



Press Release

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Emission-Free Sweeping

Baumüller has developed a compact drive system for a multifunctional municipal vehicle

Baumüller has developed a compact drive system with a very high level of energy efficiency for a fully electric municipal vehicle. The vehicle is designed in series production for a speed of up to 80 km/h and has a range of 100 kilometers. An emission-free, environmentally-friendly and low-noise multifunctional municipal vehicle has been created in conjunction with other companies. It can be used with interchangeable attachments for various municipal cleaning and maintenance work, for example as a sweeper, snow plow or loader.

The joint development with the companies Cosyst Control Systems GmbH, blz – Bayerisches Laserzentrum GmbH, Polyplast Sander GmbH and SMS Engineering GmbH was supported as a funded project by the Bavarian State Ministry of Economic Affairs and Media, Energy and Technology. The project sponsor is Bayern Innovativ.

Electric Axle for Rear and All-Wheel Drive

The compact drive system from Baumüller consists of two fully electric drives, each of which is mounted to the vehicle's rear axle. Alternatively, an all-wheel drive can also be used instead of a rear-wheel drive. The drive system consists of a Baumüller DSA synchronous external rotor motor with an integrated converter, power electronics as well as a planetary gear and was specifically developed for this funded project. The planetary gear is located in the rim of the rear wheel and is directly connected to the drive system. This has the advantage that there are fewer transmission losses, since an additional drive train, such as a cardan shaft, drive shaft or differential, is not necessary. Additional advantages of the compact drive system are increased application flexibility and improved driving comfort. In addition, the drive is very capable of handling overload, i.e. gradients of up to 18 percent can easily be managed.

The special feature about the rugged newly designed DSA motor with a rated output of 18 kW is the winding switchover. This allows an automatic gear change of the municipal vehicle from a working gear to a high-speed gear. The switchover makes it possible to achieve different torques and speeds, which are automatically adjusted to the application area and speed via the motor controller developed by Baumüller. This means that in the first stage, the working gear, i.e. when sweeping or mowing, a doubled rated torque is achieved at only half the speed. This level is used for speeds of 40 km/h or less. The energy source is not burdened with large currents here, which allows for a greater range and a longer operating duration than before. With the second stage, the high-speed gear that permits speeds of up to 80 km/h, a simple rated torque is generated and the full speed is reached in the process. Despite the higher speed, the power requirement still corresponds to that of the first stage. The degree of efficiency also remains very high, thus allowing for greater range and a longer operating duration.

The installation space of this electric axle (motor and converter) was optimally adapted to the installation conditions in the vehicle due to its small dimensions of nearly 414 mm in length and 300 mm in diameter.

Comprehensive Safety Concept

Baumüller uses CANopen for this purely electrically-operated vehicle for the fieldbus communication and thus to connect the control system. The mutual monitoring of both drive controllers of the b maXX series as well as all key safety measures affecting the drive were also realized.

Energy Recovery Included

The fully-electric municipal vehicle with a length of 3.40 meters and a width of 1.40 meters can generate energy when braking and driving downhill, which is then fed back into the three battery modules, each with 8.5 kWh. This also improves the range and energy balance. The vehicle has a range of about 100 kilometers.

Plenty of Expertise in the E-Mobility Industry

Baumüller utilizes decades of experience from motor development as well as the production of electric motors and for over ten years has been offering energy-efficient components and complete solutions for hybrid and fully-electric drive systems. The low-noise and low-emissions drive solutions are used, among other things, in hybrid agricultural machines, tracked vehicles or fully-electric city buses and municipal vehicles, just to name a few examples.



Fig. 1: Baumüller has developed a compact drive system with a very high level of energy efficiency for a fully electric municipal vehicle. The vehicle is designed in series production for a speed of up to 80 km/h and has a range of 100 kilometers



Fig. 2: The electric axle developed by Baumüller as a drive system is in duplicate on the rear axle or 4-fold with all-wheel drive. It consists of a Baumüller DSA synchronous external rotor motor with planetary gear and integrated line electronics with motor controller and converter



eTruck – Drive solutions for electric commercial vehicles
<https://youtu.be/nl8l-1E99bA>



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Baumüller is one of the leading manufacturers of innovative automation and electric drive systems. At six manufacturing locations and over 40 subsidiaries spread all over the world, 1,750 employees plan, develop, produce and install intelligent system solutions for mechanical engineering and e-mobility; from operation and visualization tools to Motion Control software as per PLCopen, from software modules to controllers, also including converters, electric drives and the whole service range for ready to use automation solutions. The areas service, installations, fitting, and relocation add to the wide range of Baumüller's services. In the mechanical engineering industry, Baumüller is one of the leading partners for automation solutions worldwide.

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