

TPS POWER STORAGE

The all-rounder for grid networks and industry



Built to last 30 years • 1C charging speed • The safest cell technology

TESVOLT
THE ENERGY STORAGE EXPERTS

WE HAVE A „THEN“ FOR ANY „WHEN“.

Our battery storage system can be optimally adapted to suit every application.

Whether for emergency power or to cut peak loads, whether on- or off-grid, whether in the desert or the arctic circle – with the *TPS system*, TESVOLT offers an industrial storage solution for every application. The *TPS system* is not only flexible, with a size and output that can be adapted to suit any need, it is also one of the most advanced and cost-efficient storage systems.

Maximum safety

Prismatic battery cells are incredibly durable, safe and powerful – particularly in comparison to round cells. Tesvolt uses cells from Samsung SDI and offers a 10-year performance warranty on the entire storage system.

Long service life

The service life of a battery has a huge impact on its economic efficiency. Our storage system features outstanding performance data: All components are built to last 8,000 cycles and offer a 30-year service life.

It is extremely robust and is therefore well-suited to the hardest tasks. High-end battery cells from the automotive industry and innovative technologies such as the *Active Battery Optimizer* guarantee a long lifespan and maximum efficiency. This way, the self consumption of a storage rack on standby is reduced to a mere 5 W (without cooling).

High-performance without compromise

TPS storage systems can store energy very quickly, and release it again even faster. With a continuous power rating of 1C for charging and discharging, the storage system is optimised for professional use in industry and grid services.

Flexibility now and in the future

Our *TPS storage systems* do not only offer flexible configuration options at the moment of purchase – thanks to the innovative *Active Battery Optimizer* technology, the battery modules can also be retrofitted or exchanged even years later.

Samsung SDI cell



- 1 Overcharge Safety Device (OSD)
- 2 Vent
- 3 Fuse

Battery module



- 4 Battery module
- 5 Active Battery Optimizer

Battery rack



- 6 Active Power Unit

The *TPS system* is designed to be completely modular, from the prismatic battery cells to the container. It is therefore easily customised and extremely efficient, thanks to its long service life.

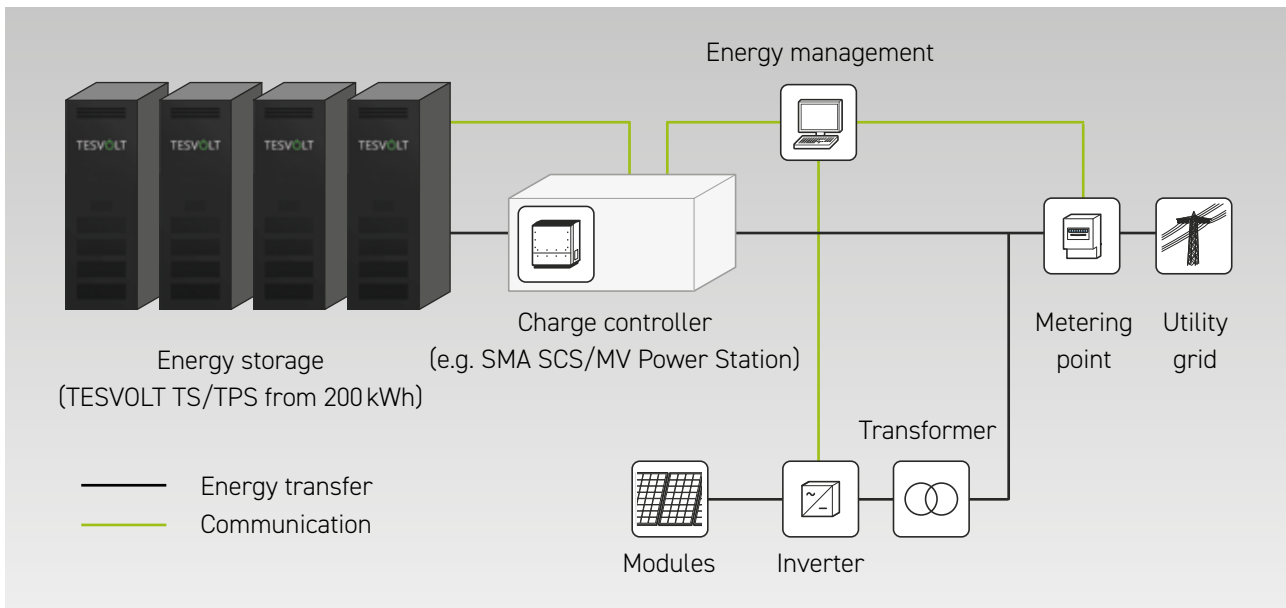
TPS container module

- 7 DC distribution
- 8 Battery racks
- 9 Air conditioning



AREAS OF APPLICATION

On-grid – Grid system services

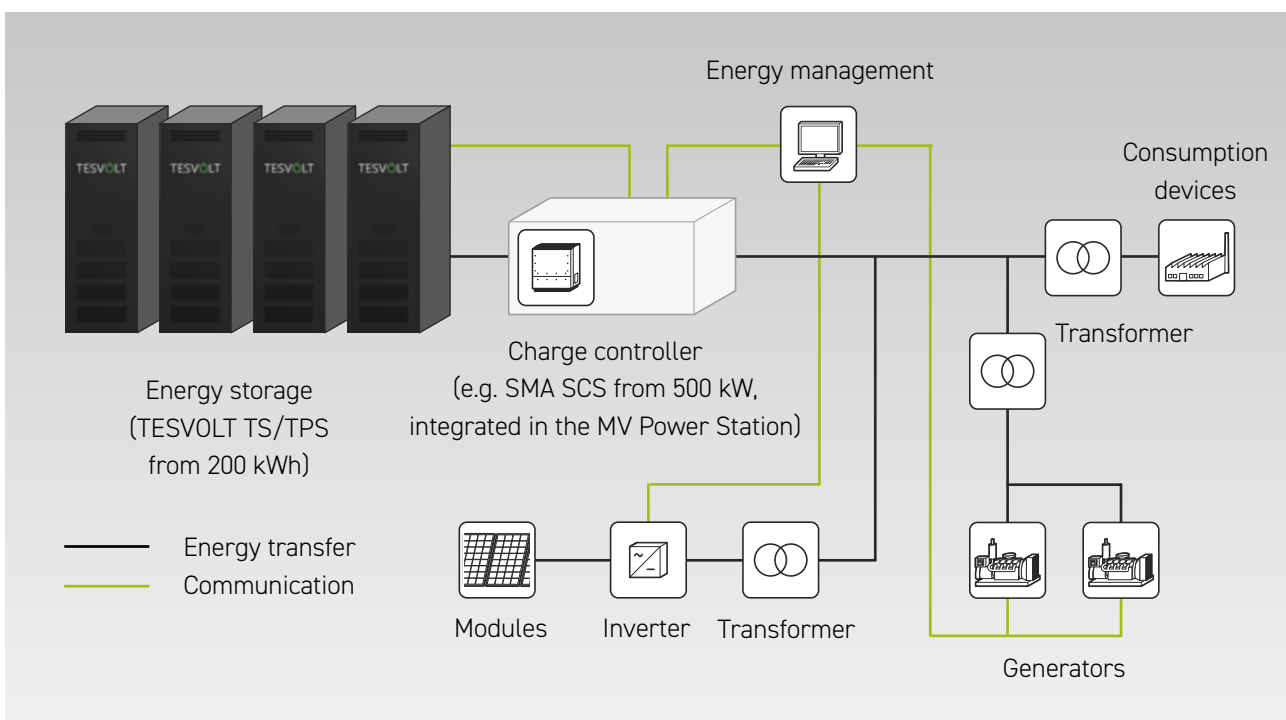


- **Q(U) on demand** – flexible reactive power supply (through the inverter)
- **Balancing power** – offsetting fluctuations in the grid
- **Ramp Rate Control** – balancing out irregularities in power output
- **P(f) on demand** – frequency-dependent active power control for grid support, e.g. (frequency response)
- **Peak load capping** – offsetting peaks in demand (load shifting and load shedding)

Off-grid

Combined with suitable charge controllers (e.g. SMA SCS), *TESVOLT TPS systems* can be used in off-grid networks e.g.

to optimise diesel hybrid plants (genset optimisation control). This enables a reduction in fuel consumption.



CONTAINER

Technical data and equipment

<p>45 ft 13.7 m length maximum 2.02 MWh</p> <p>40 ft 12.2 m length maximum 1.73 MWh</p> <p>20 ft 6.1 m length maximum 0.86 MWh</p>		<p>ISO container</p> <ul style="list-style-type: none"> • stackable • insulated walls
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- Partially integrated, ready-to-connect air-conditioning to ensure total temperature control of the interior and optimise the operating temperature
- Shelving system or *TS battery racks*
- Optional: integrated DC main distribution board for combining the battery racks

- Optional: Fire detection system with alarm (forwarding)
- Optional: Structure equipped according to fire-resistance class F90
- Optional: automatic fire extinguishing system
- Optional: containers to suit customer-specific requirements, e.g. salt water resistant paintwork near to the coast

Transportation

- Standardised ISO container transport overland by HGV
- Optional: CSC certification, international transport possibilities via ISO container sea freight

Installation

- External temperature range for operation -20°C to +45°C
- Optional: External temperature range for operation -40°C to +55°C

SMA – SUNNY CENTRAL STORAGE

- Compatible with *TESVOLT storage systems*
- Stand-alone system power outputs from 500 kW to 2,200 kW
- Power levels (kW):
500 / 630 / 720 / 800 / 850 / 900 / 1000 / 2200
2x 630 / 2x 720 / 2x 800 / 2x 850 / 2x 900 / 2x 1000
- Available up to 40 kV as a container solution: MVPS – Medium Voltage Power Station (SCS with integrated medium voltage transformer and switchgear)
- Full functionality for providing grid system services
- Parallel combined grid mode



SMA SUNNY CENTRAL STORAGE SCS 2200/2500-EV



In addition to an SCS, the SMA MV Power Station also comprises a transformer and a switchgear.



MONITORING AND SERVICE AROUND THE GLOBE

With our storage monitoring system, you can keep an eye on the state of charge and condition of each individual battery cell at all times.

This way, you can monitor and analyse the storage system both on site and remotely.

We also offer installation and maintenance support services worldwide via video livestream.

	Cell 1	Cell 2	Cell 3	Cell 4	Cell 5	Cell 6	Cell 7
U _{cell}	3,446 V	3,458 V	3,444 V	3,485 V	3,466 V	3,458 V	3,483 V
Temp	20°C	20°C	20°C	20°C	20°C	20°C	20°C
SoH	100 %	100 %	100 %	100 %	100 %	100 %	100 %

	Cell 8	Cell 9	Cell 10	Cell 11	Cell 12	Cell 13	Cell 14
U _{cell}	3,446 V	3,458 V	3,444 V	3,485 V	3,466 V	3,458 V	3,483 V
Temp	20°C	20°C	20°C	20°C	20°C	20°C	20°C
SoH	100 %	100 %	100 %	100 %	100 %	100 %	100 %

MODULAR SYSTEM PRINCIPLE

TPS systems are flexibly adaptable to suit your operating purpose:

- TPS storage systems can be installed in systems with a voltage of up to 950 V DC
- TPS storage systems are available from 200 kWh
- Three different sizes of containers (20 ft, 40 ft and 45 ft) can be used as housing
- The containers can be fitted with racks holding up to 5, 8 or 10 battery modules

SYSTEM CONFIGURATIONS

This table displays the possible output depending on the container version and capacity.

individual	14,000 kWh										●	●
	7,000 kWh	●	●	●	●	●	●	●	●	●	●	●
	5,000 kWh	●	●	●	●	●	●	●	●	●	●	○
	3,000 kWh	●	●	●	●	●	●	●	●	●	○	
	2,000 kWh	●	●	●	●	●	●	●	●	○		
45 ft	2,000 kWh				●	●	●	●	●	○		
	1,850 kWh	●	●	●	●	●	●	●	●	●		
	1,700 kWh	●	●	●	●	●	●	●	●	●		
40 ft	1,700 kWh				●	●	●	●	●			
	1,550 kWh	●	●	●	●	●	●	●	●			
	1,400 kWh	●	●	●	●	●	●	●	○			
	1,250 kWh	●	●	●	●	●	●	○	○			
	1,100 kWh	●	●	●	●	●	○	○	○			
20 ft	950 kWh	●	●	●	●	●	○	○	○			
	800 kWh	●	●	●	●	○	○	○				
	650 kWh	●	●	●	●	○	○					
	500 kWh	●	●	●	○	○						
	350 kWh	●	○	○	○							
Container	200 kWh	○	○	○								
	↑ Energy Output →	500 kW	630 kW	720 kW	850 kW	1,000 kW	1,260 kW	1,600 kW	1,800 kW	2,000 kW	4,000 kW	8,000 kW

● available ○ on request

Technical data TESVOLT battery

C-rate	1C
Cells	Lithium NMC prismatic (Samsung SDI)
Cell balancing	Active Battery Optimizer
Cycles at 100% DOD 70% EOL 23°C ± 5°C 1C/1C	6 000
Cycles at 100% DOD 70% EOL 23°C ± 5°C 0.5C/0.5C	8 000
Efficiency (battery)	up to 98%
Maximum system voltage	627 up to 930 V DC
Stand-alone system storage capacity at DOD 100%	94 Ah
Self consumption (without cooling/heating)	5 W
System coupling	up to 99 systems in parallel
Communication interface	CAN 2.0, Modbus TCP/IP
Certificates/norms	Cell: IEC 62619, UL 1642, UN 38.3 Product: CE, UL 1973*, UN 38.3, IEC 62619, IEC 61000-6-1/2/3/4, BattG 2006/66/EG
Warranty	10-year performance warranty, 5-year product warranty
Recycling	free take-back of batteries from TESVOLT

*In progress

Container system

Size	20 ft	40 ft	45 ft
Energy (max.)	864 kWh	1728 kWh	2016 kWh
Number of storage systems	up to 12	up to 24	up to 28
Integrated DC main distribution board	.	.	.
External temperature range for operation	-20 to 45°C		
Humidity	0 to 85% (non-condensing)		
Power supply circuit	3-N 400 V, 50 Hz, 16 A	3-N 400 V, 50 Hz, 32 A	3-N 400 V, 50 Hz, 32 A
Dimensions (L x W x H)	6.06 m x 2.44 m x 2.90 m	12.19 m x 2.44 m x 2.90 m	13.72 m x 2.44 m x 2.90 m
Protection class	IP 54		
Optional extras	Fire alarm unit, fire extinguisher unit, CSC certification, extended operating temperature range		

Example SMA SCS configuration

SMA product	SCS 500	SCS 720	SCS 1000	SCS 2200
Nominal power at 40°C	500 kVA	720 kVA	1000 kVA	2000 kVA
Battery system				
Voltage range (battery)	627.2 to 813.4 V	627.2 to 813.4 V	672 to 871.5 V	672 to 871.5 V
1C	8 systems at 67.2 kWh each	10 systems at 67.2 kWh each	14 systems at 72 kWh each	28 systems at 72 kWh each
Energy	537.6 kWh	670.0 kWh	1008 kWh	2016 kWh
Product (container)	TPS 500 (20 ft)	TPS 650 (20 ft)	TPS 1000 (40 ft)	TPS 2000 (45 ft)
0.5C	16 systems at 67.2 kWh each	20 systems at 67.2 kWh each	28 systems at 72 kWh each	56 systems at 72 kWh each
Energy	1075.2 kWh	1344 kWh	2016 kWh	2x 2016 kWh
Product (container)	TPS 1000 (40 ft)	TPS 1400 (40 ft)	TPS 2000 (45 ft)	2x TPS 2000 (45 ft)

Your certified TESVOLT partner

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