

Press release

## **E-mobility for commercial vehicles: Knorr-Bremse showcases turnkey product solutions for OEMs at IAA TRANSPORTATION 2022**

- **E-mobility is fundamentally transforming commercial vehicle architecture and many of the associated products**
- **Working closely with customers, Knorr-Bremse's eCUBATOR® innovation unit is adapting and developing modular e-mobility systems**
- **Knorr-Bremse is all about safe, quiet, energy-efficient products**
- **Knorr-Bremse supplies e-mobility products that are easy to integrate and ready for series production, such as the Electric Power Steering (EPS) system, e-compressors, and the SYNACT® family of modular disc brakes**

**Munich, September 15, 2022** – The mobility and transportation industry is asking commercial vehicle manufacturers and fleet operators for new strategies, concepts and products that meet the demand for e-mobility. Knorr-Bremse, the global market leader for braking systems and other rail and commercial vehicle systems, is providing commercial vehicle manufacturers with steady support as they make the transition. Knorr-Bremse will be presenting its strategy and product portfolio for the e-mobility transformation at IAA TRANSPORTATION 2022 in Hanover on September 20-25, 2022 (Hall 12, Booth C21).

Electric mobility will fundamentally change the architecture of commercial vehicles, as well as the system requirements it must fulfil. Bernd Spies, Member of the Executive Board of Knorr-Bremse AG and responsible for the Commercial Vehicle Systems division, sees Knorr-Bremse as a reliable partner for navigating this systemic transformation – a partner already deeply embedded in the commercial vehicle industry: “We’ve focused our mindset, business processes and product portfolio on e-mobility – and this includes taking responsibility for cutting energy consumption and carbon emissions. By leveraging our vast experience, we aim to adapt our existing product portfolio while simultaneously expanding our activities into new areas of business. We intend to pursue joint project opportunities with our customers by anticipating the system solutions and business models they’ll need in the future.” Knorr-Bremse’s Commercial Vehicle Systems division is already developing many new products that meet the requirements for electric commercial vehicles and contribute to achieving the “Zero Emissions” mission espoused by vehicle manufacturers and Knorr-Bremse alike.

### **New eCUBATOR® innovation unit**

Aiming to play a proactive role in this transformation, Knorr-Bremse has set up an e-mobility innovation unit, eCUBATOR®. The unit’s experts take a holistic, systems-based approach to developing innovative, intelligent solutions for electrically powered commercial vehicles. This is already opening up numerous opportunities for Knorr-Bremse to produce efficient, scalable technologies ranging from traction, braking and steering solutions through to power supplies. At the same time, Knorr-Bremse is already looking ahead to second-generation electric vehicles, which are expected to appear on the market starting in 2025. Key technologies here include energy management systems, electromechanical actuators, additional functions for drive and powertrain integration, and electronic braking systems.

### **E-mobility solutions: safe, reliable, quiet and energy-efficient**

Knorr-Bremse wants to make e-mobility sustainable – by supplying safe, reliable systems that support vehicle manufacturers’ electrification roadmaps while minimizing carbon, noise

and brake-dust emissions. Making rail and commercial vehicle operations safe and reliable is part of Knorr-Bremse's DNA. Knorr-Bremse has the expertise to ensure that systems comply with the highest safety standards, whether supplying power (redundant Power Management System), braking, or recovering energy (Electric Vehicle Motion Control). In the ongoing quest to improve commercial vehicles' energy efficiency, Knorr-Bremse is developing products that save and recover energy rather than simply consuming it. To reduce vehicle noise emissions, Knorr-Bremse supplies components with optimized noise and efficiency profiles, such as the Electronic Vane Module (EVM) and Electronic Screw Module (ESM). Iterative analytical and optimization processes help to improve the NVH (Noise, Vibration, Harshness) characteristics of, for example, wheel brakes. Knorr-Bremse applies the "best-fit" maxim to all developments: The various solutions must be adaptable, modular and compact so they are flexible and easy enough to fit into OEMs' vehicle architectures. Knorr-Bremse's e-mobility roadmap envisages optimal interaction between e-vehicles' braking and energy recovery systems, including full integration of wheel ends, eVMC and braking resistors. Thanks to the company's "first-to-market" approach, various pioneering products for e-trucks have already been successfully launched on the market:

### **EPS – Electric Power Steering**

With its all-electric EPS system, Knorr-Bremse offers a steering system that is fully redundant and fail-safe, hence a key enabler of e-mobility, Advanced Driver Assistance Systems (ADAS) and Highly Automated Driving (HAD). Because EPS systems are based on a modular approach, they are easy to integrate into applications for all categories of commercial vehicles, including ICE trucks. The power-on-demand principle behind these systems also enables customers to significantly reduce both energy consumption and carbon emissions.

### **EVM – Electrical Vane Module**

The Electrical Vane Module (EVM) consists of a rotary vane compressor combined with a compact electric motor. The quietest, most energy-efficient compressor on the market, the rotary vane compressor is scalable for electric vehicles with medium to low compressed-air requirements, and is scheduled for launch in 2023. The compressor owes its quiet operation to minimized vibration and a smooth, pulse-free air supply. With a compact, robust design for operating in temperatures ranging from -40°C to 80°C, the compressor features a thermal management system that keeps it running very efficiently over its entire speed range. Its efficiency is further enhanced by a permanent magnet electric motor with integral inverter.

### **ESM – Electric Screw Module**

The extremely reliable and efficient Electric Screw Module (a screw-type compressor combined with an electric motor) delivers impressively quiet performance in commercial vehicles with high compressed-air requirements, such as buses. The volumetric flow rate ranges from 230 up to 475 NL/min (rotary vane compressor: 180 to 300 NL/min; 330 NL/min up to 11 bar). The product characteristics are similar to those of the rotary vane compressor.

### **Wheel end – the modular SYNACT® family**

This integrated wheel-end unit comprises actuator, brake caliper, brake pad and disc. The robust disc brakes in the modular SYNACT® family are energy-efficient and easy to install, with sufficient flexibility to fit changing space requirements. Typical options include, for example, a more compact axial design or a radial cylinder arrangement. The optimized weight and dimensions of the wheel-end unit provide designers of electrified commercial vehicles with considerable freedom. The modular SYNACT® approach will also accommodate future solutions for minimizing brake-dust emissions and electrifying the braking system.

### **eVMC – Electric Vehicle Motion Control**

The eVMC software optimizes the longitudinal dynamics of electrically powered commercial vehicles, resulting in energy-efficient driving and stable handling. The eVMC achieves best-in-class energy recovery during braking maneuvers by optimizing the vehicle's existing brake blending strategy. To do so, the eVMC uses the vehicle dynamics monitoring function on both tractor and trailer to predictively determine the tractor-trailer unit's stability limits. Thus when the electric motor is running in generator-only mode, the system can achieve deceleration forces in excess of 0.2G. The motion control functions can be integrated into all new eDrive configurations anywhere in the world, from single, centralized electric motors to multi-motor layouts with axle-mounted or wheel-mounted drives on one or more powered axles. The eVMC will add these new functions to the Global Scalable Brake Control (GSBC) system.

### **rPMS – redundant Power Management System**

The redundant Power Supply System (rPMS) is a solution for safety-related systems. These include the Electric Power Steering (EPS) system in electrified commercial vehicles, as well as brake control systems, ECUs and sensors for automated driving. Two independent power supply circuits deliver fail-safe operation in highly automated commercial vehicles by ensuring that systems remain highly available.

### **eBRS – e-Vehicle Brake Resistor System**

The liquid-cooled, high-performance eBRS brake resistor system is a solution for providing an optimized, always-available braking function in commercial vehicles with electrified powertrains. The sustained-action braking function is permanently available, regardless of the battery's charge level, ensuring the latter is always protected. The fully integrated eBRS consists of brake resistor, ECU and high-performance electronics. It features high power density and scalability, as well as a favorable weight-to-volume ratio that makes installation in vehicles a smooth, efficient process. The system's high braking dynamics deliver an optimal balance between energy recovery and energy dissipation.

### **Where to find Knorr-Bremse: Hall 12, Booth C21**

Product innovations, efficient systems solutions, and sustainable business models that help commercial vehicle manufacturers to effectively manage their transformation within the transportation sector – this is what Knorr-Bremse has in store for trade visitors to IAA TRANSPORTATION 2022. In Hanover, Knorr-Bremse will present transparent, clearly explained demonstrations of technologies for automated driving, e-mobility, sustainability, connectivity and traffic safety. You will find Knorr-Bremse at IAA TRANSPORTATION in Hanover, Germany (Hall 12, Booth C21) on September 20-25, 2022.

**Caption:** IAA TRANSPORTATION 2022 in Hanover: Knorr-Bremse has focused the entire company and its product portfolio on new architectures for electrified commercial vehicles. | © Knorr-Bremse

**Knorr-Bremse (ISIN: DE000KBX1006, ticker symbol: KBX)** is the global market leader for braking systems and other systems for rail and commercial vehicles. Knorr-Bremse's products make a decisive contribution to greater safety and energy efficiency on rail tracks and roads around the world. About 30,500 employees at over 100 sites in more than 30 countries use their competence and motivation to satisfy customers worldwide with products and services. In 2021, Knorr-Bremse's two divisions together generated revenues of EUR 6.7 billion. For more than 115 years, the company has been the industry innovator, driving developments in mobility and transportation technologies with an edge in connected system solutions. Knorr-Bremse is one of Germany's most successful industrial companies and profits from the key global megatrends: Urbanization, Sustainability, Digitalization and Mobility.

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