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New platform for electrifying mobile working machines: Bosch Rexroth presents “eLION”

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As an end-to-end high-voltage portfolio, eLION includes a full range of electric motor-generators, inverters and accessories as well as tailored gearboxes, hydraulics and software.

- Developed specially for the challenging environmental conditions of off-highway applications
- Functional safety implemented in the inverter, in full in accordance with ISO 13849
- Scalable portfolio with a nominal power range from 20 to 200 kW (peak power up to 400 kW) in various sizes for applications in compact and heavy machines, for driving as well as for work functions



The modular and scalable Rexroth eLION platform for the electrification of mobile machinery includes motor-generators, inverters, gearboxes, software and accessories as well as matching hydraulics. (Image source: Bosch Rexroth AG)

Bosch Rexroth is expanding its capabilities in the off-highway segment. Under the name eLION, the company is presenting its wide range of 700 V components for the electrification of mobile working machines.

Machine manufacturers from all sectors have recognized that electric drives are an important building block for a future-viable, sustainable product portfolio. In order to support and encourage the electrification of off-highway machines, Bosch Rexroth is now presenting eLION, its comprehensive range of components for electrifying mobile working machines, as announced at bauma 2019.

At the official launch of eLION during a trade conference in Ulm in September 2021, Matthias Kielbassa, Vice President Electrification, presented the portfolio of components. In his presentation, he emphasized the three most important properties of the new product platform: scalability, robustness and functional safety.

Scalability thanks to a modular design

The electric 700 V eLION motor-generators from Bosch Rexroth cover a nominal power range from 20 to 200 kW (peak power up to 400 kW) and deliver nominal torques of up to 1050 Nm

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and maximum torque of up to 2400 Nm. They are available in four sizes with different lengths and winding configurations and, depending on the design, in a fast or standard-speed version. Over 80 configurations are possible, which means maximum design freedom for manufacturers when electrifying existing and new vehicle architectures.

To go with the range of motors, eLION also offers inverters in various power classes with up to 300 A continuous current and high overload capacity. The inverters support DC bus voltages from 400 to 850 V.

Gearboxes with high power density for hub and central drive configurations (eGFT and eGFZ) are also part of the eLION portfolio and allow compact drive units for a wide range of applications.

BODAS software modules are available for the entire eLION platform, along with matching hydraulic components such as axial piston pumps.

Other electrical components such as DC/DC converters, power distribution units, on-board chargers and high-voltage cables round off the range. As a result, manufacturers can rely on integrated solutions, irrespective of the energy source (e.g. hybrid or battery).

Newly developed components with a focus on operating conditions and functional safety

According to Kielbassa, the eLION developers rely on the company's own experience with electrical industry solutions and its comprehensive knowledge of the mobile working machine sector throughout the development process. On top of this, they take advantage of Bosch's wealth of expertise when it comes to electric mobility. Because all components are newly developed, there is no need for compromises in light of the harsh off-highway operating conditions. The eLION motor-generators and inverters are highly robust: both comply with the IP6K9K ingress protection requirements and can be used at a temperature range between -40 °C and 85 °C. The maximum temperature for the motor-generators is as high as 100 °C. The shock and vibration resistance of the eLION components is up to 50 g for shock and 10 g for vibration.

A particular focus during product development was on functional and electrical safety. Manufacturers and users benefit from inverter safety functions in accordance with ISO 13849.

Production to start in 2022

During pilot projects, OEMs such as Kalmar or Sennebogen have already gained positive experiences with eLION from Bosch Rexroth. Kielbassa is therefore looking forward to the market launch of the eLION platform which is due to take place in 2022. "The aim is to use our technology to create a future with higher efficiency, lower noise emissions and less air pollution. We have the right products at the right time and we're also helping our customers to strengthen their market position with future-viable mobile working machines."

Basic Information Bosch Rexroth

As one of the world's leading suppliers of drive and control technologies, Bosch Rexroth ensures efficient, powerful and safe movement in machines and systems of any size. The company bundles global application experience in the market segments of Mobile Applications, Machinery Applications and Engineering, and Factory Automation. With its intelligent components, customized system solutions and services, Bosch Rexroth is creating the necessary environment for fully connected applications. Bosch Rexroth offers its customers hydraulics, electric drive and control technology, gear technology and linear motion and assembly technology, including

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software and interfaces to the Internet of Things. With locations in over 80 countries, more than 29,600 associates generated sales revenue of around 5.2 billion euros in 2020.

Basic Information Bosch

The Bosch Group is a leading global supplier of technology and services. It employs roughly 395,000 associates worldwide (as of December 31, 2020). The company generated sales of 71.5 billion euros in 2020. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT provider, Bosch offers innovative solutions for smart homes, Industry 4.0, and connected mobility. Bosch is pursuing a vision of mobility that is sustainable, safe, and exciting. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to facilitate connected living with products and solutions that either contain artificial intelligence (AI) or have been developed or manufactured with its help. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiary and regional companies in some 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. With its more than 400 locations worldwide, the Bosch Group has been carbon neutral since the first quarter of 2020. The basis for the company's future growth is its innovative strength. At 129 locations across the globe, Bosch employs some 73,000 associates in research and development, of which nearly 34,000 are software engineers.

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