290 kWh bess

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Built on the Volvo Group’s electromobility platform, the battery management system (BMS) helps the battery reach its full potential and longevity by protecting it from excessive degradation, maintaining optimal SOC, and optimizing charging cycles. The BMS also incorporates cybersecurity features to meet global cyber compliance requirements.

It is designed for easy integration with the BESS OEM’s energy management systems and SCADA infrastructure, to meet the demands of industrial applications. Given the substantial investment often required for BMS, the integration of this automotive-grade platform with battery technology aims to deliver operational reliability and value, while driving long-term efficiency and optimizing system performance.

The DC/DC unit converts the voltage from the batteries (600 V) into lower voltage (24 V) to auxiliaries. The auxiliary power required to maintain the subsystem functionality is provided by the onboard converter as soon as the system is started; in contrast to something that is plugged into the grid to power. This facilitates the batteries’ cooling requirement should a BESS featuring our subsystem is moving or in a location without grid connection.

The thermal management system in our BESS subsystem has been optimized for performance in tough environments, featuring pumps, radiators, active cooling and heaters. This dynamic system regulates battery performance, using active cooling in warm conditions and heating in colder climates to ensure fast, efficient energy charge and discharge.

The traction voltage monitoring unit monitors the HVIL and interrupts the system when violated. Other components as part of Volvo Penta’s BESS subsystem’s electrical safety include junction boxes, fuses, contactors, isolation monitoring (for fault detection), all of which is aimed at ensuring safe handling of energy storage.

Adapted from the Volvo Group, Volvo Penta’s DC interface is calculated to handle the configured load capacity and connected to the OEM’s inverter. Helping OEMs with cable sizing and dimensioning not only serves as right-fitting our BESS subsystem to better meet their application needs, it also serves as functional safety between our BESS subsystem and the OEM’s busbar*.

*High energy throughput typically generates heat, which is why it is important to Volvo Penta to run extensive testing to ensure the functional safety of our energy-dense BESS subsystem.

Adapted from the Volvo Group, the CAN interface has been extensively used in Volvo Penta’s in its combustion engine platform and later adapted for use in BESS.

Feedback on the system (both individual component level and overall system performance) to the OEM’s controller via the CAN bus using the J1939 communication protocol for reliable data transfer. If a component detects an issue (e.g., overvoltage, overheating), it can communicate the fault through the CAN bus, and the system can take corrective action, such as shutting down a battery module or adjusting the operating parameters.

The customer (BESS OEMs) will be responsible for the AC part of a BESS that includes the DC to AC converter (OEM interface), transformers, energy management system, AC switch gear (breakers, etc), OEM CAN interface and the external container shell(s).

Volvo Penta’s subsystem spans the DC Part of a BESS solution. This includes, but isn’t entirely limited to, the batteries, BMS, electrical safety, DC/DC converters, thermal management, CAN and DC interfaces.