

PRELIMINARY

TS-1 HV 80

The commercial and industrial all-rounder



Integrated inverter • 1C charging speed • Safest cell technology

HIGH-VOLTAGE SYSTEM

TESVOLT
THE ENERGY STORAGE EXPERTS

WE HAVE A "THEN" FOR ANY "WHEN".

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

The *TESVOLT TS-I HV 80* is the first battery storage system with an integrated inverter and TESVOLT energy management system. Whether to increase self consumption, to cut peak loads, or for on-/off-grid use, the *TESVOLT TS-I HV 80* is not only the perfect energy storage solution for every application but also provides sustainable local grid quality due to active

filter technology. It is extremely robust and well-suited to the hardest tasks. Thanks to high-quality battery cells from the automobile industry and innovative technologies, such as the *Active Battery Optimizer*, our *TESVOLT TS-I HV 80 storage system* is one of the most efficient and durable products on the market.

Maximum safety

Prismatic battery cells are incredibly durable, safe and powerful, particularly in comparison to round cells. TESVOLT uses Samsung SDI cells and offers a performance guarantee of 10 years on the battery modules.

Long lifespan

The lifespan of a battery has a huge impact on its economic efficiency. Our storage system features outstanding performance: all components are designed to last 8,000 cycles or offer a 30-year lifespan.

High performance without compromise

The *TS-I HV 80 storage systems* can store energy very quickly, and release it again just as quickly. With a continuous power rating of 1C the storage system is optimised for professional use in commercial applications, agriculture and industry.

Ready for the future

Not only do our *TS-I HV 80 storage systems* offer easy modular configuration as they are purchased – you can also add further IPU's to increase output or another *TS-I HV 80 battery cabinet* at any time.

Battery system



Samsung SDI cell



- 1 Active Power Unit
- 2 Battery module
- 3 Overcharge safety device
- 4 Vent
- 5 Fuse
- 6 Active Battery Optimizer

Prismatic cells from Samsung SDI are extremely safe. For example, the *NSD (Nail Safety Device)* ensures that, even when penetrated with a metal nail, the cell will not catch fire.

Battery module



Every battery module has its own *Active Battery Optimizer (ABO)* which can be separated from the module in a few easy steps, for example, for servicing.

TESVOLT TS-I HV 80 INVERTER AND TESVOLT ENERGY MANAGEMENT

TESVOLT TS-I HV 80 storage systems are fitted with an integrated 3-phase battery inverter. The inverter is available in four power levels and can be upgraded at a later date. It can also be operated in parallel with up to five cascaded systems. In combination with the innovative TESVOLT energy management system, *TESVOLT TS-I HV 80* systems adapt perfectly to the requirements of trade and

industry. TESVOLT energy management offers not just the most diverse, combinable range of applications, it also enables comprehensive monitoring, intelligent control of consumers and improved quality of power supply. This flexibility increases the sustainability of your TESVOLT battery storage system and, thanks to multi-use application, its profitability as well.

TESVOLT INVERTER BENEFITS

- Black-start capable – the battery inverter can be operated off-grid or supply back-up power in the event of power outage
- Active filter – stabilise your voltage and frequency while reducing load imbalance, reactive power and harmonics in your local utility grid
- Modular principle – the inverter consists of up to four IPU inverter modules (of 85 kW each, can be upgraded at any time)
- Control speed – response time to power requirements in the network in milliseconds
- Maximum power density – potential for up to 340 kW with a footprint of just 0.54 m²

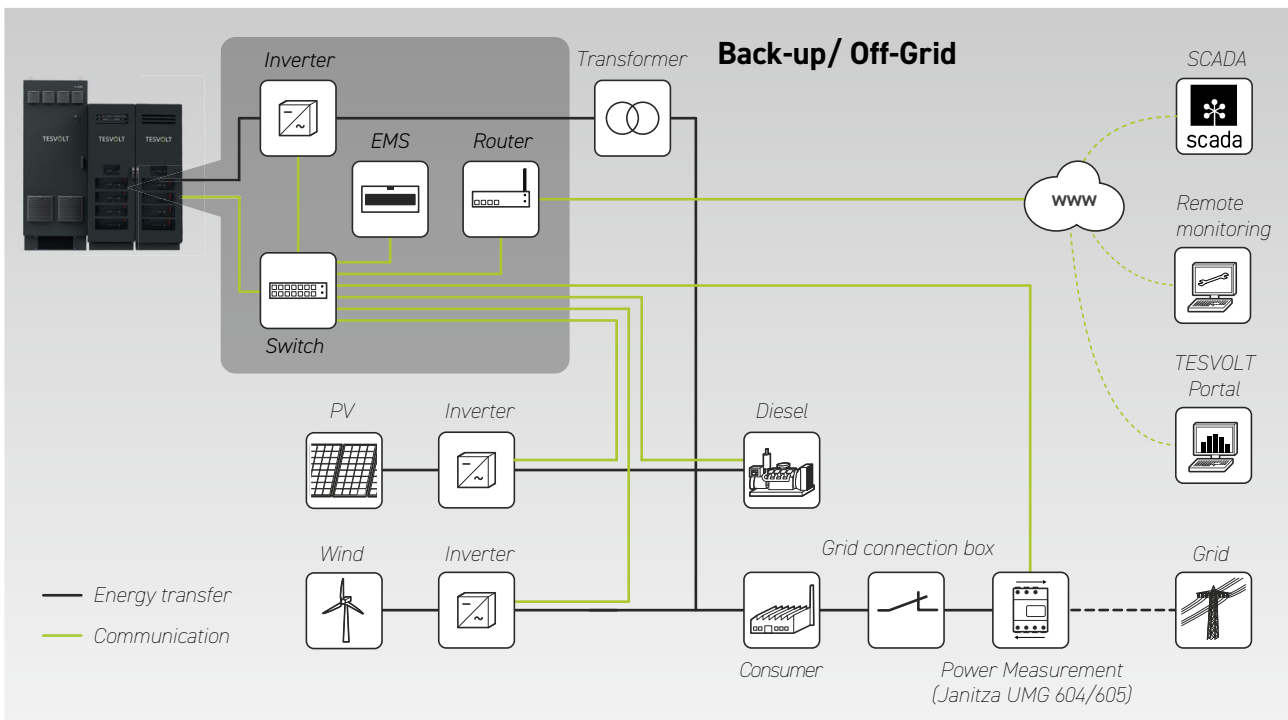
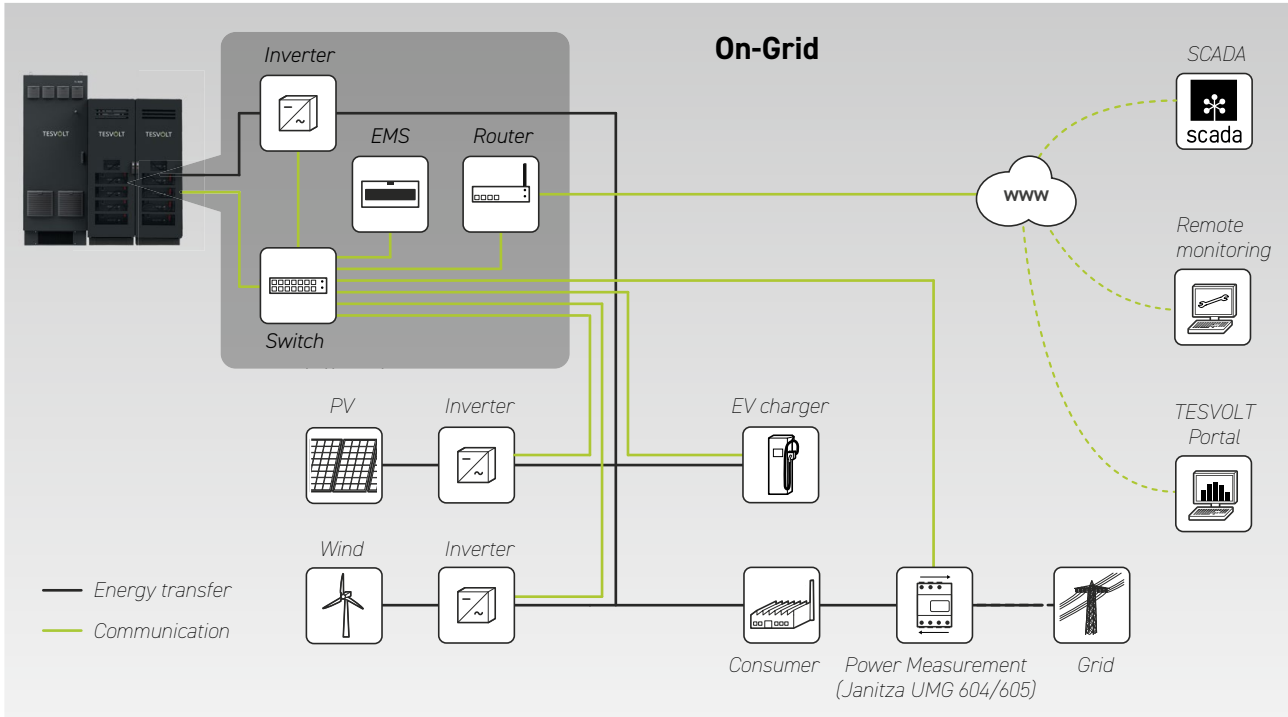
TESVOLT ENERGY MANAGEMENT BENEFITS

- Universal applications – off-grid, back-up power, peakshaving, increased self-consumption, multi-use, power quality, time of use, forecast-based charging, control of consumers, control of producers, network services (e.g. PBP)
- Multi-use – combine various applications such as increased self-consumption, peak load shaving, time of use, back-up power, etc.
- TESVOLT Monitoring Portal – manage and control the function and savings of your battery storage system/inverter at any time
- Long-term flexibility – add new functions whenever you want



TESVOLT battery inverter with three independent power units

SYSTEM STRUCTURE



APPLICATIONS

- **Off-grid electricity supply** – create your own utility grid, e.g. in combination with your photovoltaic plant
- **Back-up power** – in the event of a mains failure, the storage system takes over the power supply within fractions of a second
- **Peakshaving** – cap your consumption peaks and save money thanks to lower output use
- **Increase self-consumption** – use more of the power you have generated
- **Multi-use** – combine various applications such as increased self-consumption, peak load shaving, time of use and back-up power

- **Power quality** – improve power quality in the system for maximum lifespan of machines and devices
- **Time of use*** – use of the storage system is dependent on the electricity cost (e.g. charge when low; discharge when high)
- **Forecast-based charging*** – use weather forecasting and artificial intelligence to avoid regulation loss
- **Manage consumers*** – actively switch consumers on and off depending on generation and consumption
- **Manage producers*** – actively manage and switch producers on and off for maximum self-sufficiency
- **Ancillary services (e.g. PBP)*** – grid stabilisation by charging or discharging the battery

**on request*

SYSTEM CONFIGURATIONS

This table displays the possible output depending on the energy and the number of battery inverters and modules.

| Number of TS-1 HV 80 | Energy [kWh] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|------|------|------|------|------|------|------|--|--|
| 32 | 2432 | | | | | | | | | | | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | | |
| 31 | 2356 | | | | | | | | | | | | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 30 | 2280 | | | | | | | | | | | | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 29 | 2204 | | | | | | | | | | | | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 28 | 2128 | | | | | | | | | | | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 27 | 2052 | | | | | | | | | | | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 26 | 1976 | | | | | | | | | | | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 25 | 1900 | | | | | | | | | | | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 24 | 1824 | | | | | | | | | | • | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 23 | 1748 | | | | | | | | | | • | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 22 | 1672 | | | | | | | | | | • | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 21 | 1596 | | | | | | | | | | • | • | | | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 20 | 1520 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 19 | 1444 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 18 | 1368 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 17 | 1292 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 16 | 1216 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 15 | 1140 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 14 | 1064 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 13 | 988 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 12 | 912 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 11 | 836 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 10 | 760 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 9 | 684 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 8 | 608 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 7 | 532 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 6 | 456 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 5 | 380 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 4 | 304 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 3 | 228 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 2 | 152 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| 1 | 76 | | | | | | | | | • | • | | | • | | | | | • | • | • | • | • | • | • | • | • | • | • | | | | | |
| Output [kW] | 75 | 85 | 150 | 170 | 225 | 255 | 300 | 340 | 375 | 425 | 450 | 510 | 525 | 595 | 600 | 680 | 675 | 765 | 750 | 850 | 825 | 935 | 900 | 1020 | 975 | 1105 | 1050 | 1190 | 1125 | 1275 | 1200 | 1360 | | |
| Number of IPUs | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | | | | | | | | | | | | | | | | | | |
| Inverter | 1 | | | | 2 | | | | 3 | | | | 4 | | | | | | | | | | | | | | | | | | | | | |

Other variants available on request

| Technical specifications inverter | 1 independent power unit (IPU) | 2 IPU | 3 IPU | 4 IPU |
|-----------------------------------|--|----------------|----------------|----------------|
| Rated effective power | 75 kW | 150 kW | 225 kW | 300 kW |
| Rated apparent power | 75 kVA | 150 kVA | 225 kVA | 300 kVA |
| Rated AC current | 125 A | 250 A | 375 A | 500 A |
| Rated DC current | 140 A | 280 A | 420 A | 560 A |
| DC short-circuit current | 175 A | 350 A | 525 A | 700 A |
| Operating voltage AC | 400 V | | | |
| Grid frequency | 50/60 Hz | | | |
| DC voltage range | 680 to 1200 V DC | | | |
| Dimensions (H x W x D) | 2200 x 820 x 660 mm | | | |
| Max. efficiency | 97.8% | | | |
| Operating temperature | 0 to 40°C | | | |
| Weight | approx. 390 kg | approx. 530 kg | approx. 670 kg | approx. 820 kg |
| Protection class | IP 20 | | | |
| Communication | Modbus TCP/IP | | | |
| Topology | Transformer-free | | | |
| Certificates and standards | EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-2/4, EN 55011, EN 62477-1, EN 60664-1, IEC 60364, EN 61439-1/2, EN 50178, CE, VDE-AR-N 4110: 2018-11, VDE-AR-N 4120: 2018-11 | | | |

| Technical specifications battery | |
|---|--|
| Energy for each TS-I HV80 battery system (16 battery modules) | 76 kWh |
| C-rate | 1C |
| Cells | Lithium NMC prismatic (Samsung SDI) |
| Max. charging, discharging current | 94 A |
| Cell balancing | Active Battery Optimizer |
| Cycles @ 100% DoD 70% EoL 23°C +/- 5°C 1C/1C | 6000 |
| Cycles @ 100% DoD 70% EoL 23°C +/- 5°C 0.5C/0.5C | 8000 |
| Efficiency (battery) | Up to 98% |
| Selfconsumption (standby) | 5 Watt (without battery inverter) |
| Operating voltage | 761 to 930 V DC |
| Operating temperature | -10 to 50°C |
| Humidity | 0 to 85% (non-condensing) |
| Altitude of installation site | < 2000 m above sea level |
| Dimensions (H x W x D) | 1900 x 1200 x 600 mm |
| Certificates/standards | Cells IEC 62619, UL 1642, UN 38.3 Product CE, UN 38.3, IEC 62619, IEC 61000-6-2/4/7, BattG 2006/66/EC |
| Warranty | 10-year performance guarantee, 5-year system guarantee |
| Recycling | TESVOLT offers free return of batteries from Germany |
| Total weight | (16 battery modules, 2 racks) 823 kg |
| | Weight per battery module rack 36 kg 120 kg |
| Protection class | IP 20 |

Your certified TESVOLT specialist partner

TESVOLT GmbH

Am Heideberg 31
06886 Lutherstadt Wittenberg
Deutschland | Germany

TEL. +49 (0)3491 87 97-100

info@tesvolt.com

www.tesvolt.com



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 829877



EUROPÄISCHE UNION
EFRE
Europäischer Fonds für regionale Entwicklung