



# Powering the Mobility of Tomorrow Today

The Battery Systems of AKASOL have been providing energy for a multitude of electrified commercial and industrial vehicles for numerous years. The modular approach followed by AKASOL does not only offer remarkable flexibility and scalability, but also the highest economic efficiency. In co-operation with ALSTOM, this proven technology will now be brought on to the railways,

bringing a highly efficient and environmentally friendly alternative power unit to yet another industry.

What started as an association of electrical engineering students practicing research and development at Technical University Darmstadt in 1990, was transformed into a company in 2008. Early on, the vision of alternative mobility concepts constituted the main incentive for conducting research and forging products ready for serial production out of it. This objective was achieved in 2015 when AKASOL

won series orders for two major European bus manufacturers. Since then, various orders have followed and leading to massive growth for AKASOL and paving the way for new serial production facilities, which opened up in Michigan (US), and Langen (Germany). Finally, in 2020, the company moved its headquarters to the newly built Gigafactory 1 in Darmstadt. The value created in those three plants exceeds the materialistic one represented by more than 4,500 series systems delivered to 84 customers globally; compared to the use of conventional combustion engines, 280t of CO<sub>2</sub> reduction will be achieved over the lifetime of all equipped CVs.

## The Advantages of a Systemic Approach

This success was achieved by a systemic approach: based on its AKASystems, AKASOL developed four types of automotive-certified high-performance lithium-ion battery systems that provide intelligent solutions to all areas of mobility. Each type has been designed to serve a specific application, adjusting characteristics such as cell type, cycle life, or cost per kWh to the respective needs. All of them share the ability to scale freely. Together with the model range that allows prioritization between ultra-high energy (AKM CYC), ultra-high power (AKM POC), the mean of power and energy (OEM PRC), and the use of a 48V system (AKR PRC), this means that no matter whether AKASOL battery systems are applied in bus, commercial, industrial, rail or marine applications – the modular design and free scalability of the AKASystem solution means it can be tailored to suit any needs. This

is also true for the liquid cooling system which was designed to require as little space as possible. With very high energy densities on the system-level, AKASOL can produce more power in less space while emitting only little heat. These are the ideal preconditions for the highest power output across a long battery life – a safe, reliable and durable operation.

## Expansion in Fuel Cell Powertrains

AKASOL has been involved in the development of traction batteries for trains for a decade. Co-operating with French railway technology specialist ALSTOM, this expertise has been particularly valuable: AKASOL's high-performance battery systems form the heart of the drivetrain of the globally unique Coradia iLint hydrogen train. It is the first emission-free alternative for diesel trains on lines that cannot be electrified at all or only with immense effort. While the

application of an AKASystem in a train is not a trailblazer's work, the combination with a hydrogen-powered power unit is. The use of two 3P AKASYSTEM 18 AKM battery systems once again accentuates the system's adaptivity. They sum up to a total capacity of 220kWh and use the energy recuperated when braking as well as the energy produced by the fuel cell. Not only to provide the power needed for propulsion but also to supply it to on-board systems like lighting and air-conditioning. In September 2018, the Coradia iLint started running successfully in a test phase. Since then, it has travelled more than 150,000km – safely, silently and emission-free. More than 40 of the trains will be delivered to transport associations in Germany in 2022, replacing diesel trains and thereby reducing noise and air pollution.

