

Reliable 24 V supply – even when the power fails

Uninterruptible power supplies
for any application



SITOP DC UPS

Answers for industry.

SIEMENS

24 volts nonstop

A reliable power supply is essential for guaranteeing the productivity of automated plants and machines. The SITOP switched-mode power supplies already offer maximum reliability in this respect. But in order to protect 24 V loads from longer power failures as well, the power supplies can be upgraded with DC UPS modules. Their various applications are differentiated above all by the energy storage. Temperature sensitive capacitors buffer the 24 V supply for up to a few minutes, while battery modules can span periods of several hours.

SITOP DC UPS with capacitors

In many PC-based automation solutions, more serious damage due to a power failure can be prevented by bringing the plant to a defined status. The backing up of operating data necessary for this purpose and the subsequent controlled shutdown of the PC generally takes no more than a minute. The double-layer capacitors of the SITOP UPS500 are highly-capacitive and supply sufficient energy for this and offer some unique benefits in addition.

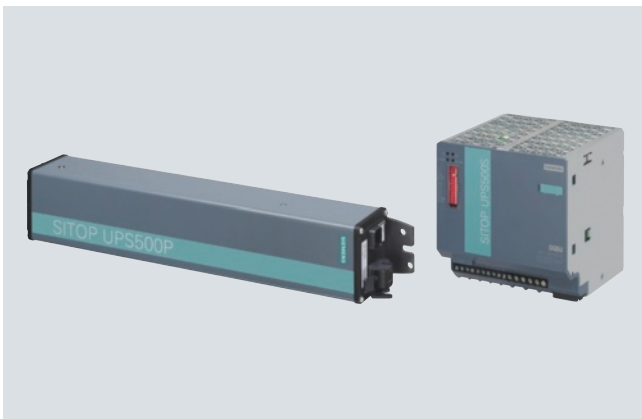
Totally maintenance-free

The capacitors have an extremely long life even at high ambient temperatures. No maintenance or replacement of the energy buffer is required, which means that the DC UPS pays for itself within a short time. And because the capacitors do not emit any gas, no ventilation of the control cabinet is required either. Short recharging times quickly restore the buffering capability following a power failure.

For use both inside and outside the control cabinet

The buffering time of the UPS500S for DIN rail mounting can be extended by adding expansion modules. The SITOP UPS500P is designed with IP65 degree of protection and can be used on a distributed basis. The elongated format of the aluminum enclosure is ideally suited for mounting on a support arm.

The USB interface and the software tool allow easy communication with a PC for both versions.



SITOP DC UPS with capacitors for bridging power failures in the order of minutes

SITOP DC UPS with battery modules

If the 24 Volt supply has to be buffered for an extended period or a more powerful buffering current is required, the DC UPS with maintenance-free lead-acid batteries offers optimum reliability. It spans power failures up to several hours long and delivers up to 40 A. This enables processes or parts of them to be continued, measured values to be recorded without interruption and communication to be maintained. High-performance industrial PCs that have to be shut down also have somewhat higher energy demands. Especially if a large panel continues to be operated during the shutdown.

High system availability due to battery management

The sophisticated battery management of the compact DC UPS modules ensures optimum charging of the batteries – and means the unit is always reliably available for buffering. The active battery test function even checks the age of the battery. This means that precautionary replacement of the battery is not necessary – saving a considerable amount of money.

Extremely communicative

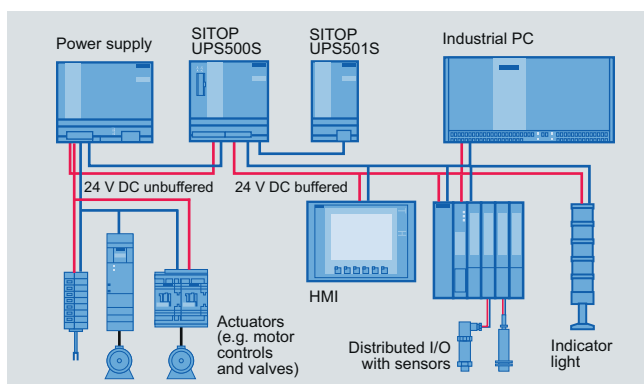
All relevant messages are output via floating contacts, and also optionally via a serial interface or USB port. The software tool ensures that the connection is easy from the software viewpoint.



SITOP DC UPS with battery module for bridging power failures in the order of hours

The advantages of SITOP DC UPS with capacitors

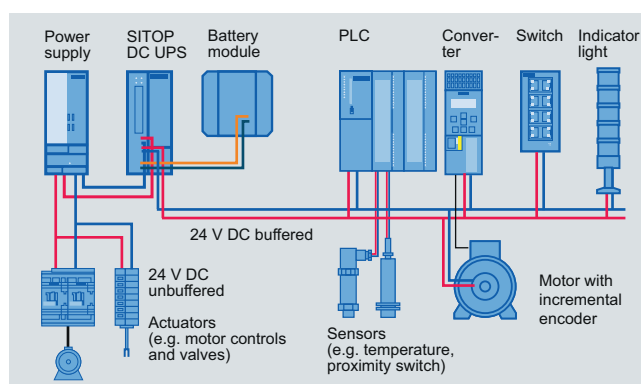
- Completely maintenance-free DC UPS with high-capacity double-layer capacitors
- Can be cascaded on modular basis for DIN rail mounting: SITOP UPS500S 24 V / 15 A basic unit with integrated energy store, 2.5 or 5 kW, can be combined with up to 3 UPS501S expansion modules (5 kW)
- SITOP UPS500P 24 V / 7 A, 5 or 10 kW with IP65 protection for distributed use
- Long-life capacitors make battery replacement unnecessary: After 8 years, the UPS500 still has 80% of rated capacity at 50°C ambient temperature
- Mounting location does not require ventilation (VDE 0510 Part 2 / EN 50272-2)
- Quick restoration of buffer readiness



Configuration with SITOP UPS500S: 24 V buffering for backing up process data and performing a controlled shutdown of a PC. To relieve the load on the UPS, the actuators are supplied directly from the power supply unit.

The advantages of SITOP DC UPS with battery modules

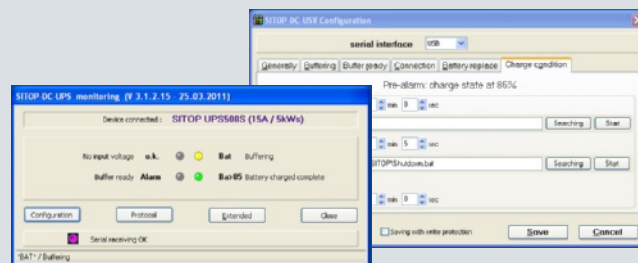
- DC UPS modules 6 A, 15 A and 40 A
- Maintenance-free battery modules from 1.2 to 12 Ah
- High reliability and availability due to monitoring of the operational readiness, battery feeder, aging and charging status
- Extended life of loads and batteries due to integrated battery management
- Settings by means of DIP switches: Battery connection threshold, end-of-charge voltage, charging current, bridging time
- Uninterrupted transition from readiness to buffering mode



Configuration with SITOP DC UPS and battery module: 24 V buffering to maintain communication, signaling, sensor measured values and position values. To relieve the load on the UPS, the actuators are supplied directly from the power supply unit.



DC UPS software tool for easy integration of the PC

Both the battery and the capacitor DC UPS system can easily be integrated into PC-based systems using the free software tool. It supports the further processing of the status messages and the safe shutdown of the PC. This enables, for example, an individual power failure program to be started after a definable time. The software also supports the correct restart of the system in the event that the power supply is restored while the PC is shutting down. In this case, the PC would remain shut down, because it does not experience any change to the input voltage. On the other hand, the DC UPS can be adjusted by means of the software or DIP switches in such a way that it interrupts the 24 V supply and so automatically causes the PC to restart.



- Further processing of all signals of the UPS module
- Monitoring of the communication by the UPS module
- Executes under Windows 2000, XP, Vista and Windows 7
- Executes as service (without logged-in user) or as an application (with logged-in user)
- OPC server (software interface) that permits access by other programs to the status messages of the UPS, e.g. by WinCC or a Soft PLC
- User-friendly installation, download via: www.siemens.com/sitop-ups


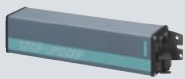
SITOP UPS500 – maintenance-free DC UPS using capacitor technology

Technical data ¹⁾				
Basic units	SITOP UPS500S - 15 A		SITOP UPS500P - 7 A	
	2.5 kW	5 kW	5 kW	10 kW
Order number ²⁾	6EP1 933-2EC41	6EP1 933-2EC51	6EP1933-2NC01	6EP1933-2NC11
Input data				
Rated input voltage $U_{in \text{ rated}} / \text{Range}$:	24 V DC / 22 ... 29 V		24 V DC / 22.5 ... 29 V	
Connection threshold for buffering	22.5 V DC \pm 0.1 V (factory setting), 22 ... 25.5 V DC in 0.5 V increments, adjustable		–	
Input current $I_{in \text{ rated}}$	15.2 A + approx. 2.3 A in charging mode		7A + approx. 2 A in charging mode	
Mains buffering				
Adjustable range using DIP switches	5, 15, 25, 35, 45, 55 etc. up to 315 seconds (in 10-s increments) or max. buffering time		–	
Behavior on restoration of input voltage after buffering time	Interruption of U_{out} for 5 s for the automatic restart of PCs or optionally no interruption			
On/off control circuit (via external floating NO contact)	by opening the circuit the buffer mode is terminated		–	
Output data				
Output voltage in normal operation	24 V DC \pm 3%			
Output voltage in buffering mode	24 V DC \pm 3%			
Output current I_{out}	0 ... 15 A		0 ... 7 A	
Charging current	1 A (factory setting) or 2 A, selectable		2 A	
Efficiency / power loss approx.	97.5% / 9 W (rated operation)		96.5% / 5.9 W (rated operation)	
Protection and monitoring				
Polarity reversal protection	against polarity reversal on input voltage			
Overload / short-circuit protection	yes, restart			
Normal operation	LED green (OK) and floating changeover contact		LED green (OK)	
Buffering mode	LED yellow (Bat) and floating changeover contact		LED yellow (Bat)	
Alarm (not ready for buffering)	LED red (Alarm) and floating changeover switch		LED red (Alarm)	
Charging status (over 85% charged)	Second LED green and floating NO contact closed (Bat > 85%)		Second LED green (Bat > 85%)	
General details				
Radio interference level (EN 55022) / noise immunity	Class B / Noise immunity to EN 61000-6-2			
Protection class	Class III (ext. circuit and power-supply unit: SELV in accordance with EN 60950 required)			
Degree of protection (EN 60529)	IP20		IP65	
Ambient temperature during operation	0 ... +60°C		0 ... +55°C 0 ... +60°C	
Transport/storage temperature	-40 ... +70 °C			
Dimensions (W x H x D) in mm	120 x 125 x 125		400 (without connector) x 80 x 80 470 (without connector) x 80 x 80	
Weight approx.	1.0 kg 1.2 kg		1.9 kg 2.2 kg	
Installation	Snaps onto standard DIN rail, DIN EN 50022-35x15/7.5		Screw-mounted in all installation positions, e.g. on support arms	
Approvals	CE, UL 508/CSA C22.2, file E197259		CE	
Expansion module				
Expansion module	SITOP UPS501S expansion module 5 kW		Connector set for SITOP UPS500P	
Order number ²⁾	6EP1 935-5PG01		6EP1 975-2ES00	
Description	Expansion module to extend the backup time, up to 3 units can be connected in parallel with one SITOP UPS500S basic unit		Connector for input and output, and preassembled USB cable in 2 m length	
Dimensions (W x H x D) in mm	70 x 125 x 125		–	
Weight approx.	0.7 kg		–	

¹⁾ Technical data applies for rated input voltage and +25°C ambient temperature (if not otherwise specified).

²⁾ Current ordering data, plus terms and conditions of sales and delivery can be found in Catalog KT10.1 and on the Internet at www.siemens.com/industrymall

SITOP UPS500 – Buffering and charging times

Technical data ¹⁾										
	SITOP UPS500S/501S								SITOP UPS500P	
Available energy										
Basic units	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 x 5 kW	1 x 5 kW	2 x 5 kW	2 x 5 kW	3 x 5 kW	3 x 5 kW	–	–
Combined	2.5 kW	5 kW	7.5 kW	10 kW	12.5 kW	15 kW	17.5 kW	20 kW	5 kW	10 kW

Buffer times											
at load current ...	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 times											
at load current ...	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	–	–






DIN rail mounting of 3 compact SITOP UPS500S basic units together with SITOP modular switched-mode power supplies



Space-saving wall mounting of the narrow SITOP UPS500P 10 kW






SITOP DC UPS with battery modules

Technical data ¹⁾			
SITOP DC UPS module	6 A	15 A	40 A
Order number²⁾			
DC UPS without interface	6EP1931-2DC21	6EP1931-2EC21	6EP1931-2FC21
DC UPS with serial interface	6EP1931-2DC31	6EP1931-2EC31	–
DC UPS with USB	6EP1931-2DC41	6EP1931-2EC41	6EP1931-2FC41
Input data			
Rated input voltage $U_{in rated}$ / Range:	24 V DC / 22 ... 29 V		
Connection threshold for buffering	22.5 V DC \pm 0.1 V (factory setting), 22 ... 25.5 V DC in 0.5 V increments, adjustable		
Input current $I_{in rated}$	6 A + approx. 0.6 A in charging mode	15 A + approx. 1 A in charging mode	40 A + approx. 2.5 A in charging mode
Mains buffering			
Adjustable range using DIP switches	5, 15, 25, 35, 45, 55 etc. up to 315 seconds (in 10-s increments) or max. buffering time		
Behavior on restoration of input voltage after buffering time	Interruption of U_{out} for 5 s for the automatic restart of PCs or optionally no interruption		
On/off control circuit (via external floating NO contact)	by opening the circuit the buffer mode is terminated		
Output data			
Output voltage in normal operation	Input voltage U_{in} less approx. 0.5 V		
Output voltage in buffering mode	27 V DC (no load); 24V (50% battery rated current); 22V (100% battery rated current); 18.5 V (exhaustive discharge protection)		
Charging the battery: • Output +Bat/-Bat in normal operation • End-of-charge voltage: Factory setting / range	I-U charging characteristic (first rapid charging current, then constant voltage for charge retention) 27.0 V DC \pm 0.1 V / 26.3 ... 29.3 V DC in 0.1 V increments, adjustable		
Output current I_{out}	0 ... 6 A	0 ... 15 A	0 ... 40 A
Charging current: • Factory setting • Range	approx. 0.4 A 0.2 A or 0.4 A selectable	approx. 0.7 A 0.35 A or 0.7 A selectable	approx. 2 A 1 A or 2 A selectable
Efficiency / power loss approx.	95% / 7 W	95% / 14 W	97% / 32 W
Protection and monitoring			
Polarity reversal protection	against input voltage U_{in} and against batteries		
Overload / short-circuit protection	yes, restart		
Normal operation	LED green (OK) and floating changeover contact		
Buffering mode	LED yellow (Bat) and floating changeover contact		
Alarm (not ready for buffering)	LED red (Alarm) and floating changeover switch		
Charging status (over 85% charged)	Second LED green and floating NO contact closed (Bat > 85%)		
General details			
Radio interference level (EN 55022) / noise immunity	Class B / Noise immunity to EN 61000-6-2		
Protection class	Class III (ext. circuit and power-supply unit: SELV in accordance with EN 60950 required)		
Degree of protection (EN 60529)	IP20		
Ambient temperature during operation	-25... +60°C		
Transport/storage temperature	-40 ... +85°C		
Dimensions (W x H x D) in mm	50 x 125 x approx. 125		102 x 125 x approx. 125
Weight approx.	0.4 kg	0.4 kg	1.1 kg
Installation	Snaps onto DIN rail DIN EN 50022-35x15/7.5		
Approvals	CE, cULus	CE, cULus	CE, cULus

¹⁾ Technical data applies for rated input voltage and +25°C ambient temperature (if not otherwise specified).

²⁾ Current ordering data, plus terms and conditions of sales and delivery can be found in Catalog KT10.1 and on the Internet at www.siemens.com/industrymall

Battery modules and buffer times

Technical data ¹⁾					
Battery module	1.2 Ah	3.2 Ah	7 Ah	12 Ah	2.5 Ah High-temperature
for SITOP DC UPS module	6 A	6 A and 15 A	6 A, 15 A and 40 A (for >30 A to 40 A, 2 units are required in parallel)		6 A and 15 A
Order number ²⁾	6EP1935-6MC01	6EP1935-6MD11	6EP1935-6ME21	6EP1935-6MF01	6EP1935-6MD31
Recommended end-of-charging voltage	26.4...27.3 V DC (> +20°C), 27.3...29.0 V DC (< +20°C)				26.4...27.9 V DC (at > +20°C), 27.9...29.0 V DC (at < +20°C)
Charging current	max. 0.3 A	max. 0.8 A	max. 1.75 A	max. 3 A	max. 5 A
Rated output voltage	24 V DC, 22 ... 27.0 V DC (no load)				
Rated output current	6 A	15 A	30 A	30 A	10 A
Integral battery fuse	7.5 A / 32 V	15 A / 32 V	30 A / 32 V	30 A / 32 V	15 A / 32 V
Degree of protection (EN 60529)	IP00				
Ambient temperature	0 ... +40°C				-40 ... +60°C
Transport/storage temperature	-20 ... +50°C				-40 ... +60°C
Service life (when capacity falls to 50% of original capacity), depending on battery temperature, approx.	+20°C: 4 years, +30°C: 2 years, +40°C: 1 year				+20°C: > 10 years, +30°C) 7 years, +40°C: 3 years, +50°C: 1.5 years, +60°C: 1 year
Installation	Standard rail or wall mounting		Wall mounting		Standard rail or wall mounting
Dimensions (W x H x D) in mm	96 x 106 x 108	190 x 151 x 82	186 x 168 x 121	253 x 168 x 121	265 x 151 x 91
Weight approx.	2.0 kg	3.5 kg	6.0 kg	9.0 kg	3.8 kg
Certifications	CE, cURus	CE, cURus	CE, cURus	CE, cURus	CE, cURus

Buffer times

at load current ...	1 A	2 A	3 A	4 A	6 A	8 A	10 A	12 A	14 A	16 A	20 A	25 A	30 A
34.5 min	34.5 min	15.5 min	9 min	6.5 min	3.5 min	–	–	–	–	–	–	–	–
2.6 h	2.6 h	1 h	39.3 min	27.1 min	17.5 min	12.1 min	9 min	–	–	–	–	–	–
5.4 h	5.4 h	2.6 h	1.6 h	1.2 h	41 min	28.6 min	21.8 min	17.3 min	15.1 min	12.5 min	9.1 min	–	–
9 h	9 h	4.6 h	2.9 h	2.2 h	1.2 h	53.3 min	43.5 min	33.3 min	27.5 min	23.8 min	20.1 min	12.6 min	9.1 min
2 h	2 h	1 h	37.5 min	27 min	17.6 min	12.5 min	8.8 min	6.8 min	5.1 min	4.3 min	–	–	–

Note:

The mains buffering times are based on the discharge period of new and 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).

Further information

More information on SITOP DC UPS:

www.siemens.com/sitop-ups

Information material for download:

www.siemens.com/sitop-infomaterial

Using the SITOP Selection Tool to select the appropriate power supply:

www.siemens.com/sitop-selection-tool

Operating instructions for downloading:

www.siemens.com/sitop/manuals

CAX data (2D, 3D, circuit diagram macro) as download:

www.siemens.com/sitop-cax

Electronic ordering via the Internet with the Industry Mall:

www.siemens.com/industrymall

Your personal contact partner is listed at:

www.siemens.com/automation/partner

Siemens AG
Industry Sector
Sensors and Communication
Postfach 48 48
90026 NÜRNBERG
GERMANY

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