 s/min	Yes, according to EN 60950 Typically 23 A
Short-circuit protection	Alternatively, constant current characteristic approx. 11 A or latching shutdown	Alternatively, constant current characteristic approx. 23 A or latching shutdown
Sustained short-circuit current rms value	Approx. 11 A	Approx. 23 A
Overload/short-circuit indicator	LED yellow for "overload", LED red for "latching shutdown"	LED yellow for "overload", LED red for "latching shutdown"
Safety		
Primary/secondary isolation Protection class	Yes, SELV output voltage V_{out} according to EN 60950-1 and EN 50178 Class I	Yes, safety extra low output voltage V_{out} according to EN 60950-1 Class I
Leakage current Safety test CE mark	< 3.5 mA Yes Yes	< 3.5 mA (typ. 0.68 mA) Yes Yes
UL/cUL (CSA) approval Explosion protection Marine approval	cULus-listed (UL 508, CSA C22.2 No. 107.1), File E197259 ATEX (available soon) GL and ABS available soon	cULus-Listed (UL 508, CSA C22.2 No. 107.1), File E197259; cCSAus (CSA C22.2 No. 60950, UL 60950) – –
Degree of protection (EN 60529)	IP20	IP20
EMC		
Emitted interference Supply harmonics limitation Noise immunity	EN 55022 Class B EN 61000-3-2 EN 61000-6-2	EN 55022 Class B EN 61000-3-2 EN 61000-6-2
Operating data		
Permitted ambient temperature Transport/storage temperature range Humidity class	-10 ... +70 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation	0 ... +60 °C with natural convection -40 ... +85 °C Climate class 3K3 according to EN 60721, no condensation
Mechanics		
Connections • Supply input L1, L2. L3.PE • Output + • Output - • Alarm signals	 One screw-type terminal each for 0.5 ... 2.5 mm^2 solid/finely stranded One screw terminal each for 0.2 ... 4 mm^2 One screw terminal each for 0.2 ... 4 mm^2 2 screw terminals for 0.14 ... 1.5 mm^2	 One screw-type terminal each for 0.2 ... 4 mm^2 solid/finely stranded 2 screw terminals each for 0.33 ... 10 mm^2 2 screw terminals each for 0.33 ... 10 mm^2 –
Dimensions (W x H x D) in mm Weight, approx. Installation	70 x 125 x 125 1.2 kg Snaps onto DIN rail EN 60715 35×7.5/15	240 × 125 × 125 3.2 kg Snaps onto DIN rail EN 60715 35×15
Accessories		
	Device labeling plates (3RT1900-1SB20)	Signaling module (6EP1961-3BA10)

Ordering data and additional information

Selection and ordering data

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
Special design, SITOP flexi					
	**120/230 V AC**	**DC 3-52 V**	2-10 A	**6EP1 353-2BA00**	
LOGO!Power NEW					
	**100-240 V AC**	**5 V DC**	3 A	**6EP1 311-1SH03**	
LOGO!Power NEW					
	**100-240 V AC**	**5 V DC**	6.3 A	**6EP1 311-1SH13**	
LOGO!Power NEW					
	**100-240 V AC**	**12 V DC**	1.9 A	**6EP1 321-1SH03**	
SITOP compact, PSU100C NEW					
	**100 - 230 V AC**	**12 V DC**	2 A	**6EP1 321-5BA00**	
Special design, SITOP DC/DC					
	**24 V DC**	**12 V DC**	2.5 A	**6EP1 621-2BA00**	
Special design, PSU100D NEW (Planned delivery date: December 2011)					
	**100-240 V AC**	**12 V DC**	3 A	**6EP1 321-1LD00**	
LOGO!Power NEW					
	**100-240 V AC**	**12 V DC**	4.5 A	**6EP1 322-1SH03**	

13

Selection and ordering data (continued)

Product	Input Voltage $V_{in\ rated}$	Output Voltage $V_{out\ rated}$	Current $I_{out\ rated}$	Order No.	Price
SITOP compact, PSU100C NEW					
	**100 - 230 V AC**	**12 V DC**	6.5 A	**6EP1 322-5BA10**	
Special design, PSU100D NEW (Planned delivery date: December 2011)					
	**100-240 V AC**	**12 V DC**	8.3 A	**6EP1 322-1LD00**	
Special design, PSU300B NEW (Planned delivery date: December 2011)					
	**400-500 V 3 AC**	**12 V DC**	20 A	**6EP1 424-3BA00**	
LOGO!Power NEW					
	**100-240 V AC**	**15 V DC**	1.9 A	**6EP1 351-1SH03**	
LOGO!Power NEW					
	**100-240 V AC**	**15 V DC**	4 A	**6EP1 352-1SH03**	
Special design, SITOP dual					
	**120/230 V AC**	**2 × 15 V DC**	2 × 3.5 A	**6EP1 353-0AA00**	
SITOP modular, PSU300M					
	**400-500 V 3 AC**	**48 V DC**	10 A	**6EP1 456-3BA00**	
SITOP modular					
	**400-500 V 3 AC**	**48 V DC**	20 A	**6EP1 457-3BA00**	

Further information

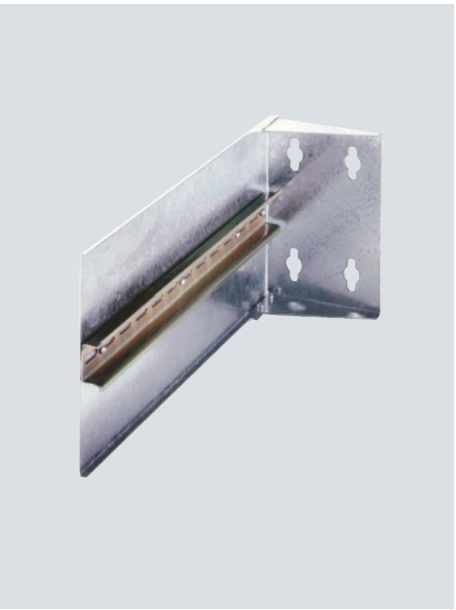
Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros: www.siemens.com/sitop-cax
- Operating instructions: www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool: www.siemens.com/sitop-selection-tool

Notes

Accessories

14



Export regulations AL and ECCN
see page 17/9

Mounting bracket, mounting adapter, connectors, device labeling plates

Mounting bracket

Product	90° mounting bracket
Mounting bracket	For a depth of 320 mm
Order No.	6EP1 971-2BA00

The combination of a SITOP power supply and a 90° mounting bracket results in a minimum surface area requirement on the rear panel of the control cabinet (the width of the power supply becomes the depth, and the depth becomes the width). The mounting bracket is suitable for control cabinets with a depth of 320 mm or more.

Technical specifications of mounting bracket	
Dimensions (W × H × D) in mm	100 × 150 × 320
Sheet metal thickness	1.5 mm
Mounting rail, attached	DIN rail EN 60715 35×15
Weight, approx.	0.9 kg
Installation	Can be screwed onto a flat surface (keyhole mounting for hooking onto M6 screws, drill hole distance 90 mm height, 50 mm side distance)
Accessories, included	4 M6 combi screws
Suitable, for example, for	SITOP 24 V/20 A (6EP1336-3BA00, 6EP1436-3BA00) SITOP 24 V/40 A (6EP1337-3BA00, 6EP1437-3BA00) SITOP 48 V/20 A (6EP1457-3BA00)

Mounting adapter for DIN rail

The 24 V/2 A (6ES7 305-1BA80-0AA0) and 24 V/5 A (6ES7 307-1EA80-0AA0) single-phase power supplies are special mechanical versions for SIMATIC S7-300 which can be snapped on S7 mounting rails. An adapter (6SE7 390-6BA00-0AA0) for mounting on the DIN rail EN 60715 35×15 is available separately as an accessory.

The 24 V/ 2 A (6ES7 307-1BA01-0AA0), 24 V/5 A (6ES7-307-1EA01-0AA0) and 10 A (6ES7-307-1KA02-0AA0) power supplies are variants for SIMATIC S7-300 and can be snapped on the S7 mounting rail.
A mounting adapter (6EP1 971-1BA00) for installation on the DIN rail EN 60715 35×15/7.5 is separately available as an accessory.

Connector for devices in IP65 and IP67 degree of protection

For the SITOP PSU300P power supply (6EP1 433-2CA00) in IP67 degree of protection, a power connection plug (3RK1 911-2BE50) is available as a spare part.

For the maintenance-free DC UPS modules SITOP UPS500P (6EP1 933-2NC01, 6EP1 933-2NC11) in IP65 degree of protection, a connector kit (6EP1 975-2ES00) for input and output with pre-assembled 2 m USB cable is available as spare part.

Device labeling plates

Device labeling plates (delivered blank, sized at 20 mm x 7 mm, pastel turquoise) are available to label power supplies. The order number is 3RT1 900-1SB20. The package unit comprises 340 labels on frames, 20 labels per frame. For usability, refer to "Accessories" in the technical data of the respective power supplies.

Ordering data

Product	Description	Order No.	Price
90° mounting bracket			
	Suitable for cabinets that are at least 320 mm deep	**6EP1 971-2BA00**	
Mounting adapter			
	For DIN rail EN 60715 35x7.5/15	**6EP1 971-1BA00**	
	For DIN rail EN 60715 35x15	**6ES7 390-6BA00-0AA0**	
Power connection plug			
	For SITOP PSU300P	**3RK1 911-2BE50**	
Connector set			
	For UPS500P	**6EP1 975-2ES00**	
Device labeling plates			
	Pastel turquoise, 20 x 7 mm; Package containing 340 pcs.	**3RT1 900-1SB20**	

Further information

Additional information is available in the Internet under:

- 2D dimensional drawings, 3D CAD data, circuit diagram macros: www.siemens.com/sitop-cax
- Operating instructions: www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool: www.siemens.com/sitop-selection-tool

SIPLUS power supplies

15

Export regulations AL and ECCN
see page 17/9

Overview

In harsh industrial environments you need products that exhibit special properties, products that can cope with these conditions and that are even more robust that the standard products.

SIPLUS extreme is our answer to these requirements.

SIPLUS extreme products are based on Siemens Industry standard power supplies SITOP, LOGO!Power and power supplies for SIMATIC S7.

The SIPLUS versions possess the following characteristics:

- Expanded ambient temperature range (e.g. -40 … +70 °C)
- Conformal coating as a protection against extreme and difficult conditions and contact with substances
- EN 50155:
  Matches standard „Electronic equipment used on rolling stock“ (EN 50155, temperature T1, category)
- Hard gold-plated contacts for improved contact-making, even for low currents

Technical specifications

Ambient conditions (includes contact with substances)	
Relative humidity	5 … 100 %, condensation permissible
Biologically active substances	Conformity with EN 60721-3-3, class 3B2: mold, fungus, spores (fauna is excluded)
Chemically active substances	Conformity with EN 60721-3-3, class 3C4 incl. salt mist and ISA -S71.04 severity level G1; G2; G3; GX [1)2)]
Mechanically active substances	Conformity with EN 60721-3-3, class 3S4, incl. sand, dust[2)]
Air pressure (depending on the highest positive temperature range specified)	1080...795 hPa (-1000 … +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 … 540 hPa (+3500 … +5000 m) derating 20 K
Other technical data	are the same as for the corresponding standard products

1) ISA -S71.04 severity level GX: Long-term load:
SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NO_x < 5.2 ppm
Limit value (max 30 min/d): SO_2 < 14.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 1.0 ppm; NO_x < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

3) Ballast for operation with combustion engines
(Input DC: 10.5 ... 59 V, output DC: 20.4 ... 28.8 V).

Selection and ordering data

Product	SIPLUS version	Standard product	Order No.	Price
1-phase				
SIPLUS S7-200 PS203 3.5 A				
	-25 … +70 °C protected against contact with substances	**6EP1 332-1SH31** see page 4/2	**6AG1 203-1SH31-2AA0**	
SIPLUS S7-300 PS 305 2 A				
	-25 … +70 °C protected against contact with substances, EN 50155	**6ES7 305-1BA80-0AA0** see page 2/3	**6AG1 305-1BA80-2AA0**	
SIPLUS PS 24 0.375 A				
	protected against contact with substances	**6EP1 731-2BA00** see page 2/2	**6AG1 931-2BA00-3AA0**	
SIPLUS S7-1200 PM 1207				
	-25 … +70 °C protected against contact with substances	**6EP1 332-1SH71** see page 3/3	**6AG1 332-1SH71-7AA0**	
	protected against contact with substances	**6EP1 332-1SH71** see page 3/3	**6AG1 332-1SH71-4AA0**	
SIPLUS LOGO! upmiter 1.25 A [3]				
	-25 … +70 °C protected against contact with substances		**6AG1 053-1AA00-2AA0**	
SIPLUS S7-200 upmiter 2.5 A [3]				
	-25 … +70 °C protected against contact with substances		**6AG1 203-1AA00-2AA0**	
SIPLUS S7-300 upmiter 2.5 A [3]				
	-25 … +60 °C protected against contact with substances		**6AG1 305-1AA00-2AA0**	
1-phase and 2-phase				
SIPLUS PS modular 5 A				
	-40 … +70 °C protected against contact with substances	**6EP1 333-3BA00** see page 5/2	**6AG1 933-3BA00-2AA0**	
SIPLUS S7-300 PS 307 5 A Outdoor				
	-25 … +70 °C protected against contact with substances, EN 50155	**6ES7 307-1EA80-0AA0** see page 5/3	**6AG1 307-1EA80-2AA0**	
SIPLUS PS modular 10 A				
	-40 … +60 °C protected against contact with substances	**6EP1 334-3BA00** see page 7/2	**6AG1 334-3BA00-2AA0**	
	protected against contact with substances	**6EP1 334-3BA00** see page 7/2	**6AG1 334-3BA00-4AA0**	
SIPLUS PS smart 10 A				
	protected against contact with substances	**6EP1 334-2BA01** see page 7/2	**6AG1 334-2BA01-4AA0**	
SIPLUS S7-300 PS 307 10 A				
	-25 … +70 °C protected against contact with substances	**6ES7 307-1KA02-0AA0** see page 7/3	**6AG1 307-1KA02-7AA0**	
SIPLUS PS modular 20 A				
	-40 … +70 °C protected against contact with substances	**6EP1 336-3BA00** see page 8/3	**6AG1 336-3BA00-7AA0**	
	protected against contact with substances	**6EP1 336-3BA00** see page 8/3	**6AG1 936-3BA00-4AA0**	
SIPLUS PS modular 40 A				
	protected against contact with substances	**6EP1 337-3BA00** see page 8/3	**6AG1 337-3BA00-4AA0**	

Ordering data (continued)

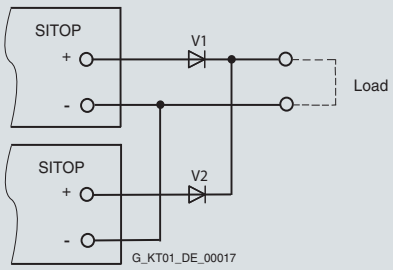
Product	SIPLUS version	Standard product	Order No.	Price
3-phase				
SIPLUS PS modular 5 A				
	-40 … +70 °C protected against contact with substances	6EP1 333-3BA00 see page 9/2	6AG1 933-3BA00-2AA0	
SIPLUS PS modular 10 A				
	-40 … +60 °C protected against contact with substances	6EP1 334-3BA00 see page 9/2	6AG1 334-3BA00-2AA0	
SIPLUS PS modular 20 A				
	-40 … +70 °C protected against contact with substances	6EP1 436-3BA00 see page 9/3	6AG1 436-3BA00-7AA0	
SIPLUS PSU300M 40 A				
	-25 … +70 °C protected against contact with substances	6EP1 437-3BA10 see page 10/2	6AG1 437-3BA10-7AA0	
SIPLUS PS modular 3AC 40 A				
	protected against contact with substances	6EP1 437-3BA00 see page 10/3	6AG1 437-3BA00-4AA0	

Product	SIPLUS version	Standard product	Order No.	Price
Expansion modules				
SIPLUS PS signaling module				
	Contacts hard gold plated protected against contact with substances	6EP1 961-3BA10 see page 11/2	6AG1 961-3BA10-6AA0	
SIPLUS PS signaling module				
	-25 … +70 °C protected against contact with substances	6EP1 961-3BA10 see page 11/2	6AG1 961-3BA10-7AA0	
SIPLUS PSE202U redundancy module				
	-40 … +70 °C protected against contact with substances	6EP1 961-3BA21 see page 11/2	6AG1 961-3BA21-7AX0	
	protected against contact with substances	6EP1 961-3BA21 see page 11/2	6AG1 961-3BA21-4AX0	
SIPLUS PS buffer module				
	-25 … +70 °C protected against contact with substances	6EP1 961-3BA01 see page 11/2	6AG1 961-3BA01-7AA0	

Product	SIPLUS version	Standard product	Order No.	Price
Uninterruptible power supply DC UPS				
SIPLUS PS DC UPS module 15 A				
	-25 … +60 °C protected against contact with substances	6EP1 931-2EC21 see page 12/14	6AG1 931-2EC21-2AA0	
SIPLUS PS DC UPS module 40 A				
	-25 … +70 °C protected against contact with substances	6EP1 931-2FC21 see page 12/14	6AG1 931-2FC21-7AA0	

Technical information and configuring notes

16



Power supplies in general

Power supplies

In plant building or mechanical equipment manufacture, or in any other situations in which electrical controls are used, a safe and reliable power supply is needed to supply the process with power.

The functional reliability of electronic controls and therefore the reliable operation of automated plants is extremely closely linked to the resistance of the load power supply to failure. Final control elements as well as input and output modules will only respond to command signals if the power supply is operating reliably.

In addition to requirements such as safety, particular demands are placed on the electromagnetic compatibility (EMC) of the power supply with reference to the tolerance range of the output voltage as well as its ripple.

Important factors that determine problem-free implementation are, in particular:

- An input current with a low harmonic content
- Low emitted interference
- Adequate immunity (noise immunity) to interference

EMC	Interference phenomena
Emission (emitted interference)	Interference caused by television and radio reception Interference coupling on data lines or power supply cables
Noise immunity (immunity to interference)	Faults on the power cable due to switching non-resistive loads such as motors or contactors Static discharge due to lightning strikes Electrostatic discharge through the human body Conducted noise induced by radio frequencies

Selected interference phenomena

General notes on DC power supplies

The DC power supply is a static device with one or more inputs and one or more outputs that converts a system of AC voltage and AC current and/or DC voltage and DC current to a system with different values of DC voltage and DC current by means of electromagnetic induction for the purpose of transmitting electrical energy.

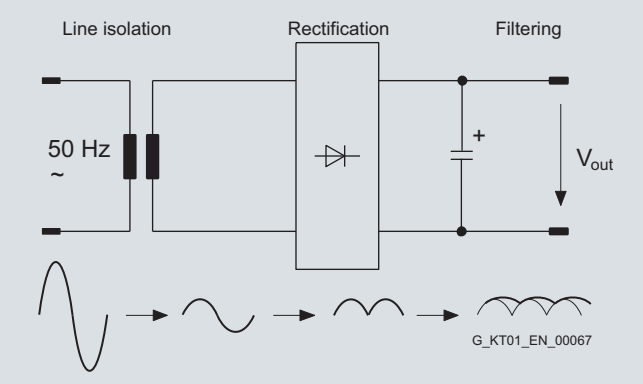
The type of construction of a DC power supply is primarily decided by its intended use.

Non-stabilized DC power supplies

The AC mains voltage is transformed using 50 Hz/60 Hz safety transformers to a protective extra-low voltage and smoothed with down-circuit rectification and capacitor filtering.

In the case of non-stabilized DC power supplies, the DC output voltage is not stabilized at a specific value, but the value is varied in accordance with the variation in (mains) input voltage and the loading.

The ripple is in the Volt range and is dependent on the loading. The value for the ripple is usually specified as a percentage of the DC output voltage level. Non-stabilized DC power supplies are characterized by their rugged, uncomplicated design that is limited to the important factors and focused on a long service life.



Block diagram of a non-stabilized power supply

Stabilized DC power supplies

Stabilized DC power supplies have electronic control circuits that maintain the DC voltage at the output at a specific value with as little variation as possible. Effects such as variation in input voltage or changes in load at the output are electrically compensated in the specified function area.

The ripple in the output voltage for stabilized DC power supplies lies in the millivolt range and is mainly dependent on the loading at the outputs.

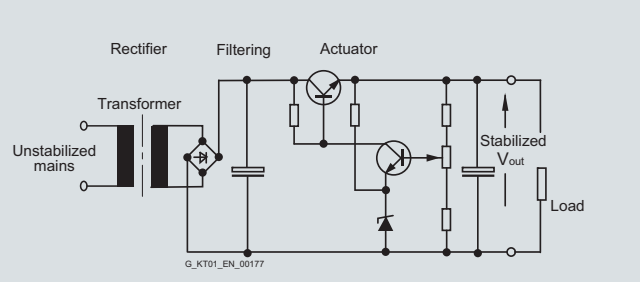
Stabilized DC power supplies can be implemented on different functional principles. The most common types of circuit are:

- Linear stabilized power supplies
- Magnetic voltage stabilizers
- Secondary pulsed switched-mode power supplies
- Primary pulsed switched-mode power supplies

The most suitable principle for a particular application case will depend mainly on the application. The objective is to generate a DC voltage to supply the specific load as inexpensively and as accurately as possible.

Stabilized DC power supplies (continued)

Linear stabilized power supplies



Block diagram: Transformer with in-phase regulation

The transformer with in-phase regulation operates according to a conventional principle. The supply is provided from an AC supply system (one, two or three conductor supply).

A transformer is used to adapt it to form the required secondary voltage.

The rectified and filtered secondary voltage is converted to a stabilized voltage at the output in a regulation section. The regulation section comprises a final control element and a control amplifier. The difference between the stabilized output voltage and the non-stabilized voltage at the filter capacitor is converted into a thermal loss in the final control element. The final control element functions in this case like a rapidly changeable ohmic impedance. The thermal loss that arises in each case is the product of output current and voltage drop over the final control element.

This system is extremely adaptable. Even without further modifications, several output voltages are possible. In the case of multiple outputs, the individual secondary circuits are usually generated from separate secondary windings of the input transformer. Some applications can only be resolved in accordance with this circuit principle. Especially when highly accurate regulation, minimal residual ripple and fast compensation times are required.

The efficiency is, however, poor and the weight and volume are considerable. The transformer with in-phase regulation is therefore only an economical alternative at low power ratings.

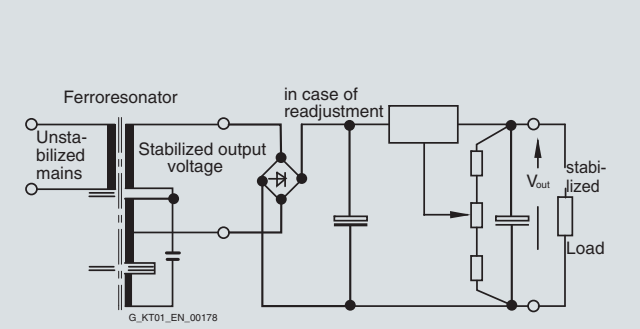
Advantages:

- Simple, well-proven circuit principle
- Good to excellent control characteristics
- Fast compensation time

Disadvantages:

- Relatively high weight and large volume due to the 50 Hz transformer
- Poor efficiency, heat dissipation problems
- Low storage time

Magnetic stabilizer



Block diagram: Magnetic stabilizer

The complete transformer comprises two components. The "ferro resonator" and a series-connected auxiliary regulator. The input winding and the resonance winding of the magnetic stabilizer are decoupled to a large extent by means of the air gap. The magnetic stabilizer supplies a well-stabilized AC voltage. This is rectified and filtered. The transformer itself is operated in the saturation range.

The ferro resonator frequently has a transformer with in-phase regulation connected downstream to improve the control accuracy. Secondary pulsed switched-mode regulators are frequently also connected to the output.

The magnetic stabilizer technique is reliable and rugged but is also large-volume, heavy and relatively expensive.

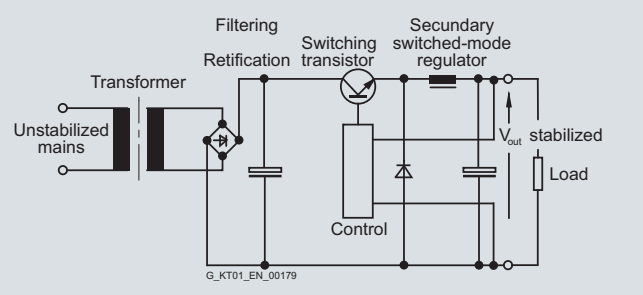
Advantages:

- Good to excellent control characteristics in combination with series-connected linear regulators
- Significantly better efficiency than a transformer with in-phase regulation alone

Disadvantages:

- The ferro resonator is frequency dependent
- The power supplies are large and heavy due to the magnetic components

Secondary pulsed switched-mode power supplies:



Block diagram: Secondary pulsed switched-mode power supply

Isolation from the supply system is implemented in this case with a 50 Hz transformer. Following rectification and filtering, the energy is switched at the output by means of pulsing through a switching transistor in the filtering and storage circuit. Thanks to the transformer at the input that acts as an excellent filter, the mains pollution is low.
The efficiency of this circuit is extremely high.

This concept offers many advantages for power supplies with numerous different output voltages.

To protect the connected loads, however, care must be taken; in the event of the switching transistor breaking down, the full, non-stabilized DC voltage of the filter capacitor will be applied to the output. However, this danger also exists in the case of linear stabilized power supplies.

Advantages:

- Simple design and high efficiency
- Multiple outputs, also galvanically isolated from one another, are easily implemented by means of several secondary windings
- Fewer problems with interference than with primary pulsed switched-mode power supplies

Disadvantages:

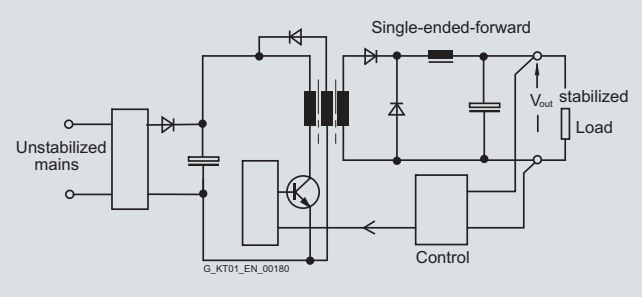
- The 50 Hz transformer makes the power supplies relatively large and heavy
- The output ripple (spikes) correspond to those of a primary pulsed switched-mode power supply

Power supplies in general

Stabilized DC power supplies (continued)

Primary pulsed switched-mode power supplies:

The term SMPS (Switch Mode Power Supply) or primary switched-mode regulator is often used in the literature.



Block diagram: Single-ended forward converter

The primary switched-mode regulators are available in many different circuit versions. The most important basic circuits are single-ended forward converters, flyback converters, half-bridge converters, full-bridge converters, push-pull converters and resonance converters.

The general principle of operation of the primary switched-mode regulator is shown in the block diagram of the single-ended forward converter:

The non-stabilized supply voltage is first rectified and filtered. The capacitance of the capacitor in the DC link determines the storage time of the power supply on failure of the input voltage. The voltage at the DC link is approximately 320 V DC for a 230 V supply. A single-ended converter is then supplied with this DC voltage and transfers the primary energy through a transformer to the secondary side with the help of a pulse width regulator at a high switching frequency. The switching transistor has low power losses when functioning as a switch, so that the power balance lies between > 70 % and 90 % depending on the output voltage and current.

The volume of the transformer is small in comparison with a 50 Hz transformer due to the high switching frequency because the transformer size, taking into account the higher switching frequency, is smaller. Using modern semiconductors, clock frequencies of 100 kHz and above can be achieved. However, switching losses increase at excessively high clock frequencies so that in each case a compromise has to be made between high efficiency and the largest possible clock frequency. In most applications, the clock frequencies lie between approximately 20 kHz and 250 kHz depending on the output power.

The voltage from the secondary winding is rectified and filtered. The system deviation at the output is fed back to the primary circuit through an optocoupler. By controlling the pulse width (conducting phase of the switching transistor in the primary circuit), the necessary energy is transferred to the secondary circuit and the output voltage is regulated. During the non-conducting phase of the switching transistor, the transformer is demagnetized through an auxiliary winding. Exactly the same amount of energy is transferred as is removed at the output. The maximum pulse width for the pulse duty factor for these circuits is < 50 %.

Advantages:

- Small magnetic components (transformer, storage reactor, filter) thanks to the high operating frequency
- High efficiency thanks to pulse width regulation
- Compact equipment units
- Forced-air cooling is not necessary up to the kW range
- High storage times are possible in case of power failure by increasing the capacitance in the DC link
- Large input voltage range possible

Disadvantages:

- High circuit costs, many active components
- High costs for interference suppression
- The mechanical design must be in accordance with HF criteria

Primary switched-mode power supplies have taken over from the other switching modes in recent years. This is due, in particular, to their compact size, minimal weight, high efficiency and excellent price/performance ratio.

Summary

The most important characteristics of the circuit types described above are summarized in the following table:

Comparison criteria	Connection types			
	Primary switched-mode	**Secondary switched-mode**	**Transformer with in-phase regulation**	**Magnetic stabilizer**
Input voltage range	Very large	Medium	Very small	Large
Regulation speed	Medium	Medium	Very fast	Slow
Storage time after power failure	Very long	Long	Very short	Long
Residual ripple	Medium	Medium	Very low	Medium
Power loss	Very small	Small	Large	Very small
Frame size	Very small	Medium	Very large	Large
Weight	Very light	Medium	Heavy	Very heavy
Interference suppression overhead	Very large	Medium	Low	Medium

Comparison criteria for basic circuit variants

Supply system data

When dimensioning and selecting plant components, the supply systems data, supply system conditions and operating modes must be taken into account for these components.

The most important data for a supply system include the rated voltage and rated frequency. These data for the supply system are designated as rated values in accordance with international agreements.

Rated voltages and rated frequencies

Since May 1987, the standard DIN IEC 60038 "IEC rated voltages" has been applicable in the Federal Republic of Germany.

The international standard IEC 60038, Edition 6, 1983, "IEC standard voltages" was included unmodified in this standard.

The IEC 60038 standard is the result of an international agreement to reduce the diverse rated voltage values that are in use for electrical supply networks and traction power supplies, load installations and equipment.

Conversion of low-voltage systems

In the low-voltage range, it is emphasized in IEC 60038 that the 220 V/380 V and 240 V/415 V values for three-phase electricity supplies have been replaced by a single internationally standardized value of 230 V/400 V.
The tolerances for the rated voltages of the supply systems that were specified for the transition period up to 2003 were intended to ensure that equipment rated for the previous voltages could be operated safely until the end of its service life.

Year	Rated voltage	Tolerance range
Up to 1987	220 V/380 V	– 10 % to +10 %
1988 to 2003	230 V/400 V	– 10 % to + 6 %
Since 2003	230 V/400 V	– 10 % to +10 %

Conversion of low-voltage systems

The IEC recommendations have been implemented as national regulations in the most important countries, as far as the conditions in the
country allow.

International supply voltages and frequencies in low-voltage systems

Country	Supply voltage
Western Europe:	
Belgium	50 Hz 230/400 – 127-220 V
Denmark	50 Hz 230/400 V
Germany	50 Hz 230/400 V
Finland	50 Hz 230/400-500[1] – 660[1] V
France	50 Hz 127/220 – 230/400 – 500[1] – 380/660[1] – 525/910[1] V
Greece	50 Hz 230/400 – 127/220[2] V
Great Britain	50 Hz (230/400 V)
Ireland	50 Hz 230/400 V
Iceland	50 Hz 127/220[2] – 230/400 V
Italy	50 Hz 127/220 – 230/400 V
Luxembourg	50 Hz 230/400 V
The Netherlands	50 Hz 230/400 – 660[1] V
Northern Ireland	50 Hz 230/400 – Belfast 220/380 V
Norway	50 Hz 230-230/400-500[1] – 690[1] V
Austria	50 Hz 230/400 – 500[1] – 690[1] V
Portugal	50 Hz 230/400 V
Sweden	50 Hz 230/400 V
Switzerland	50 Hz 230/400 – 500[2] V
Spain	50 Hz 230/400 V
Eastern Europe:	
Albania	50 Hz 230/400 V
Bulgaria	50 Hz 230/400 V
Russian Federation	50 Hz 230/400 – 690[1] V
Croatia	50 Hz 230/400 V
Poland	50 Hz 230/400 V
Romania	50 Hz 230/400 V
Serbia	50 Hz 230/400 V
Slovakia	50 Hz 230/400 – 500[1] – 690[1] V
Slovenia	50 Hz 230/400 V
Czech Republic	50 Hz 230/400 – 500[1] – 690[1] V
Hungary	50 Hz 230/400 V

[1] Industry only

[2] No further expansion

Supply system data, line-side connection

International supply voltages and frequencies in low-voltage systems (continued)

Country	Supply voltage
Middle East:	
Afghanistan	50 Hz 220/380 V
Bahrain	50 Hz 230/400 V
Cyprus	50 Hz 240/415 V
Iraq	50 Hz 220/380 V
Israel	50 Hz 230/400 V
Jordan	50 Hz 220/380 V
Kuwait	50 Hz 240/415 V
Lebanon	50 Hz 110/190 – 220/380 V
Oman	50 Hz 220/380 – 240/415 V
Qatar	50 Hz 240/415 V
Saudi Arabia	60 Hz 127/220 – 220/380 – 480[1] V (220/380 – 240/415 V 50 Hz: a few remaining areas only)
Syria	50 Hz 115/200 – 220/380 – 400[1] V
Turkey	50 Hz 220/380 V (parts of Istanbul: 110/190 V)
United Arab Emirates (Abu Dhabi; Ajman; Dubai; Fujairah; Ras al Khaymah; Sharjah; Um al Qaywayn)	50 Hz 220/380 – 240/415 V
Yemen (North)	50 Hz 220/380 V
Yemen (South)	50 Hz 230/400 V
Far East:	
Bangladesh	50 Hz 230/400 V
Burma	50 Hz 230/400 V
People's Republic of China	50 Hz 127/220 – 220/380 V (in mining: 1140 V)
Hong Kong	50 Hz 200/346 V
India	50 Hz 220/380 – 230/400 – 240/415 V
Indonesia	50 Hz 127/220 – 220/380 – 400[1] V
Japan	50 Hz 100/200 – 400[1] V
South Honshu, Shikoku, Kyushu, Hokkaido, North Honshu	60 Hz 110/220 – 440[1] V
Cambodia	50 Hz 120/208 V – Phnom Penh 220/238 V
Korea (North)	60 Hz 220/380 V
Korea (South)	60 Hz 100/200[2] – 220/380 – 440[1] V
Malaysia	50 Hz 240/415 V
People's Republic of Mongolia	50 Hz 220/380 V
Pakistan	50 Hz 230/400 V
Philippines	60 Hz 110/220 – 440 V
Singapore	50 Hz 240/415 V
Sri Lanka	50 Hz 230/400 V
Taiwan	60 Hz 110/220 – 220 – 440 V
Thailand	50 Hz 220/380 V
Vietnam	50 Hz 220/380 V
North America:	
Canada	60 Hz 600 – 120/240 – 460 – 575 V
USA	60 Hz 120/208 – 120/240 – 277/480 – 600[1] V
Central America:	
Bahamas	60 Hz 115/200 – 120/208 V
Barbados	50 Hz 110/190 – 120/208 V
Belize	60 Hz 110/220 – 220/440 V
Costa Rica	60 Hz 120/208[2] – 120/240 – 127/220 – 254/440[2] – 227/480[1] V
Dominican Republic	60 Hz 120/208 – 120/240 – 480[1] V

[1] Industry only

[2] No further expansion

International supply voltages and frequencies in low-voltage systems (continued)

Country	Supply voltage
Central America (continued)**:**	
Guatemala	60 Hz 120/208 – 120/240 – 127/220 – 277/480[1] – 480[1] – 550[1] V
Haiti	50 Hz 220/380 V (Jacmel), 60 Hz 110/220 V
Honduras	60 Hz 110/220 – 127/220 – 277/480 V
Jamaica	50 Hz 110/220 – 440[1] V
Cuba	60 Hz 120/240 – 220/380 – 277/480[1] – 440[1] V
Mexico	60 Hz 127/220 – 440[1] V
Nicaragua	60 Hz 110/220 – 120/240 – 127/220 – 220/440 – 254/40[1] V
Panama	60 Hz 120/208[1] – 120/240 – 254/440[1] – 277/480[1] V
Puerto Rico	60 Hz 120/208 – 480 V
El Salvador	60 Hz 110/220 –120/208 –127/220 – 220/440 – 240/480[1] –254/440[1] V
Trinidad	60 Hz 110/220 – 120/240 – 230/400 V
South America:	
Argentina	50 Hz 220/380 V
Bolivia	60 Hz 220/380 – 480 V, 50 Hz 110/220 – 220/380 V (exception)
Brazil	60 Hz 110/220 – 220/440 – 127/220 – 220/380 V
Chile	50 Hz 220/380 V
Ecuador	60 Hz 120/208 – 127/220 V
Guyana	50 Hz 110/220 V (Georgetown), 60 Hz 110/220 – 240/480 V
Columbia	60 Hz 110/220 – 150/260 – 440 V
Paraguay	60 Hz 220/380 – 220/440 V
Peru	60 Hz 220 – 220/380/440 V
Surinam	60 Hz 115/230 – 127/220 V
Uruguay	50 Hz 220 V
Venezuela	60 Hz 120/208 – 120/240 – 208/416 – 240/480 V
Africa:	
Egypt	50 Hz 110/220 – 220/380 V
Ethiopia	50 Hz 220/380 V
Algeria	50 Hz 127/220 – 220/380 V
Angola	50 Hz 220/380 V
Benin	50 Hz 220/380 V
Ivory Coast	50 Hz 220/380 V
Gabon	50 Hz 220/380 V
Ghana	50 Hz 127/220 – 220/380 V
Guinea	50 Hz 220/380 V
Kenya	50 Hz 220/380 V
Cameroon	50 Hz 127/220 – 220/380 V
Congo	50 Hz 220/380 V
Liberia	60 Hz 120/208 – 120/240 V
Libya	50 Hz 127/220[2] – 220/380 V
Madagascar	50 Hz 127/220 – 220/380 V
Malawi	50 Hz 220/380 V
Mali	50 Hz 220/380 V
Morocco	50 Hz 115/200 – 127/220 – 220/380 – 500[1] V
Mauritius	50 Hz 240/415 V
Mozambique	50 Hz 220/380 V
Namibia	50 Hz 220/380 V
Niger	50 Hz 220/380 V

[1] Industry only

[2] No further expansion

Supply system data, line-side connection

International supply voltages and frequencies in low-voltage systems (continued)

Country	Supply voltage
Africa (continued)**:**	
Nigeria	50 Hz 220/415 V
Rwanda	50 Hz 220/380 V
Zambia	50 Hz 220/380 V – 415 – 550 [1] V
Senegal	50 Hz 127/220 – 220/380 V
Sierra Leone	50 Hz 220/380 V
Somalia	50 Hz 220-220/440 V
Sudan	50 Hz 240/415 V
South Africa	50 Hz 220/380 – 500 [1] – 550/950 [1] V
Swaziland	50 Hz 220/380 V
Tanzania	50 Hz 230/400 V
Togo	50 Hz 127/220 – 220/380 V
Tunisia	50 Hz 115/200 – 220/380 V
Uganda	50 Hz 240/415 V
Zaire	50 Hz 220/380 V
Zimbabwe	50 Hz 220/380 V

Connection and fusing on the line side

All SITOP and LOGO!Power supplies are built-in devices. Compliance with the pertinent country-specific regulations is essential for installation and electrical connection of the devices. During installation, protective gear and isolating gear must be provided for activating the power supply.

Power supply units cause a current inrush immediately after connection of the input voltage due to charging of the load capacitor, however, it falls back to the rated input current level after a few milliseconds. Aside from the internal impedances of the power supply, the inrush current is dependent on the size of the input voltage applied as well as the source impedance of the supply network and the line impedance of the supply line. The maximum inrush current for the power supplies is specified in the applicable technical data.
It is important for dimensioning up-circuit protective devices.

Single-phase SITOP and LOGO!Power supplies are equipped with internal device protection (fuses). For connection to the supply system, only one protective device (fuse or MCB) must be provided for line protection in accordance with the rated current of the installed cable. The circuit-breakers recommended in the data sheets and operating instructions were selected such that even during the maximum inrush current that can occur under worst-case conditions when switching on the supply voltage, the circuit-breaker will not trip. A two-pole connected miniature circuit-breaker is required for the connection of certain device types.

Three-phase SITOP power supplies do not have internal device protection. The up-circuit protective device (three-phase coupled miniature circuit-breaker or motor protection switch) protects the cables and devices. The protective devices specified in the data sheets and operating instructions are optimized to the characteristics of the relevant power supplies.

[1] Industry only

Overview

The quality of the mains voltage has become a decisive factor in the functioning, reliability, maintenance costs and service life of highly sensitive electronic installations and devices (computers, industrial controls, instrumentation, etc.).

Mains disturbances cause system failures and affect the function of plants as well as electronic loads. They can also result in total failure of the installation or equipment.

The most frequent types of disturbance are:

- Long-term overvoltages
- Long-term undervoltages
- Interference pulses and transients
- Voltage dips and surges
- Electrical noise
- Momentary network failure
- Long-term network failure

Mains disturbances can be caused by a number of things, e.g.:

- Switching operations in the supply system
- Long cable paths in the supply system
- Environmental influences such as thunderstorms
- Mains overloads

Typical causes of mains disturbances generated in-house are:

- Thyristor-controlled drives
- Elevators, air-conditioning, photocopiers
- Motors, reactive-power compensation systems
- Electrical welding, large machines
- Switching of lighting equipment

Disturbances in mains voltages can occur individually or in combination. Possible reasons for these disturbances and reactions can include:

System disturbances	Percentage of total disturbance	Effect
Overvoltage The supply voltage is exceeded for a long period by more than +6 % (acc. to DIN IEC 60038)	approx. 15 % – 20 %	Can result in overheating and even thermal destruction of individual components. Causes total failure.
Undervoltage The supply voltage is reduced for a long period by more than + 10 % (acc. to DIN IEC 60038)	approx. 20 % – 30 %	Can result in undefined operating states of loads. Causes data errors.
Interference pulses Energy-rich pulses (e.g. 700 V/1 ms) and energy-poor transients (e.g. 2500 V/20 µs) result from switching operations in the supply system	approx. 30 % – 35 %	Can result in undefined operating states of the loads and can lead to the destruction of components.
Voltage dips and surges The voltage level changes suddenly and in an uncontrolled manner, e.g. due to changes in loading and long cable routes	approx. 15 % – 30 %	Can result in undefined operating states and destruction of components. Cause data errors.
Electrical noise A mix of frequencies superimposed on the mains due to bad grounding and/or strong HF emitters, such as radio transmitters or thunderstorms	approx. 20 % – 35 %	Can result in undefined operating states of loads. Causes data errors.
Voltage interruption Short-term interruption of the supply voltage (up to approx. 10 ms) due to short-circuiting in neighboring supply systems or starting of large electrical machines.	approx. 8 % – 10 %	Can result in undefined operating states of loads, especially those with insufficient mains buffering. Causes data errors.
Voltage interruption Long interruption of the supply voltage (longer than approx. 10 ms)	approx. 2 % – 5 %	Can result in undefined operating states of loads, especially those with insufficient mains buffering. Causes data errors.

Mains disturbances and effects

The SITOP product family offers a range of possibilities for minimizing or preventing the risk of mains disturbances already during the planning stage.

Installation instructions, mounting areas and fixing options

Installation instructions

All SITOP and LOGO!Power supplies are built-in devices. They must be mounted vertically so that the supply air can enter the ventilation slots at the bottom of the devices and leave through the upper part of the devices. If the units are not mounted vertically (at your own risk), the ambient temperature should not exceed +45 °C and the load current should not exceed approx. 50% of the rated current value. The minimum distances specified in the relevant operating instructions for the top, bottom and side of the devices must be observed to ensure free air convection.

Mounting areas and fixing options

Power supply	Order No.	Required mounting area	Mounting on a standard mounting rail (DIN Rail) acc. to EN 60715		Wall mounting
		in mm (B × H)	35 × 7.5 mm	35 × 15 mm	
SITOP 24 V, 1-phase and 2-phase power supplies					
24 V/0.375 A	6EP1731-2BA00	22.5 × 180	X	X	
24 V/0.6 A	6EP1331-5BA00	22.5 x 180	X	X	
24 V/1.3 A	6EP1331-5BA10	30 x 180	X	X	
24 V/1.3 A	6EP1331-1SH03	54 × 130	X	X	
24 V/2 A	6ES7307-1BA01-0AA0 3)	40 × 205	2)	2)	
	6ES7305-1BA80-0AA0 3)	80 × 225		1)	
	6EP1732-0AA00	80 × 235		X	X
24 V/2.1 A	6EP1331-1LD00	58 (117) x 128			X
24 V/2.5 A	6EP1332-2BA10	33 × 225	X	X	
	6EP1332-5BA00	45 × 180	X	X	
	6EP1332-1SH43	72 × 130	X	X	
	6EP1332-1SH71	70 × 140	X	X	X
	6EP1332-1LB00	33 × 225	X	X	
	6EP1232-1AA00	52 (110) × 230	X	X	X
24 V/3.1 A	6EP1332-1LD00	58 (117) x 128			X
24 V/3.5 A	6EP1332-1SH31	160 × 280	X	X	X
24 V/3.7 A	6EP1332-2BA00	75 × 225	X	X	
24 V/4 A	6EP1332-5BA10	52.5 x 180	X	X	
	6EP1332-1SH52	90 × 130	X	X	
	6EP1232-1AA10	52 (110) × 230	X	X	X
24 V/4.1 A	6EP1332-1LD10	58 (117) x 158			X
24 V/5 A	6EP1333-3BA00	70 × 225	X	X	
	6EP1333-2BA01	50 × 225	X	X	
	6EP1333-2AA01	50 × 225	X	X	
	6ES7307-1EA01-0AA0 3)	60 × 205	2)	2)	
	6EP1333-1LB00	50 × 225	X	X	
	6ES7307-1EA80-0AA0 3)	80 × 225		1)	
	6EP1333-1AL12	160 × 230	X	X	
24 V/6 A	6EP1233-1AA00	52 (110) × 230	X	X	X
24 V/6.2 A	6EP1333-1LD00	58 (117) x 178			X
24 V/10 A	6EP1334-3BA00	90 × 225	X	X	
	6EP1334-2BA01	70 × 225	X	X	
	6EP1334-2AA01	70 × 225	X	X	
	6ES7307-1KA02-0AA0 3)	80 × 205	2)	2)	
	6EP1334-1LB00	70 × 225	X	X	
	6EP1334-1AL12	160 × 230	X	X	
24 V/12 A	6EP1234-1AA00	52 (110) × 230	X	X	X
24 V/12.5 A	6EP1334-1LD00	61 (125) x 199			X
24 V/20 A	6EP1336-3BA10	90 × 225	X	X	
	6EP1336-3BA00	160 × 225	X	X	
24 V/40 A	6EP1337-3BA00	240 × 225		X	

Power supply	Order No.	Required mounting area in mm (B × H)	Mounting on a standard mounting rail (DIN Rail) acc. to EN 60715 35 × 7.5 mm	Mounting on a standard mounting rail (DIN Rail) acc. to EN 60715 35 × 15 mm	Wall mounting
SITOP 24 V, 3-phase power supplies					
24 V/8 A	6EP1433-2CA00 [4]	Approx. 310 × 285			X
	6ES7148-4PC00-0HA0 [4]	Approx. 310 × 285			X
24 V/10 A	6EP1434-2BA10	90 × 225	X	X	
24 V/20 A	6EP1436-3BA10	70 × 225	X	X	
	6EP1436-3BA00	160 × 225	X	X	
	6EP1436-2BA10	90 × 225	X	X	
24 V/30 A	6EP1437-3BA20	150 x 225		X	
24 V/40 A	6EP1437-3BA10	150 x 225		X	
	6EP1437-3BA00	240 × 225	X	X	
	6EP1437-2BA20	150 x 225		X	
SITOP 24 V, uninterruptible power supplies					
SITOP UPS500S (2.5 kWs)	6EP1933-2EC41	120 × 225	X	X	
SITOP UPS500S (5 kWs)	6EP1933-2EC51	120 × 225	X	X	
SITOP UPS501S Expansion module	6EP1935-5PG01	70 × 225	X	X	
SITOP UPS500P (5 kWs)	6EP1933-2NC01	500 × 178			X
SITOP UPS500P (10 kWs)	6EP1933-2NC11	570 × 178			X
DC UPS 6 A (with serial/USB interface)	6EP1931-2DC21 (-2DC31/-2DC42)	50 × 225	X	X	
DC UPS 15 A (with serial/USB interface)	6EP1931-2EC21 (-2EC31/-2EC42)	50 × 225	X	X	
DC UPS 40 A (with USB interface)	6EP1931-2FC21 (-2FC42)	102 × 225	X	X	
SITOP 24 V, uninterruptible power supply, battery modules					
Battery module 1.2 Ah	6EP1935-6MC01	116 × 126	X	X	X
Battery module 2.5 Ah	6EP1935-6MD31	285 × 171	X	X	X
Battery module 3.2 Ah	6EP1935-6MD11	210 × 171	X	X	X
Battery module 7 Ah	6EP1935-6ME21	206 × 188			X
Battery module 12 Ah	6EP1935-6MF01	273 × 138			X
SITOP 24 V, expansion modules					
Signaling module	6EP1961-3BA10	26 × 225			
Redundancy module	6EP1961-3BA21	70 × 225	X	X	
Buffer module	6EP1961-3BA01	70 × 225	X	X	
Selectivity module	6EP1961-2BA11/ -2BA21	72 × 180	X	X	
Diagnostics module	6EP1961-2BA00	72 × 190	X	X	
Switch-on current limiter	6EP1967-2AA00	22.5 × 180	X	X	
SITOP alternative voltages					
3-52 V/120 W	6EP1353-2BA00	75 × 225	X	X	
5 V/3 A	6EP1311-1SH03	54 × 130	X	X	
5 V/6.3 A	6EP1311-1SH13	72 × 130	X	X	
12 V/1.9 A	6EP1321-1SH03	54 × 130	X	X	
12 V/2 A	6EP1321-5BA00	30 × 180	X	X	
12 V/2.5 A	6EP1621-2BA00	32.5 × 225	X	X	
12 V/3 A	6EP1321-1LD00	158 (117) x 98			X
12 V/4.5 A	6EP1322-1SH03	72 × 130	X	X	
12 V/6.5 A	6EP1322-5BA10	52.5 × 180	X	X	
12 V/8.3 A	6EP1322-1LD00	58 (117) x 158			X
12 V/20 A	6EP1424-3BA00	70 × 225	X	X	
15 V/1.9 A	6EP1351-1SH03	54 × 130	X	X	
15 V/4 A	6EP1352-1SH03	72 × 130	X	X	
2 × 15 V/3.5 A	6EP1353-0AA00	75 × 325	X	X	
48 V/10 A	6EP1456-3BA00	70 × 225	X	X	

Planning assistance

Power supply	Order No.	Required mounting area	Mounting on a standard mounting rail (DIN Rail) acc. to EN 60715		Wall mounting
		in mm (B × H)	35 × 7.5 mm	35 × 15 mm	
48 V/20 A	6EP1457-3BA00	240 × 255		X	

1) With additional mounting adapter 6ES7390-6BA00-0AA0.
2) With additional mounting adapter 6EP1971-1BA00.
3) Installation on S7-rail.
4) Installation on mounting rail ET 200pro.

Planning aids

As an aid for planning and construction, operating instructions with mounting options, dimension drawings and principle circuits with pin names in different file formats (also suitable for CAD applications) are available for download on the Internet.

Further information can be found on the Internet at

http://www.siemens.de/sitop

Parallel connection for redundant operation

Two SITOP power supplies of the same type can be connected in parallel through diodes for a redundant configuration. 100% redundancy only exists for two power supplies when the total load current is no higher than that which one power supply can supply alone and when the supply for the primary side is also implemented redundantly (i.e. a short-circuit on the primary side will not trigger a shared fuse which would disconnect both power supplies from the mains).

Parallel connection with decoupling diodes for redundant operation is permitted for all SITOP power supplies. The diodes V1 and V2 are used for decoupling. They must have a blocking voltage of at least 40 V and it must be possible to load them with a current equal to or greater than the maximum output current of the respective SITOP power supply. For diode dimensioning, see the following note "General information on selection of diodes".

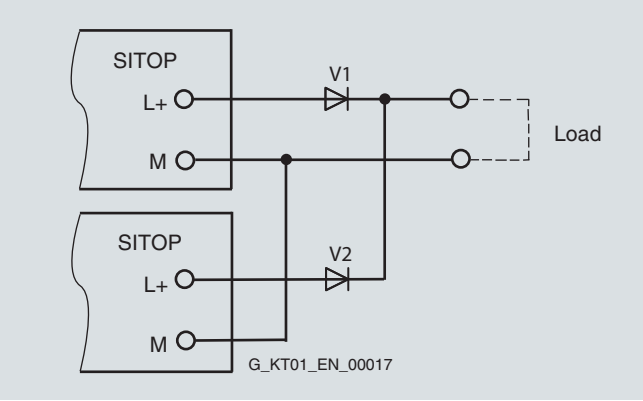
The ready-to-use expansion "SITOP modular redundancy module" is available as a simple alternative to diode dimensioning (Order No.: 6EP1961-3BA21, see Section 11) for redundant connection of two power supplies.

General information on selection of diodes:

The diodes must be dimensioned for the maximum dynamic overcurrent. This can be the dynamic overcurrent during power-up in the short-circuit case, or the dynamic overcurrent during a short-circuit in operation (the largest of the two values should be taken from the relevant technical specifications).

To dissipate the significant power loss of the decoupling diodes (sustained short-circuit current × diode conductive-state voltage), the diodes must be equipped with suitably dimensioned heat sinks.

An additional safety margin is recommended, because the output capacitor integral to the power supply generates an additional peak current in the short-circuit case. This additional current flows only for a few milliseconds so it is within the period in which diodes are permitted to be loaded with a multiple of the rated current (< 8.3 ms, known as the permissible surge current for diodes) .



Parallel connection of two SITOP power supplies for redundant operation

Example

Two 1-phase SITOP modular power supplies with 10 A rated output current, (Order No.: 6EP1 334-3BA00) are connected in parallel. The dynamic overcurrent in the event of a short-circuit during operation is approximately 30 A for 25 ms.

The diodes should therefore have a loading capability of 40 A to be safe, the common heat sink for both diodes must be dimensioned for the maximum possible current of approximately 24 A (sustained short-circuit current rms value) × diode conductive-state voltage.

Parallel connection for redundant operation and performance enhancement

Parallel connection for performance enhancement

To enhance performance, identical types of most SITOP power supplies can be connected in parallel galvanically (the same principle as parallel connection for redundant operation, but without decoupling diodes):

Advantage

The costs for mounting the diodes onto heat sinks and the not insignificant power losses for the decoupling diodes (current × diode conducting-state voltage) are avoided.

The types permitted for direct galvanic parallel connection are listed in the relevant technical specifications under "Output, parallel connection for performance enhancement".

Prerequisite:

- The output cables connected to terminals "+" and "–" of every power supply should be installed with an identical length and cross-section (or the same impedance) to the common external linking point.
- The power supplies connected in parallel must be switched simultaneously using a common switch in the mains supply line (e.g. using the main switch available in control cabinets).
- The output voltages of the power supplies must be measured under no-load operation before they are connected in parallel and are permitted to differ by up to 50 mV. This usually corresponds to the factory default setting. If the output voltage is changed in case of variable power supplies, the "–" terminals should first be connected and then the voltage difference between the "+" output terminals measured under no-load conditions before these are connected. The voltage difference must not exceed 50 mV.

Note:

With a direct galvanic connection in parallel of more than two SITOP power supplies, further circuit measures may be necessary for short-circuit and overload protection!

Parallel connection for redundant operation and performance enhancement

Almost 100% redundancy

Using the types permitted for direct galvanic parallel connection (see the relevant technical specifications under "Output, parallel connection for performance enhancement"), performance can be increased without the need for decoupling diodes, and simultaneously, redundancy of almost 100% can be implemented by direct galvanic parallel connection of an additional power supply of the same type to the power supplies required. This means that at least one power supply is required than is necessary for the sum of all load currents.

A decoupling diode is normally required for redundancy to ensure that a power supply that has failed as a result of short-circuiting of the outputs (especially as a result of short-circuiting the output electrolytic capacitor) does not also short-circuit the power supplies that remain intact. A redundancy of almost 100% can be implemented with this type of circuit.

Example

A load current of up to 40 A is required and the power supplies must operate on both 400 V and 500 V three-phase supplies (without switch-over).

The three-phase type SITOP modular 20 A is suitable for this (Order No.: 6EP1 436-3BA10). For load currents up to 40 A, direct galvanic parallel connection of two SITOP modular power 20 supplies is necessary. By connecting another SITOP modular 20 in parallel, performance enhancement and redundancy are implemented simultaneously (if one of the three power supplies fails to supply an output voltage, the remaining two 20 A power supplies are capable of supplying a total load current of 40 A).

Note:

With a direct galvanic connection in parallel of more than two SITOP power supplies, further circuit measures may be necessary for short-circuit and overload protection!

Series connection to increase the voltage

To generate a load voltage of e. g. 48 V DC, two 24 V SITOP power supplies of the same type can be connected in series. The SITOP outputs "+" and "–" are isolated up to at least 60 V DC against PE (creepage and clearances as well as radio interference suppression capacitors on "+" and "–" against PE), so that with this type of series connection (see Figure), the following points can be grounded:

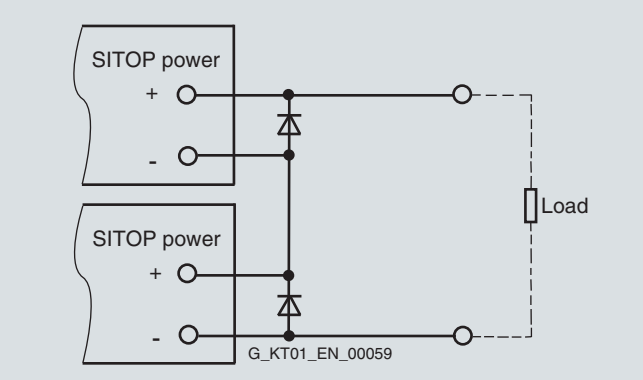
- "–" of the lower power supply (results in +48 V DC against PE)
- Midway "+"/ "–" between both power supplies (results in ±24 VDC against PE)
- "+" of the lower power supply (results in -48 V DC against PE)

Note:

If two devices are connected in parallel, it cannot be guaranteed that the voltage will remain below the maximum permissible SELV voltage of 60 V DC in the event of a fault.

The purpose of diodes V1 and V2 is to protect the electrolytic output capacitor integrated in the power supply against reverse voltages > 1 V. As a result of the not absolutely simultaneous power-up (even when a common mains switch is used for switching on, differences of a few tens of milliseconds can occur between the various startup-up delays), the power supply which starts up more quickly supplies current from output "–" of the slower power supply whose output electrolytic capacitor is then theoretically impermissibly discharged.

The internal LC filter causes the internal rectifier diode on the secondary side of the slower-starting power supply to accept this current a few milliseconds later; this means that the external diode connected with its anode to "–" and cathode to "+" is essential on each power supply. These diodes are, however, only loaded dynamically, so that the 8.3 ms surge current loading capability (specified in the data sheets for suitable diodes) can be used as a basis for dimensioning and it is not usually necessary to cool the diodes using heat sinks.



Series connection of two SITOP power units to double the voltage

Example:

Two single-phase SITOP modular power supplies with 10 A rated output current (Order No.: 6EP1 334-1AL12) should be connected in series for increasing the voltage. They supply approximately 35 A dynamically for 700 ms on power-up in the short-circuit case or also, for example, with loads with a high-capacity input capacitor that momentarily act as a short-circuit at the start.

Suitable diodes for V1 and V2 are, for example, of Type SB 340[1)] (Schottky diode in axially wired enclosure DO-201AD with approximately 5.3 mm diameter and approximately 9.5 mm length of body).

40 V are permissible as the blocking voltage, and the stationary direct current load capacity $I_{F\,AV}$ is 3 A. The dynamic surge current loading capacity $I_{F\,SM}$ important in this case is sufficient for the selected SITOP power supply at more than 100 A for 8.3 ms. For SITOP power supplies with a lower rated output current, this diode can also be used, but it is over-dimensioned.

- Manufacturer: General Instrument
- Distributor: e.g. RS Components, Spoerle

[1)] We do not accept any liability for this diode recommendation.

Battery charging, fusing of the 24 V DC output circuit, selectivity

Battery charging with SITOP power supplies

The power supplies SITOP PSU300M12 V/20 A (Order No. 6EP1424-3BA00) and 24 V/30 A (Order No. 6EP1437-3BA20) are suitable for charging lead batteries.

In the case of a V/I characteristic set for parallel operation, the battery will be charged with a constant current until approximately 95 % of the set SITOP output voltage has been achieved. The charging current is then continuously reduced from 1.2 × rated current at 95 % of the set voltage to approximately 0 A or the self-discharge current of the battery at 100 % of the set output voltage, that is, resistance characteristic in this range.

As reverse voltage protection and polarity reversal protection, we recommend that a diode suitable for at least 1.2 × rated current of the power supply with a blocking voltage of at least 40 V is connected in series with the "+" output (anode connected to "+" output of the SITOP modular and cathode connected to positive pole of the battery)..

The output voltage of the power supply must be set at no-load to the end-of-charge voltage plus the voltage drop at the diode. For an end-of-charge voltage of e. g. 27.0 V DC (usual at 20 °C to 30 °C battery temperature; in each case, compliance with the specifications of the battery manufacturer must be observed!) and 0.8 V voltage drop at the diode, SITOP modular must be set to 27.8 V during no-load operation.

General note for using SITOP power supplies as a battery-charging unit

When SITOP modular is used as a battery charging unit, the regulations of VDE 0510 or the relevant national regulations must be observed, and adequate ventilation of the battery location must be provided. The SITOP modular power supplies are designed as rack-mounting units, and protection against electric shock should therefore be provided by installation in an appropriate housing.

The value recommended by the battery manufacturer must be set as the end-of-charge voltage (depending on the battery temperature). An ideal temperature for the lead-acid battery is between +20 to 30 °C and the recommended end-of-charge voltage in this case is usually about 27 V.

Fusing of 24 V power supply circuits and selectivity

With non-stabilized rectifiers (power transformer equipped with rectifier) the output usually had to be protected with a suitable fuse so that its rectifier diodes would not fail in the event of an overload or a short-circuit (this would destroy the DC loads due to the resulting alternating voltage and lead to serious damage in most cases).

On the other hand, the stabilized SITOP power supplies are provided with integral electronic short-circuit protection that automatically protects both the power supply and the supplied 24 V DC circuits against an excess current in the event of an overload/short-circuit. A distinction must be made between the following three cases with respect to fusing on the secondary side:

Example 1: No fusing

Fusing the secondary side (24 V DC) for protecting the load circuits and lines is not required if the respective cross-sections are selected for the maximum possible output current RMS value. Depending on the event (short-circuit or overload) this may either be the short-circuit RMS value or the current limitation value.

Fusing of 24 V power supply circuits and selectivity (continued)

Example SITOP modular 10 A (Order No.: 6EP1334-3BA00)

- 10 A rated current
- Current limitation typ. 12 A
- Short-circuit current rms value approximately 12 A

The technical specifications usually specify typical values, maximum values are approximately 2 A above the typical value. In the example here, a maximum possible output current rms value of approximately 14 must therefore be used for line dimensioning.

Example 2: Reduced conductor cross-sections

If smaller conductor cross-sections are used than specified in the relevant standards (e.g. EN 60204-1), the affected 24 V load infeed cables must be protected with a suitable circuit breaker.

It is then unimportant whether the power supply enters current limiting mode (overload) or delivers the maximum short-circuit current (low-resistance short-circuit).
The load supply is in any case protected against an overload by the line protection matched to the conductor cross-section.

Example 3: Selectivity

In cases where a load which has failed (e.g. because of a short-circuit) has to be rapidly detected or where it is essential to selectively switch it off before the power supply enters current limiting mode (with current limiting mode, the voltage would also fall for all remaining 24 V DC loads), there are two possibilities for the secondary side connection:

- **A selectivity module SITOP PSE200U or a diagnostics module SITOP select for the distribution of the 24 V DC supply over up to 4 load feeders.**
  Each output is adjustable between
  0.5 A and 3 A (Order No.: 6EP1961-2BA11) or
  3 A and 10 A ((Order No.: 6EP1961-2BA21) or
  2 A and 10 A (Order No.: 6EP1961-2BA00).
- Series connection of appropriate 24 V DC fuses or miniature circuit breakers

The basis for selection of the 24 V DC fuse or circuit-breaker is the short-circuit current above the rated current which the SITOP power supplies deliver in the event of a short-circuit during operation (values are specified in the respective technical specifications under "Output, dynamic V/I on short-circuit during operation").

It is not easy to calculate the amount of the short-circuit current flowing into the usually not ideal "short-circuit" and the amount flowing into the remaining loads. This depends on the type of overload (high-resistance or low-resistance short-circuit) and the type of load connected (resistive, inductive and capacitive/electronic loads).

However, it can be assumed with a first approximation in the average case encountered in practice that the difference of dynamic overcurrent minus 50 % SITOP rated output current is available for the immediate tripping of a circuit-breaker within a typical time of 12 ms (with 14 times the rated DC with a circuit-breaker characteristic C acc. to IEC 898, or with 7 times the rated DC with a circuit-breaker characteristic B or with 5 times the rated DC with a circuit-breaker characteristic A). Please refer to the following tables for circuit-breakers appropriate for selected fusing according to this assumption.

List of ordering data and tripping characteristics of single-pole circuit-breakers 5SY4...

acc. to IEC 898 / EN 60898, for use up to 60 V DC (250 V AC, switching capacity 10.000 A)

Rated current	Tripping characteristic	Order No.	Range for immediate tripping < 100 ms for operation with direct current (alternating current)	DC current for immediate tripping in < 100 ms	DC current for immediate tripping in approx. 12 ms
1 A	Type A	5SY4 101-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 2 ... 5 A	5 A DC
1 A	Type C	5SY4 101-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 5 ... 14 A	14 A DC
1.6 A	Type A	5SY4 115-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 3.2 ... 8 A	8 A DC
1.6 A	Type C	5SY4 115-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 8 ... 22.4 A	22.4 A DC
2 A	Type A	5SY4 102-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 4 ... 10 A	10 A DC
2 A	Type C	5SY4 102-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 10 ... 28 A	28 A DC
3 A	Type A	5SY4 103-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 6 ... 15 A	15 A DC
3 A	Type C	5SY4 103-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 15 ... 42 A	42 A DC
4 A	Type A	5SY4 104-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 8 ... 20 A	20 A DC
4 A	Type C	5SY4 104-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 20 ... 56 A	56 A DC
6 A	Type A	5SY4 106-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 12 ... 30 A	30 A DC
6 A	Type B	5SY4 106-6	DC: 3 ... 7 (AC: 3 ... 5) × I_{rated}	DC 18 ... 42 A	42 A DC
6 A	Type C	5SY4 106-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 30 ... 84 A	84 A DC
8 A	Type A	5SY4 108-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 16 ... 40 A	40 A DC
8 A	Type C	5SY4 108-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 40 ... 112 A	112 A DC
10 A	Type A	5SY4 110-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 20 ... 50 A	50 A DC
10 A	Type B	5SY4 110-6	DC: 3 ... 7 (AC: 3 ... 5) × I_{rated}	DC 30 ... 70 A	70 A DC
10 A	Type C	5SY4 110-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 50 ... 140 A	140 A DC
13 A	Type A	5SY4 113-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 26 ... 65 A	65 A DC
13 A	Type B	5SY4 113-6	DC: 3 ... 7 (AC: 3 ... 5) × I_{rated}	DC 39 ... 91 A	91 A DC
13 A	Type C	5SY4 113-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 65 ... 182 A	182 A DC
16 A	Type A	5SY4 116-5	DC: 2 ... 5 (AC: 2 ... 3) × I_{rated}	DC 32 ... 80 A	80 A DC
16 A	Type B	5SY4 116-6	DC: 3 ... 7 (AC: 3 ... 5) × I_{rated}	DC 48 ... 112 A	112 A DC
16 A	Type C	5SY4 116-7	DC: 5 ... 14 (AC: 5 ... 10) × I_{rated}	DC 80 ... 224 A	224 A DC

Fusing of the 24 V DC output circuit, selectivity

Miniature circuit breakers [1] according to EN 60898 (DIN VDE 0641 T11), in 24 V DC circuits which are powered by SITOP modular or SITOP smart power supplies

Order No.	$I_{out\ rated}$	$I_{out\ dyn}$	Characteristic A									
			1 A	1.6 A	2 A	3 A	4 A	6 A	8 A	10 A	13 A	16 A
6EP1332-2BA10	2.5 A	7 A/ 200 ms	✓	❍	❍	X	X	X	X	X	X	X
6EP1333-3BA00	5 A	15 A/ 25 ms	✓	✓	✓	❍	❍	X	X	X	X	X
6EP1333-2BA01	5 A	17 A/ 200 ms	✓	✓	✓	✓	❍	X	X	X	X	X
6EP1333-2AA01	5 A	17 A/ 200 ms	✓	✓	✓	✓	❍	X	X	X	X	X
6EP1334-3BA00	10 A	30 A/ 25 ms	✓	✓	✓	✓	✓	✓	❍	X	X	X
6EP1334-2BA01	10 A	33 A/ 200 ms	✓	✓	✓	✓	✓	✓	❍	X	X	X
6EP1334-2AA01	10 A	33 A/ 200 ms	✓	✓	✓	✓	✓	✓	❍	X	X	X
6EP1434-2BA10	10 A	16 A/ 100 ms	✓	✓	✓	✓	❍	X	X	X	X	X
6EP1336-3BA00	20 A	60 A/ 25 ms	✓	✓	✓	✓	✓	✓	✓	✓	❍	❍
6EP1336-3BA10	20 A	60 A/ 25 ms	✓	✓	✓	✓	✓	✓	✓	✓	❍	❍
6EP1436-3BA00	20 A	60 A/ 25 ms	✓	✓	✓	✓	✓	✓	✓	✓	❍	❍
6EP1436-3BA10	20 A	60 A/ 25 ms	✓	✓	✓	✓	✓	✓	✓	✓	❍	❍
6EP1436-2BA10	20 A	35 A/ 100 ms	✓	✓	✓	✓	✓	✓	❍	❍	X	X
6EP1337-3BA00	40 A	120 A/ 25 ms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6EP1437-3BA00	40 A	120 A/ 25 ms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6EP1437-3BA10	40 A	120 A/ 25 ms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6EP1437-2BA20	40 A	65 A/ 120 ms	✓	✓	✓	✓	✓	✓	✓	✓	✓	❍

$I_{out\ rated}$: Rated output current.
$I_{out\ dyn}$: Dynamic overcurrent at short-circuit in operation.
✓: Immediate tripping, since dynamic overcurrent resulting from a short circuit > limit current of electromagnetic tripping.
❍: Immediate tripping very likely, since at least 50 % of dynamic overcurrent resulting from a short circuit is within tripping characteristic.
X: No immediate tripping.

1) This selection of miniature circuit breakers is based on the maximum possible short-circuit current of the power supply and on the tripping characteristic at +20 °C.
Other criteria, which might also be relevant in practice, like for example self-heating, ambient temperature, line impedance, and currents flowing in parallel paths, were not considered.

	Characteristic B				Characteristic C									
	6 A	10 A	13 A	16 A	1 A	1.6 A	2 A	3 A	4 A	6 A	8 A	10 A	13 A	16 A
	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	X	X	X	X	✓	X	X	X	X	X	X	X	X	X
	X	X	X	X	✓	❍	X	X	X	X	X	X	X	X
	X	X	X	X	✓	❍	X	X	X	X	X	X	X	X
	❍	X	X	X	✓	✓	✓	❍	X	X	X	X	X	X
	❍	X	X	X	✓	✓	✓	❍	X	X	X	X	X	X
	❍	X	X	X	✓	✓	✓	❍	X	X	X	X	X	X
	X	X	X	X	✓	❍	X	X	X	X	X	X	X	X
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	✓	❍	❍	X	✓	✓	✓	✓	✓	❍	X	X	X	X

Standards and approvals

Overview of important standards and approvals

EN	European standards
EN 50178	Electronic equipment for use in power installations
EN 55022	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
EN 60529	Degrees of protection provided by enclosures (IP-Code)
EN 60721	Classification of environmental conditions
EN 60950-1	Information technology equipment – Safety
EN 61000-3-2	Electromagnetic compatibility (EMC) – Part 3-2: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light industrial environments

UL	Underwriters Laboratories
UL 508	Industrial control equipment
UL 1604	Electrical equipment for use in class I and class II, division 2. and class III hazardous (classified) locations
UL 1778	Uninterruptible power supply equipment
UL 2367	Standard for solid state overcurrent protectors
UL 60079	Electrical apparatus for explosive gas atmospheres
UL 60950 -1	Information technology equipment – Safety

CSA	Canadian Standards Association
CSA C22.2 No. 14	Industrial control equipment
CSA C22.2 No. 142	Process control equipment
CSA C22.2 No. 107.1	General use power supplies
CSA C22.2 No. 60079	Electrical apparatus for explosive gas atmospheres
CSA C22.2 No. 60950-1	Information technology equipment – Safety

ATEX	Equipment and protective systems intended for use in Potentially Explosive Atmospheres

FM	Factory Mutual Research

ABS	American Bureau of Shipping

GL	Germanischer Lloyd

Further information

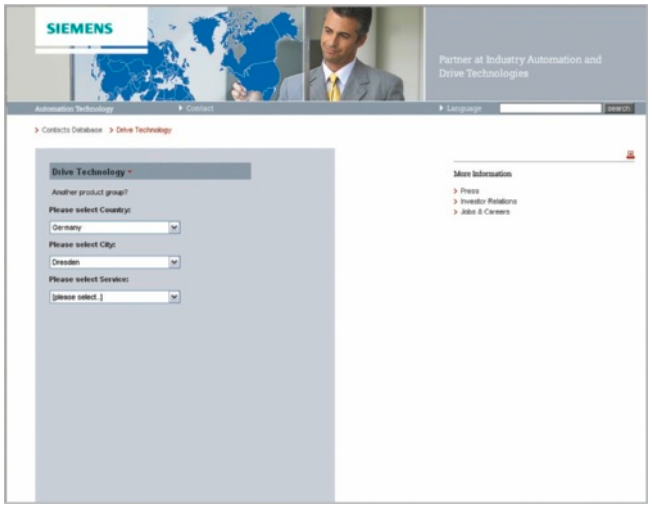
Additional information is available in the Internet under:

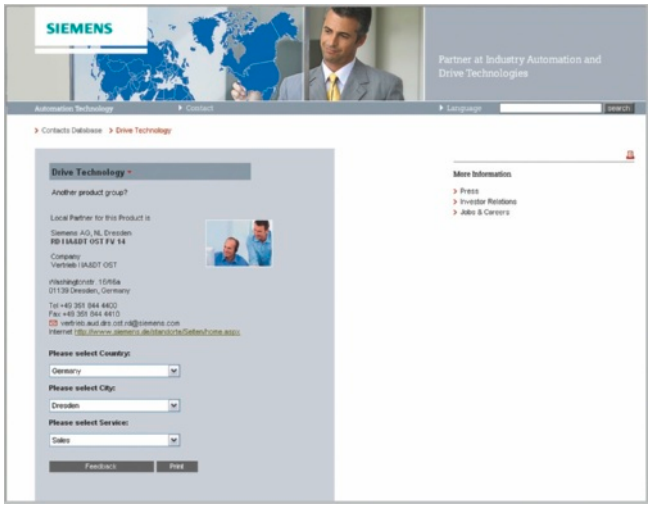
- 2D dimensional drawings, 3D CAD data, circuit diagram macros:
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.de/sitop-manuals
- Find the right product with the SITOP Selection Tool:
  www.siemens.com/sitop-selection-tool

Appendix

17

Partner at Industry Automation and Drive Technologies





At Siemens Industry Automation and Drive Technologies, more than 85 000 people are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at:
www.siemens.com/automation/partner

You start by selecting a

- Product group,
- Country,
- City,
- Service.

Overview

Siemens Solution Partner Automation

Solution Partner
Automation

SIEMENS

Solution Partner: Highest quality - guaranteed

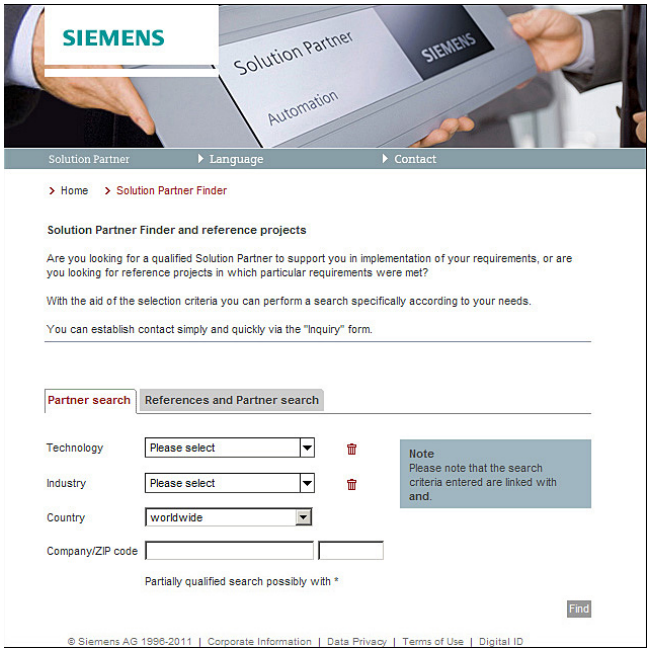
The products and systems from Siemens Industry Automation and Drive Technologies offer the ideal platform for all automation applications.

Under the name of Siemens Solution Partner Automation, selected system integrators around the world act as uniformly qualified solution providers for the Siemens range of products and services in the fields of automation and drives. Day after day, they utilize their qualified product and system know-how as well as their excellent industry expertise to your advantage – for all requirements.

The partner emblem is the guarantee and indicator of proven quality. The basis for this are defined quality features that identify Solution Partners as reliable and competent solution providers:

- Solution quality
  Always a good result with tried and tested solutions expertise.
- Expert quality
  Certified technical competence ensures maximum efficiency.
- Project quality
  With proven project experience straight to the target.
- Portfolio quality
  Comprehensive portfolio for state-of-the-art solutions from a single source.

Solution Partner Finder



The Siemens Solution Partner Program helps you to find the optimum partner for your specific requirements.

Support is provided by the Solution Partner Finder, a comprehensive online platform that showcases the profiles of all our solution partners. You can convince yourself of the competence of the respective Solution Partner by means of the references provided. Various search criteria are available for this purpose.

Once you have located a partner, you are only one small step away from contacting them.

Find the right partner here for your specific task and convince yourself of the solution competence provided:

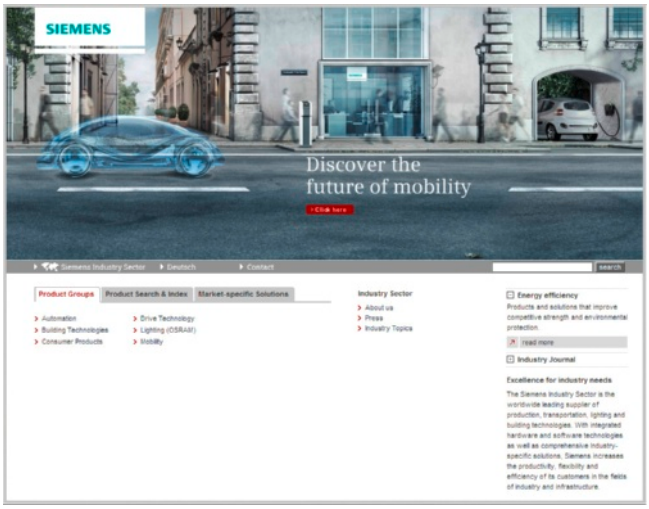
http://www.siemens.com/automation/partnerfinder

Additional information on the Siemens Solution Partner Program is available online at:

http://www.siemens.com/automation/solutionpartner

Information and Ordering in the Internet and on DVD

Siemens Industry Automation and Drive Technologies in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

www.siemens.com/industry

you will find everything you need to know about products, systems and services.

Product Selection Using the Interactive Catalog CA 01 of Industry

Detailed information together with convenient interactive functions:
The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

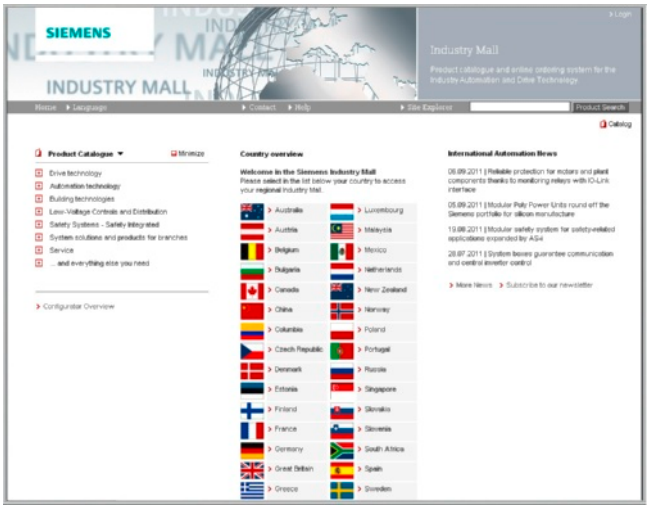
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the virtual department store of Siemens AG in the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

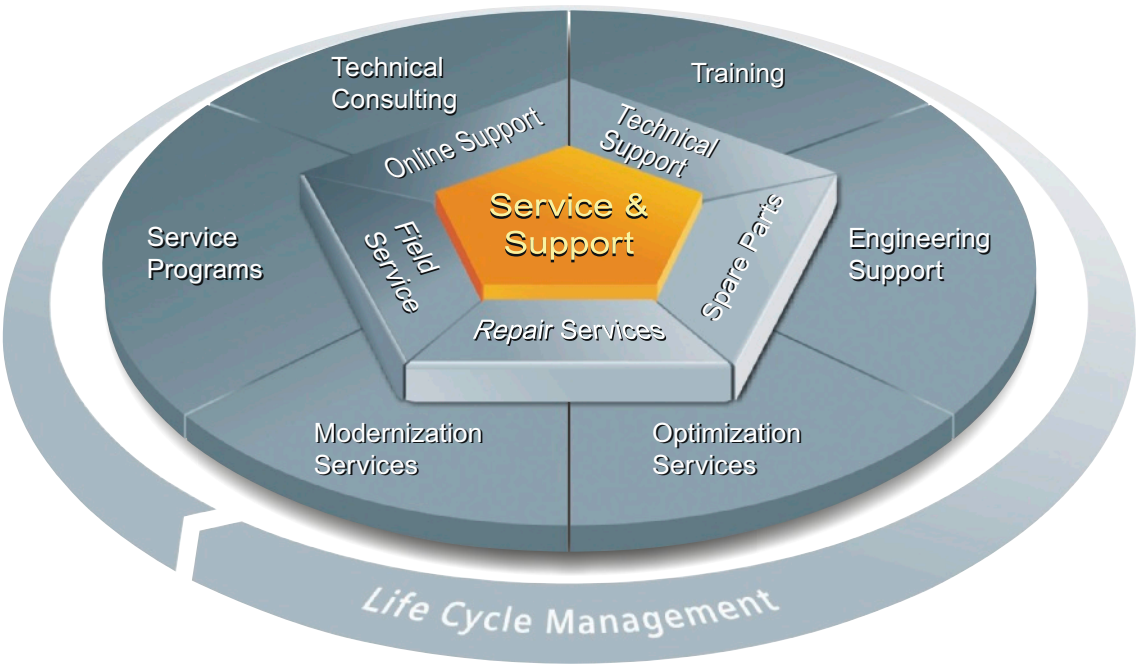
Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

The unmatched complete service for the entire life cycle



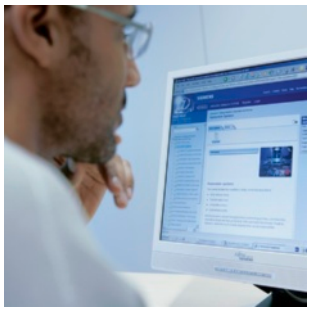
For machine constructors, solution providers and plant operators: The service offering from Siemens Industry, Automation and Drive Technologies includes comprehensive services for a wide range of different users in all sectors of the manufacturing and process industry

To accompany our products and systems, we offer integrated and structured services that provide valuable support in every phase of the life cycle of your machine or plant - from planning and implementation through commissioning as far as maintenance and modernization.

Our Service & Support accompanies you worldwide in all matters concerning automation and drives from Siemens. We provide direct on-site support in more than 100 countries through all phases of the life cycle of your machines and plants.

You have an experienced team of specialists at your side to provide active support and bundled know-how. Regular training courses and intensive contact among our employees - even across continents - ensure reliable service in the most diverse areas.

Online Support



The comprehensive online information platform supports you in all aspects of our Service & Support at any time and from any location in the world.

www.siemens.com/automation/service&support

Technical Consulting

Support in planning and designing your project: From detailed actual-state analysis, definition of the goal and consulting on product and system questions right through to the creation of the automation solution.

Technical Support

Expert advice on technical questions with a wide range of demand-optimized services for all our products and systems.

www.siemens.com/automation/support-request

Training

Extend your competitive edge - through practical know-how directly from the manufacturer.

www.siemens.com/sitrain

Contact information is available in the Internet at:
www.siemens.com/automation/partner

The unmatched complete service for the entire life cycle

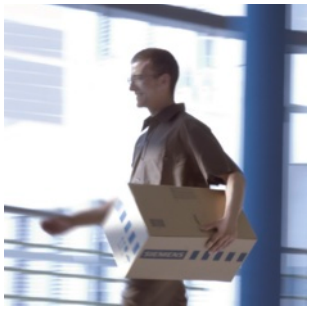
Engineering Support

Support during project engineering and development with services fine-tuned to your requirements, from configuration through to implementation of an automation project.

Field Service

Our Field Service offers you services for commissioning and maintenance - to ensure that your machines and plants are always available.

Spare parts



In every sector worldwide, plants and systems are required to operate with constantly increasing reliability. We will provide you with the support you need to prevent a standstill from occurring in the first place: with a worldwide network and optimum logistics chains.

Repairs

Downtimes cause problems in the plant as well as unnecessary costs. We can help you to reduce both to a minimum - with our worldwide repair facilities.

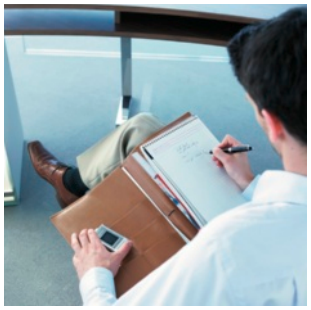
Optimization

During the service life of machines and plants, there is often a great potential for increasing productivity or reducing costs. To help you achieve this potential, we are offering a complete range of optimization services.

Modernization

You can also rely on our support when it comes to modernization - with comprehensive services from the planning phase all the way to commissioning.

Service programs



Our service programs are selected service packages for an automation and drives system or product group. The individual services are coordinated with each over to ensure smooth coverage of the entire life cycle and support optimum use of your products and systems.

The services of a Service Program can be flexibly adapted at any time and used separately.

Examples of service programs:

- Service contracts
- Plant IT Security Services
- Life Cycle Services for Drive Engineering
- SIMATIC PCS 7 Life Cycle Services
- SINUMERIK Manufacturing Excellence
- SIMATIC Remote Support Services

Advantages at a glance:

- Reduced downtimes for increased productivity
- Optimized maintenance costs due to a tailored scope of services
- Costs that can be calculated and therefore planned
- Service reliability due to guaranteed response times and spare part delivery times
- Customer service personnel will be supported and relieved of additional tasks
- Comprehensive service from a single source, fewer interfaces and greater expertise

Contact information is available in the Internet at:
www.siemens.com/automation/partner

Knowledge Base on DVD

For locations without online connections to the Internet there are excerpts of the free part of the information sources available on DVD (Service & Support Knowledge Base). This DVD contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service & Support.

The DVD also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The DVD will be updated every 4 months.

Just the same as our online offer in the Internet, the Service & Support Knowledge Base on DVD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base** DVD from your Siemens contact.

Order no. **6ZB5310-0EP30-0BA2**

Automation Value Card

Small card - great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Drive Automation and Drive Technologies will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase something on our Online portal, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Order your Automation and Value Card easily and comfortably like a product with your sales contact.

Automation Value Card order numbers	
Credits	Order no.
200	**6ES7 997-0BA00-0XA0**
500	**6ES7 997-0BB00-0XA0**
1 000	**6ES7 997-0BC00-0XA0**
10 000	**6ES7 997-0BG00-0XA0**

Detailed information on the services offered is available on our Internet site at:

www.siemens.com/automation/service&support

Service & Support à la Card: Examples

Technical Support	
"Priority"	Priority processing for urgent cases
"24 h"	Availability round the clock
"Extended"	Technical consulting for complex questions
"Mature Products"	Consulting service for products that are not available any more
Support Tools in the Support Shop	
	Tools that can be used directly for configuration, analysis and testing

Appendix
Alphabetical index

Order No.	Page	Export regulations AL	ECCN
3RK1			
3RK1 911-2BE50	14/2	N	N
3RT1			
3RT1 900-1SB20	14/2	N	N
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6EP1 321-5BA00	13/16	N	N
6EP1 322-1LD00	13/17	N	EAR99H
6EP1 322-1SH03	13/16	N	N
6EP1 322-5BA10	13/17	N	N
6EP1 331-1LD00	3/6	N	EAR99H
6EP1 331-1SH03	2/6	N	N
6EP1 331-5BA00	2/6	N	N
6EP1 331-5BA10	2/6	N	N
6EP1 332-1LB00	3/6	N	N
6EP1 332-1LD00	4/6	N	EAR99H
6EP1 332-1LD10	4/6	N	N
6EP1 332-1SH31	4/6	N	N
6EP1 332-1SH43	3/6	N	N
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6EP1 332-2BA00	4/6	N	N
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6EP1 332-5BA00	3/6	N	N
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6EP1 333-2AA01	5/6	N	N
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6EP1 351-1SH03	13/17	N	N
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6EP1 353-2BA00	13/16	N	N
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6EP1 931-2EC42	12/22	N	N
6EP1 931-2FC21	12/22	N	N
6EP1 931-2FC42	12/22	N	N
6EP1 933-2EC41	12/22	N	N
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6EP1 971-1BA00	14/2	N	N
6EP1 971-2BA00	14/2	N	N
6EP1 975-2ES00	12/22, 14/2	N	N
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6ES7 307-1KA02-0AA0	7/6	N	N
6ES7 390-6BA00-0AA0	14/2	N	N

Notes

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Conditions of Sale and Delivery Export regulations

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in Germany

The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

General

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.
The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

An exact explanation of the metal factor and the text of the Comprehensive Terms and Conditions of Sale and Delivery can be downloaded at:
www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

Export regulations

Siemens shall not be obligated to fulfill this agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes or other sanctions.

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AL	Number of the German Export List Products marked other than "N" require an export license. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "AL" not equal to "N" are subject to a European or German export authorization when being exported out of the EU.
ECCN	Export Control Classification Number Products marked other than "N" are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to. Goods labeled with an "ECCN" not equal to "N" are subject to a US re-export authorization.

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The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices.

Errors excepted and subject to change without prior notice.

Catalogs

Industry Automation, Drive Technologies and Low-Voltage Power Distribution

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Interactive Catalog on DVD

	Catalog
for Industry Automation, Drive Technologies and Low Voltage Distribution	**CA 01**

Drive Systems

Variable-Speed Drives	
SINAMICS G110, SINAMICS G120 Standard Inverters SINAMICS G110D, SINAMICS G120D Distributed Inverters	D 11.1
SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS S120 Chassis Format Units and Cabinet Modules SINAMICS S150 Converter Cabinet Units	D 21.3
SINAMICS DCM Converter Units	D 23.1
Three-phase Induction Motors • H-compact • H-compact PLUS	D 84.1
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
PDF: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	*DA 22*
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22
Low-Voltage Three-Phase-Motors	
IEC Squirrel-Cage Motors	D 81.1
MOTOX Geared Motors	D 87.1
Automation Systems for Machine Tools SIMODRIVE • Motors • Converter Systems SIMODRIVE 611/POSMO	NC 60
Automation Systems for Machine Tools SINAMICS • Motors • Drive System SINAMICS S120	NC 61
Mechanical Driving Machines	
FLENDER Standard Couplings	MD 10.1
FLENDER SIG Standard industrial gear unit	MD 30.1

Low-Voltage Power Distribution and Electrical Installation Technology

Protection, Switching, Measuring & Monitoring Devices	LV 10.1
Switchboards and Distribution Systems	LV 10.2
GAMMA Building Management Systems	ET G1
PDF: DELTA Switches and Socket Outlets	*ET D1*
SICUBE System Cubicles and Cubicle Air-Conditioning	LV 50
SIVACON 8PS Busbar Trunking Systems	LV 70

Motion Control

	Catalog
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61
SINUMERIK 828D BASIC T/BASIC M, SINAMICS S120 Combi and 1FK7/1PH8 motors	NC 82
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21
SINAMICS S110 The Basic Positioning Drive	PM 22
Drive and Control Components for Cranes	CR 1

Power Supply and System Cabling

Power supply SITOP	KT 10.1
System cabling SIMATIC TOP connect	KT 10.2

Process Instrumentation and Analytics

Field Instruments for Process Automation	FI 01
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
Products for Weighing Technology	WT 10
PDF: Process Analytical Instruments	*PA 01*
PDF: Process Analytics, Components for the System Integration	*PA 11*

Safety Integrated

Safety Technology for Factory Automation	SI 10

SIMATIC HMI/PC-based Automation

Human Machine Interface Systems/ PC-based Automation	ST 80/ ST PC

SIMATIC Ident

Industrial Identification Systems	ID 10

SIMATIC Industrial Automation Systems

Products for Totally Integrated Automation and Micro Automation	ST 70
SIMATIC PCS 7 Process Control System	ST PCS 7
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
PDF: Migration solutions with the SIMATIC PCS 7 Process Control System	*ST PCS 7.2*

SIMATIC NET

Industrial Communication	IK PI

SINVERT Photovoltaics

Inverters and Components for Photovoltaic Installations	RE 10

SIRIUS Industrial Controls

SIRIUS Industrial Controls	IC 10
SIRIUS Industrial Controls (selected content from catalog IC 10)	IC 90

System Solutions

Applications and Products for Industry are part of the interactive catalog CA 01

PDF: These catalogs are only available as pdf files.

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