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< Electrification & Power

AKASOL by BorgWarner

Charging Forward to Accelerate the World's Transition to E-mobility

The battery systems of BorgWarner's Akasol brand have been providing energy for multiple electrified commercial and industrial vehicles for numerous years. The modular approach does not only offer remarkable flexibility, scalability and safety, but also very high economic efficiency.

With very high energy densities on the system level and in our view the most compact liquid cooling, AKASOL battery systems have very low space requirements and emit only little heat. These are the ideal preconditions for long battery life with a high power output for safe, reliable and durable operation. Thanks to the modular design and free scalability of the AKASystem, we can tailor solutions to meet our customers' needs for bus, commercial, industrial, rail and marine applications.

AKASOL developed four types of high-performance lithium-ion battery systems and each type has

been designed to serve a specific application, adjusting characteristics such as cell type, cycle life and cost per kWh.

The AKASystem AKM CYC: More Energy for the Long Haul

The ultra-high-energy battery system AKASystem CYC uses the new cylindrical-cell battery modules with very high energy density. It is robust and scalable, and acquisition costs per kWh are comparatively low. In comparison to what current technology permits, this new technology will allow electric vehicles to increase their range by more than 60 percent. This system is developed for long-distance traffic such as buses using overnight charging facilities, intercity coaches and trucks.

AKASystem OEM PRC: Serial Technology for Various Applications

The latest AKASystem OEM lithium-ion battery system proves:

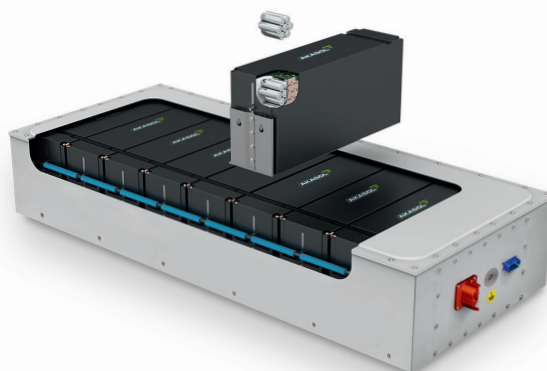
powerful, specifically adapted lithium-ion battery systems for commercial vehicles can be both high-quality and affordable at the same time. AKASOL is among the first in the world to offer a system that is compatible with the standardised PHEV modules of all major producers. This means that even commercial vehicles for series production are ideally equipped for their demanding tasks and, at the same time, remain flexible should the module supplier change at any point.

AKASystem AKM POC: High-End Technology for Heavy-Duty Performance

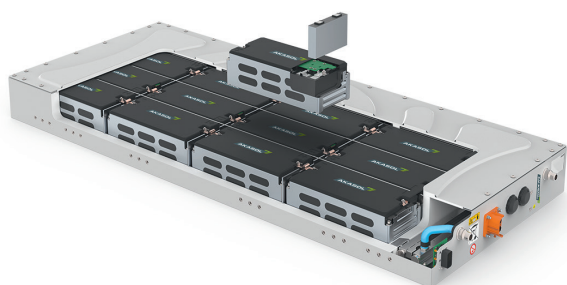
Hybrid and electric vehicles benefit from a liquid-cooled and freely scalable system that not only fulfils the highest safety standards, but also currently belongs to one of the most powerful battery solutions in the world. Robust, maintenance-free and fast-charging, the AKASystem AKM is ideal for use in commercial hybrid and electric vehicles with very high requirements when it comes to life cycle, performance and high system voltage.



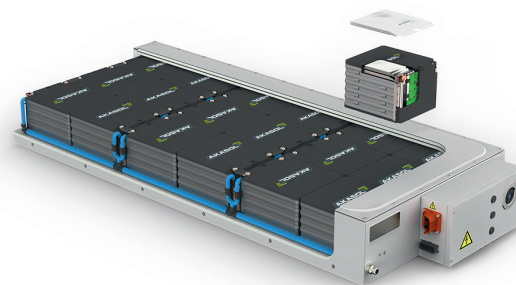
AKARack PRC



AKASystem AKM CYC



AKASystem OEM PRC



AKASystem AKM POC

AKARack PRC: The Flexible 48V Solution

The AKARack is revolutionary due to its characteristics – it offers very high energy and power density in combination with its flexible scalability. Thus, it is the ideal solution for applications in a power range from 5kW to approx. 50kW.

With 6.6kWh to 40kWh in stored energy, it is outstanding for use in industrial and construction machinery, such as small excavators or front loaders, as well as in the 48V on-board power supply system in commercial vehicles, and even for small boats. If an output of 50kW or even more energy is required, the 48V systems can also be operated as a AKASystem AKR PRC in parallel.

From Cell to System: Akasol's Test and Validation Centre

With the state-of-the-art test and validation centre at our Darmstadt location, we create optimal conditions for all new and further developments in the field of high-performance lithium-ion battery systems. From endurance tests, high and low-temperature tests in climatic chambers and tests of electromagnetic compatibility in the EMC chamber, to leakage and corrosion tests, and realistic functional, performance and aging tests: we make sure that our products meet all necessary standards to ensure maximum safety. Last year, we expanded test stands, technologies and the

necessary expertise to simulate a wide variety of environmental influences in our facility, where we conduct tests across all phases of development. For this purpose, we have state-of-the-art system test rooms, a continuous-running room for long-term tests, workshops with diagnostics areas for cells, modules and systems, and an electronics laboratory. With this broad portfolio of testing facilities, our test and validation centre covers nearly all major tests for our products, from the cell and module levels through to the completed battery system.



AKASOL

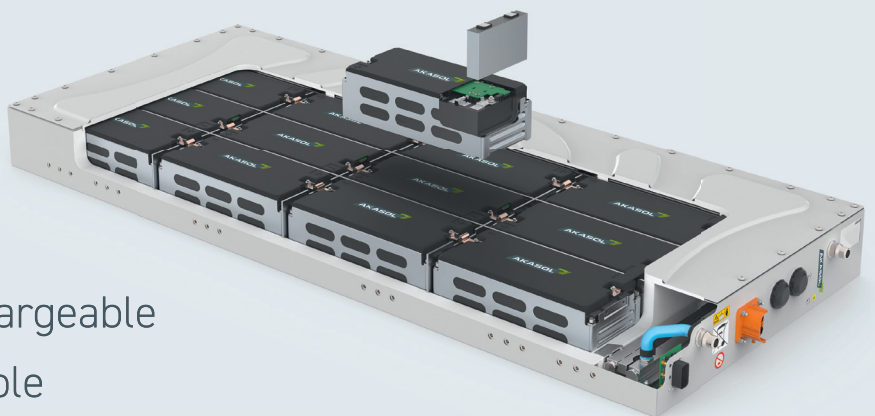


Electromobility for all.

High-performance battery systems for electric city buses from the market leader.

AKASYSTEM 15 OEM 50 PRC

- › 2nd generation with over 30 % more energy
- › Safe, robust, reliable
- › Automotive certified
- › Liquid-cooled and fast-chargeable
- › Modular and freely scalable



www.akasol.com

THE E IN MOBILITY

by  **BorgWarner**