

ADVANCED ENERGY STORAGE



Industrial Battery Storage **SAS**

AERS
ADVANCED ENERGY STORAGE

Industrial Battery Storage SAS

360 kW | SCALABLE CAPACITY STARTING AT 290 kWh

Peak shaving accumulation station (SAS) is a set of technologies creating an energy source to meet the needs of a production plant or a commercial building

SAS is intended for managing of energy consumption peaks that occur during production facility operations or during power equipment start-ups in commercial buildings.

SAS provides reliable power backup for the operations of a production plant or a commercial building.

SAS station (peak shaving accumulation station) is developed as a mass modular station BESS (Battery Energy Storage System) for industrial production applications. The station is equipped for cooperation with rooftop solar production plants or with other renewable energy sources (RES).



INTERIOR SOLUTION



Czech Energy and Environmental Project, Construction, Innovation 2018

- Title of ČEP 2018 in the category of innovations
- The award of Technology Agency of the Czech Republic for the project of peak shaving accumulation station



▶ VIDEO SAS

The station is intended for operation in the following operating modes

- Reduction of reserved power (distribution of consumption within 24 hours).
- Management of ¼ hour peak.
- Protection and energy backup against outages that can cause significant production damage. Effective elimination of micro-outages.
- Power quality management and compensation.
- Maximizing the use of photovoltaic energy.
- Ready for spot market trading.

What applications are SAS stations designed for?



ACCUMULATION ENERGY BACKUP FOR PRODUCTION OPERATIONS

- Stabilisation (decrease) of operation's consumption diagram.
- Peak shaving and regulation of ¼ hour peaks.
- Operational backup of energy for technology (POWER UPS).



CHARGING STATIONS FOR ELECTRIC VEHICLES

- Container charging station for road service stations.
- Fixed accumulation station for charging electric vehicles within multifunctional buildings and urban areas (offices, shopping centres, companies).
- Container or fixed accumulation stations for companies planning possible charging of electric vehicles as a corporate benefit.



POWER STATIONS TO SUPPORT HEAVY INDUSTRY OPERATIONS

- Load balancing stations in the foundry industry.
- Active dynamically controlled compensation power stations.
- Mitigates influence of technologies on grid quality.
- Operational backup power for technology and IT.



DYNAMIC ENERGY BALANCING OF STATIONS

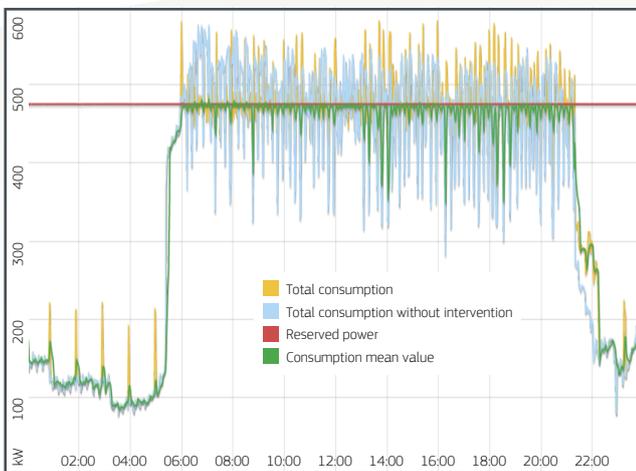
- Stations for wide deployment in distribution systems with collective control to limit the influence of local RES generation.
- Distributed quality regulators of LV and HV grids.
- Optimization of power distribution system parameters (active and reactive power flow control, improved voltage stability, harmonic distortion mitigation, flicker reduction).

PERFORMANCE AND OPERATIONAL FUNCTIONS

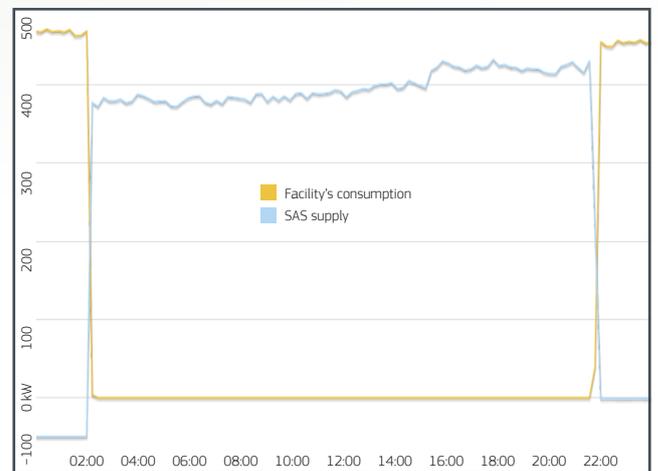
- ✦ **Regulating ¼ hour peak consumption and decreasing its reserved power:** In this mode the SAS station supplies energy from batteries while consumption from the grid is decreased. The station thus provides overall decrease of consumption fluctuations (peaks) and enables the plant operator to decrease the costs of reserved grid capacity. The units battery capacity is determined based on simulation calculations and invoice data from distribution system operator. The design of customer configuration thus provides stabilization of consumption diagram. By this professional approach towards project processing the following functionality is also achieved:
- ✦ **Eliminating penalties for exceeding peaks:** Rechargeable battery and power inverter are designed so that they provide shaving of peaks that were detected by consumption measurements in simulation and design calculations.
- ✦ **Monitoring and covering of micro-outages and irregularities in energy supply causing technology outages and shutdowns and to production interruptions:** Performance dimensioning of output inverter allows provision of power supply during very short-term outages in the distribution system. The station maintains the quality of the distribution system in compliance with ČSN EN 50160 standard. The capacity to provide adequate power quality regulation was confirmed in studies by UCEEB ČVUT and approved by ČEZ Distribuce.
- ✦ **Function of maximum storage of RES energy for investor's consumption:** The SAS station is equipped with the means working together with RES production plants, e.g. rooftop solar. Application of the SAS mass battery storage allows for increased self-sufficiency and use of RES energy for battery charging to provide other functions of the SAS station.

- ✦ **Power UPS for technology with transition to island mode:** SAS enables user's access to operating values using WEB interface. The station communicates with remote cloud database where processing and visualisation of current and historical values of facility's energy balance occur.
- ✦ **Function of power factor correction – $\cos(\varphi)$:** Progressive control of SAS station's power inverter enables utilization of its power reserve to provide the function of compensation of reactive power generated by operator's facility operation. For the purposes of compensation, the design and sizing of station's power and capacity is included in the design phase and customer preparation of the project.
- ✦ **BMS system + AcuBlock management:** The SAS station uses modern accumulator LiFePO4 volume cells with high current capacity that are equipped with our own BMS system designed by AERS. The BMS system has individual cells included in individual sets of 8 pieces, so called AcuPack, and provides permanent monitoring of all operational values. Serial accumulator battery consisting of individual AcuPacks is assembled into a basic AcuBlock capacity module. All BMS units that are part of AcuBlock are interconnected by industrial CAN communication bus with the main controlling BMS-Controller. Individual AcuBlocks can be further interconnected in parallel. BMS-Controller, the main control unit, provides communication with the main superior PMS system and power inverter and is equipped with power disconnecter of the relevant AcuBlock.
- ✦ **Web database dispatcher approach, data stored in the cloud:** Continuous data measurements are sent via Internet to the database application located on a cloud platform. SAS operator's authorized person can – through authorized access (name, password) monitor current operating modes and graphical visualisation of all monitored processes. The user's authorized person, based on the level of such authorization, can set individual operating values and modes.

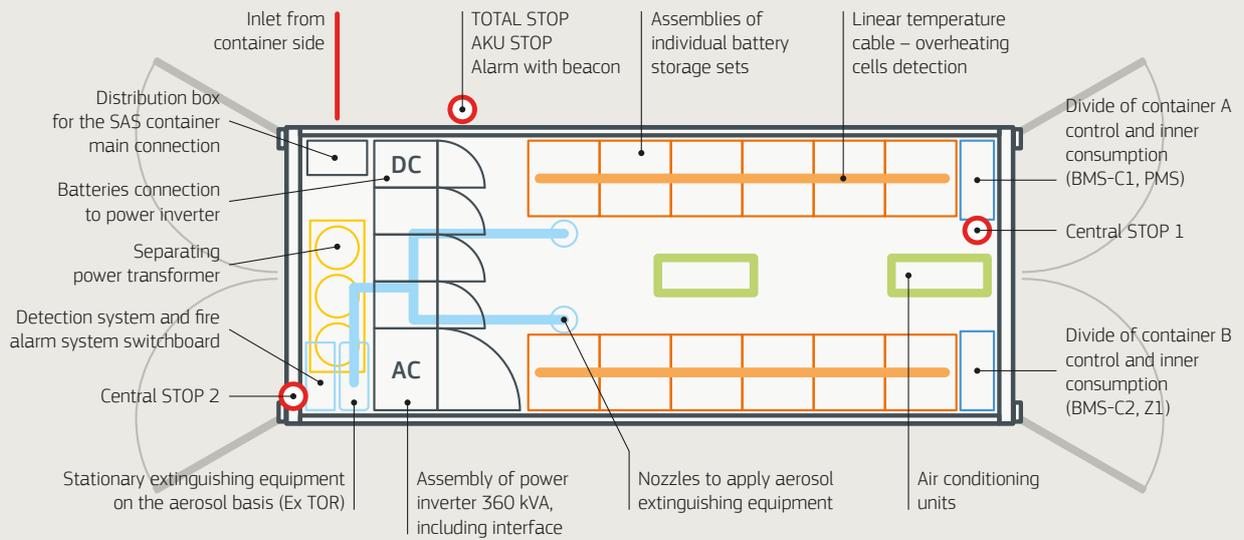
Peak shaving – safe decrease of agreed peak



Solving micro-outages – reaction time

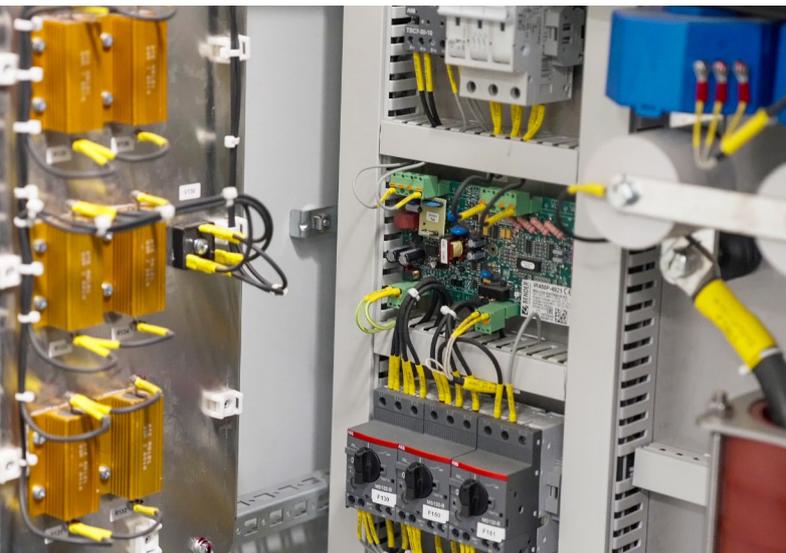


CONTAINER LAYOUT



Power supply 3+PE+N 230V / 400V 50Hz TN-C-S

Protection against hazardous contact with dead parts by automatic disconnection from the source as per ČSN 33 2000-4-41



CONTAINER CONSTRUCTION

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