



AVS Römer components ensure “cool” system solutions



Best Practice

Integrated thermal management in energy storage systems

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For energy storage systems to operate efficiently and reliably, one factor is crucial: optimally designed thermal management.

In liquid cooling applications, water or a water-glycol mixture typically circulates through the cooling circuit of the energy storage system as the cooling medium. This technology efficiently dissipates heat from the respective heat source and ensures defined operating temperatures throughout the entire system, enabling reliable and performance-optimised operation.



At a glance

The challenges

Modern battery energy storage systems are increasingly deployed under demanding operating conditions. High charging and discharging capacities, fluctuating load profiles and operation in compact enclosures or containers result in increasing thermal stress on the battery modules used. To ensure system performance and service life, a powerful, robust and flexible integrable cooling system was required.

Key technical requirements:

○ Temperature homogeneity

In addition to the maximum temperature, it is critical to ensure a uniform temperature distribution within the energy storage system. Significant temperature differences between individual modules can accelerate cell ageing and reduce usable capacity.

○ Dynamic load profiles

Energy storage systems often operate under highly variable load conditions. Therefore, the cooling system must respond quickly to peak loads, adapt flexibly to partial load operation and be energy-efficiently controllable.

○ Demanding environmental conditions

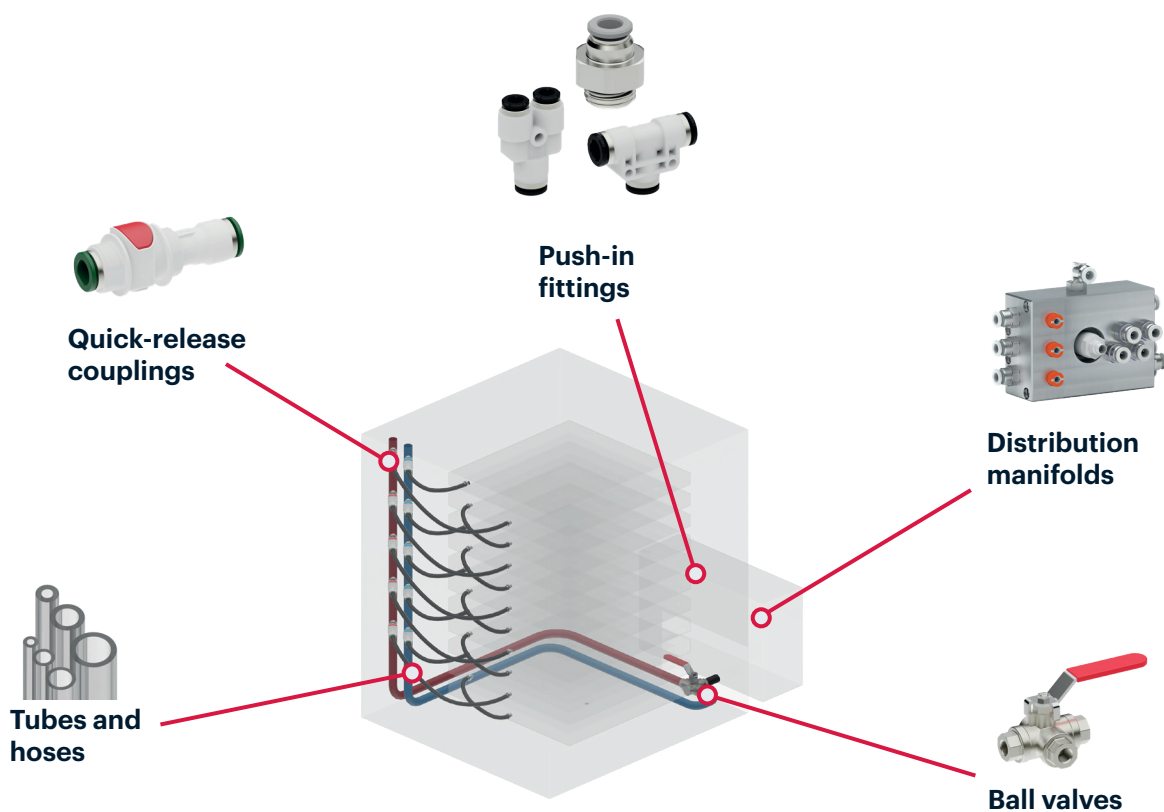
Many energy storage systems are operated in containers, control cabinets or outdoor environments. This results in the need for protection against dust and moisture, as well as corrosion and chemical resistance of the materials used.

AVS Römer offers an ideal portfolio of cooling technology components. Due to their robustness and high chemical and thermal resistance, the fittings and quick-release couplings are perfectly suited to meet these demanding requirements.

The solution

Targeted liquid cooling optimises the thermal balance and thus system efficiency. The resulting waste heat is efficiently dissipated and reused for heat generation. In contrast to air cooling, the temperature of the cooling liquid can be maintained at a constant level. The advantage: a stable battery temperature is ensured even during peak loads.

In close collaboration with the customer, AVS Römer provided a well-engineered package of components for the thermal management system. The entire liquid cooling system was jointly designed, tested and tailored to the specific application requirements. The AVS Römer components demonstrated their advantages effectively: easy integration and compact design, robustness and long service life, as well as high adaptability and proven performance in practice.



The conclusion

Integrating thermal management into energy storage systems significantly improves efficiency, reliability and sustainability. Liquid cooling is key to enabling energy storage infrastructure to operate at maximum performance.

As a system supplier, AVS Römer provides the entire cooling circuit from a single source. Interfaces are precisely defined and optimally adapted to flow rate and pressure requirements. With its extensive material expertise and many years of experience in liquid cooling, AVS Römer positions itself as a sustainable, innovative and reliable partner for thermal management system solutions in battery energy storage systems.

