

Press release

Stuttgart, July 04, 2022

MAHLE develops the most durable electric motor

- Superior continuous torque (SCT) E-motor can run indefinitely with high performance
- Technological leap through a new cooling concept—compact, light, efficient, and, by customer request, without the use of rare earth elements
- Suitable for passenger cars, commercial vehicles, construction machines, and tractors
- MAHLE becomes a full-range provider in the field of electric drives
- Presentation of the new SCT E-motor at IAA Transportation 2022

The automotive supplier MAHLE has developed the most durable electric motor available. The traction motor, which is unique on the market, can run indefinitely with high performance. A new cooling concept makes this technological leap possible. The new electric motor is surpassingly clean, light, and efficient and can be assembled without the use of rare earths by customer request. The new development is suitable for passenger cars and commercial vehicles as well as construction machines and tractors. With the SCT E-motor, MAHLE thus becomes a full-range provider in the field of electric drives and covers all needs from e-scooters to heavy-duty commercial vehicles as well as off-road and industrial applications. The new item will be presented for the first time at IAA Transportation in September 2022 in Hanover.

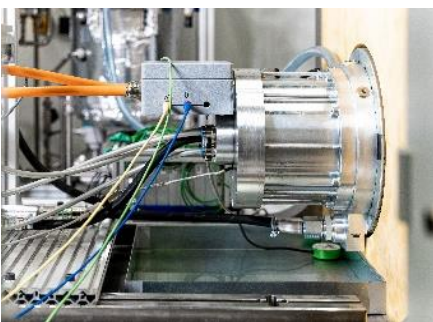
“Building large electric motors that deliver short-term high performance is easy. What was still lacking on the market until now were durable yet compact drives to make electric vehicles unrestricted for everyday use,” said Martin Berger, Vice President Corporate Research and Advanced Engineering at MAHLE. “Our new SCT E-motor is the solution.”

On the drivetrain side, this clears the way for the replacement of the combustion engine in all vehicle classes. In 2021, MAHLE presented a groundbreaking wear-free and scalable traction motor for passenger cars that runs very efficiently over a wide rpm range.

The SCT E-motor, on the other hand, is designed in such a way that it is particularly efficient within a certain rpm range. Despite its very compact and light design, its continuous output is more than 90 percent of its peak output. Unique on the market, this groundbreaking high ratio means a technological leap and allows the use of electric vehicles of all kinds even under demanding conditions. A classic example is driving an electric truck over mountain passes or the multiple sprints of a battery electric passenger car. These scenarios are only insufficiently covered by the electric motors available on the market up to now.

This resilience is achieved by the new MAHLE electric motor through the use of an innovative integrated oil cooling, which not only makes it more robust but also allows the waste heat generated to be used in the vehicle's complete system. At the same time, the extremely compact design results in an advantage in the costs of materials and weight—a lighter motor requires less material during manufacture and increases the possible net load in commercial vehicles.

In designing the product, MAHLE opted for what is known as a permanently excited motor, since this type enables a very compact design and no energy has to be transferred to the rotor as “excitation current”. This makes the motor efficient and wear-free. Neodymium magnets, currently the strongest permanent magnets that can be produced, are used to generate the magnetic field in the motor. However, to achieve greater independence from raw material prices and geopolitical developments, the SCT E- motor can also be designed without magnets for greater independence. Thanks to the unique contactless transformer developed by MAHLE, the magnet-free variant would also be wear-free and run efficiently, while only requiring slightly more assembly space.



Compact endurance athlete —the new SCT E- motor by MAHLE on the test bench.



Impressive: Innovative cooling prevents overheating – even during continuous operation with 90 percent of the motors peak performance.

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About MAHLE

MAHLE is a leading international development partner and supplier to the automotive industry with customers in both passenger car and commercial vehicle sectors. Founded in 1920, the technology group is working on the climate-neutral mobility of tomorrow, such as fuel cells and hydrogen motors, with a focus on e-mobility and thermal management as well as further technology fields to reduce CO₂ emissions. MAHLE already generates over 60 percent of its sales independently of the passenger car combustion engine. This should increase to 75 percent by 2030. Today, one in every two vehicles globally is equipped with MAHLE components.

MAHLE generated sales of around EUR 11 billion in 2021. The company is represented with over 71,000 employees at 160 production locations and 12 major research and development centers in more than 30 countries. (Last revised: 12/31/2021)

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