

Press Release

IAA Transportation 2022

Truck powertrains of the future – Schaeffler electrifies commercial vehicles

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- Schaeffler develops high-performance electric motors for commercial vehicles that are over 97 percent efficient
- 800-volt power electronics delivers weight and cost savings for manufacturers
- Innovative thermal management system makes for shorter charging times

Schaeffler is developing high-voltage technology for tomorrow's electrified light and heavy commercial vehicles. Going forward, there will be more and more commercial vehicles with electric powertrains on the roads as truck manufacturers take steps to achieve a 15-percent reduction in CO₂ emissions by 2025, as mandated by the EU. Further reductions are mandated for 2030. "Without the transportation and logistics industry on board it will not be possible to meet the world's climate targets," said Matthias Zink, Schaeffler's CEO Automotive Technologies. Some 60 percent of all truck journeys are shorter than 500 kilometers and are therefore within the range achievable by battery electric trucks on a single charge. Electric trucks are also a zero-emission, low-noise goods transportation solution that will not fall foul of increasingly stringent inner-city vehicle entry restrictions. Another advantage that e-trucks have over trucks with internal combustion engines is the ability to recover energy in stop-and-go urban traffic. "The world needs innovative electrification technologies of precisely the kind provided by suppliers like Schaeffler," Zink said. To help with the transition to electrified powertrains, Schaeffler has developed a new and innovative product family of oil-cooled electric motors. These will be on display for the first time at the IAA Transportation 2022 in Hanover. The company will also be presenting its 800 V power electronics technology, as well as components and systems for thermal management in commercial vehicles.

New product family of electric motors, 800 V power electronics systems

Schaeffler's new high-performance electric motors are scalable, efficient, and extremely robust. Impressively, they have an efficiency of over 97 percent and a continuous drive power output of up to 300 kW – features made possible by an innovative oil cooling system developed by Schaeffler's electric motor specialists. Another key feature is the wave winding technology used in the stators. Schaeffler is one of only a handful of companies worldwide to have mastered this new winding

technology, which results in electric motors with very high power densities. “We will use our extensive expertise in electrified mobility to make a decisive contribution to the decarbonization of commercial vehicles,” said Dr. Jochen Schröder, head of E-Mobility at Schaeffler. Schaeffler is developing its electric motors in various scalable series to cover all power classes cost-effectively despite the comparatively low electric drive production volumes in the commercial vehicle sector. The motors will be used in on-road and off-road vehicles, fully electric and hybrid drives, and in both electric axle and central drive configurations. They are also specially designed to meet the lifespan requirements of commercial vehicles.

Schaeffler’s first e-motors for commercial vehicles will already go into production in 2023. This second product family of water-cooled 800 V motors delivers a maximum continuous output of 180 kW and generates a maximum torque of 950 newton-meters. These motors incorporate hairpin stator windings, which Schaeffler produces in-house.

To function and deliver maximum efficiency, electric powertrains also need power electronics. Schaeffler is developing power electronics units that are specifically tailored to the requirements of commercial vehicles. They are based on silicon carbide technology and designed for voltages of up to 850 V and effective currents of 600 A (peak load) and 400 A (continuous load). Occupying a volume of 12.4 liters, this technology achieves a space-saving power density of more than 40 kW per liter. All of the electrical and mechanical components are designed for the significantly higher mileages required of heavy commercial vehicles. The power electronics system can also be connected to the standard on-board vehicle power supply via a 24 V direct current connection.

Silicon carbide technology offers numerous advantages for commercial vehicle applications, including higher switching frequencies, improved heat dissipation, and high continuous output power. These advantages all add up to significantly improved electric powertrain efficiency. Simulations performed by Schaeffler show that a drive system comprising an electric motor, power electronics, and an axle drive is 2.5 percent more efficient when based on silicon carbide semiconductors in combination with an optimized gearbox than when based on conventional silicon semiconductors. In battery-electric long-haul trucks designed for a 500-kilometer range, this efficiency gain allows the truck manufacturer to reduce the battery capacity by 14 kilowatt-hours. This reduction in battery size corresponds to an 84-kilogram reduction in weight – and hence significant cost savings.

Thermal management is key

Effective thermal management is key to improving charging efficiency and protecting the battery when charging at higher power. “It can save fleet operators

money, because the shorter the charging time, the sooner the vehicle can get back on the road,” explained Jochen Schröder. Schaeffler is a pioneer in intelligent thermal management, having amassed significant expertise in this field over several decades. The company will be presenting its technology solutions for efficient temperature conditioning of drive systems and batteries in commercial vehicles at the IAA in Hanover. These solutions include a single smart valve regulator for decentralized coolant management. The regulator can manage individual coolant flows for the battery, power electronics, motor, or transmission. This customizable and decentralized arrangement allows truck manufacturers considerable freedom in their system architecture. It also means that different coolant regulation strategies can be configured separately for different vehicle operating conditions, such as fast-charging, cold start, city traffic, and hill-climbing. As well as this technology, Schaeffler offers integrated systems for all commercial-vehicle coolant functions. These systems comprise the coolant regulator, electric water pumps, sensors, and an intelligent controller, bringing manufacturers the benefits of compact, space-saving design.

Schaeffler at IAA Transportation 2022, Hanover

This year Schaeffler will be making its first appearance as an exhibitor at IAA Transportation, the world’s leading platform for the transportation and logistics industry. The company will be presenting a range of drive and chassis solutions.

You will find Schaeffler **at Booth B37 in Hall 12** and at **Booth U47** on the open-air site.

Press conference: Monday, September 19, 2022, 3:45 – 4:00 p.m. CEST, booth B37, hall 12

IAA Conference: Tuesday, September 20, 2022, 4:30 – 5:15 p.m. CEST, panel discussion featuring Matthias Zink, CEO Automotive Technologies at Schaeffler.

Please find press images of Matthias Zink here: www.schaeffler.com/en/executive-board/

Schaeffler Group – We pioneer motion The Schaeffler Group has been driving forward groundbreaking inventions and developments in the field of motion technology for over 75 years. With innovative technologies, products, and services for electric mobility, CO₂-efficient drives, chassis solutions, Industry 4.0, digitalization, and renewable energies, the company is a reliable partner for making motion more efficient, intelligent, and sustainable – over the entire life cycle. The Motion Technology Company manufactures high-precision components and systems for drive train and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications. The Schaeffler Group

generated sales of EUR 16.3 billion in 2023. With around 83,400 employees, Schaeffler is one of the world's largest family-owned companies and one of Germany's most innovative companies.

Schaeffler's new high-performance electric motors have an efficiency of over 97 percent and a continuous drive power output of up to 300 kW. Photo: Schaeffler (Jung von Matt)

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To function and deliver maximum efficiency, electric powertrains also need power electronics. Schaeffler is developing power electronics units that are specifically tailored to the requirements of commercial vehicles. Photo: Schaeffler (Jung von Matt)

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The single smart valve regulator can manage individual coolant flows for the battery, power electronics, motor, or transmission. Photo: Schaeffler (Jung von Matt)

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