

electric drive solutions




SCHABMÜLLER
the power of e-motion

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Drive solutions made in Germany

Schabmüller has been supplying the world with highly advanced electrical drive solutions since 1924. We develop, design and produce modern electrical drives and generators in PM synchronous, induction and direct current technology for mobile equipment.

Our products are customized to meet each customer's requirements exactly. We can therefore offer a complete spectrum of drive systems for a large range of applications, including:

application in fields where operating conditions are harsh and very high efficiency coupled with utmost reliability and serviceability are paramount requirements. It's therefore no surprise that we supply solutions to a wide range of industries, and our clients include many of the world's most famous companies.

Our goal is to provide the most technically advanced, high-quality mobile equipment possible for your specific applications. Eighty years of expe -



- Complete hybrid systems with generators and motors, optimized for high energy efficiency
- Traction, pump and steering motors for battery-driven vehicles
- Motors for ship propulsion and steering

The Schabmüller Company's drive solutions are based on a broad portfolio of base products in a wide variety of sizes and powers. Often these find

rience and over 2.5 million drive systems already installed, coupled with the innovation of a modern company and highly trained and motivated employees, makes us the most successful specialized drive company in the marketplace. This combination of innovation and profound experience means that you benefit from state-of-the-art technology that is proven in practice and meets all relevant norms and standards.



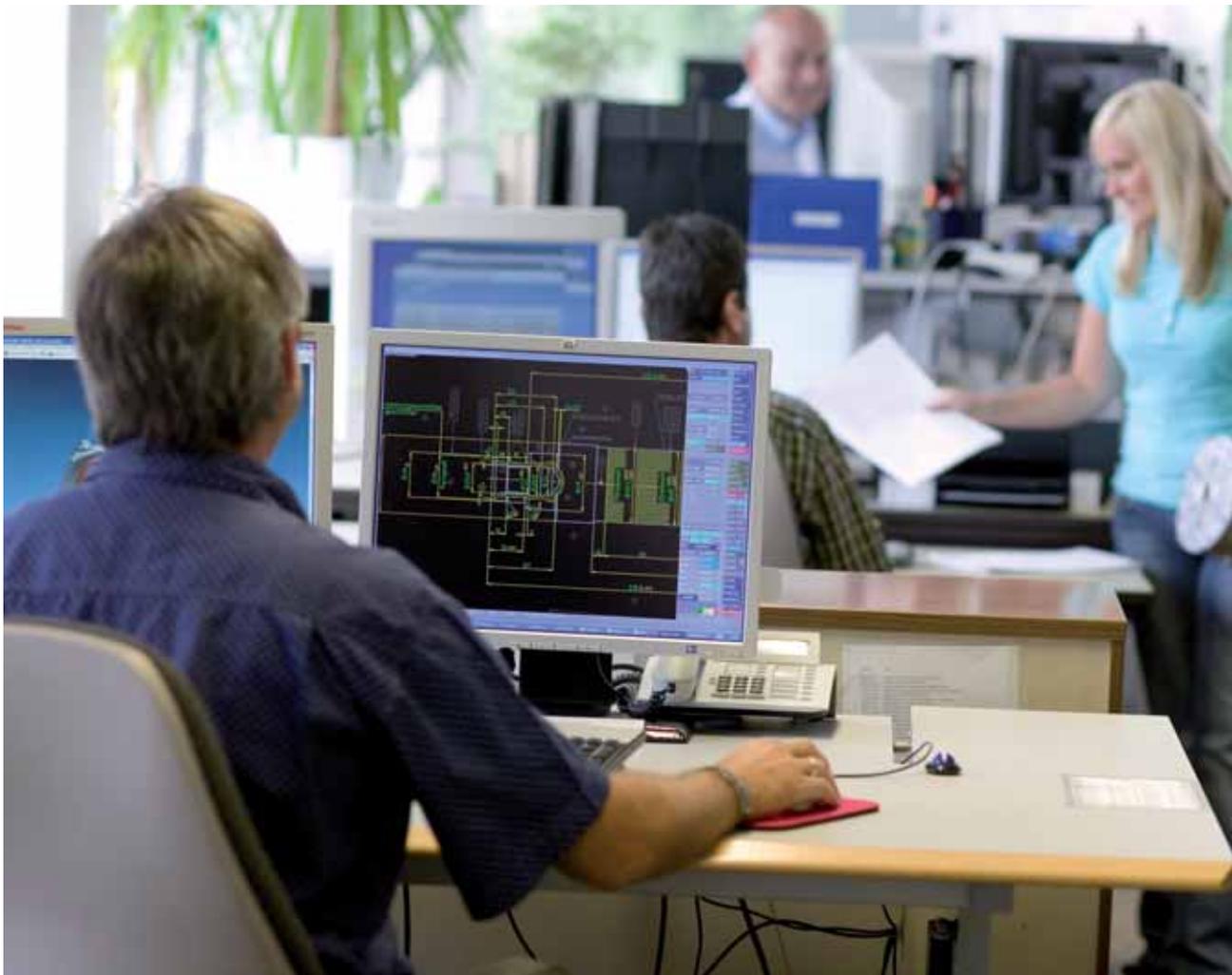
We're dedicated to traditional values – and to innovation

Located in the heart of Bavaria – Germany's high-tech industrial powerhouse – Schabmüller is perfectly situated to take advantage of the top-flight engineering capabilities available. Our headquarters boasts a highly skilled and well-organized team of scientists, technicians and engineers who further develop our products and design new solutions for customers.

the electric drive market.

Whatever the field of application, we are involved in our customers' projects right from the very beginning as a partner. This allows us to perfectly match all components such as the motors, electronics and mechanics to customer needs.

Using proven tools such as FEMAG and 3D-CAD, the



Our innovative power in this field can be seen in unique Schabmüller developments that include gearless drives, ultra-efficient torque motors and drives whose speed sensors can be replaced externally. With our hybrid drive components such as motors, generators and complete hybrid drive systems, we supply the most innovative products on

development team can quickly design and modify the drives requested, so that within a few weeks of the specification of the motor, first samples and prototypes are already being assembled, and testing in our well-equipped laboratory has commenced.



We're committed to quality – and to the environment

As a company well known for its high-quality products, Schabmüller is justifiably proud of its “Made in Germany” badge. And we make sure it stays that way.

We continuously monitor and improve our processes through the diligent use of ISO 9001 certified processes and employ TS 16949 quality management tools that ensure our processes are clear

our high quality level and keeping our delivery performance up to the expectations of our customers.

Our internal commitment to quality goes hand-in-hand with the company's stated goal of effectively protecting the environment – reflected in both the solutions we design and the sustainability of our production processes. Already certified to Bavarian Government standard, and with certification to



and transparent at all stages – an important commitment for a company that works in such close partnership with its customers.

We set the standards within our field of business – even our suppliers are integrated in the quality assurance process, and are monitored and audited frequently. These tools are critical in maintaining

ISO 14001 in progress, we place a great deal of emphasis on ecological issues. Although we already fulfill high standards with regard to energy efficiency and environmental compatibility, we pay permanent attention to this process.



the power of e-motion



Service keeps us ahead – and our customers satisfied



Schabmüller motors are well known for their high efficiency and extreme durability. This, together with our renowned on-time delivery, has made us a byword in reliability for our customers. And so it is only to be expected that a company that places quality at the core of its operations offers total support and a complete range of service products to our customers.

The Schabmüller team is not only responsible for solutions from development and production through to the application; it has the duty of developing modern concepts and strategies for preventive service and maintenance.

The professional organization tasked with delivering service is the Schabmüller Customer Service Center. This operation is set up to supply spare parts, exchange motors or perform repair jobs on site – wherever that site may be. It is fully equipped to handle everything that a service strategy meeting today's customer demands requires:

- Spare parts
- Preventive maintenance
- Machine improvement in application
- Expertise and problem analysis
- Fault clearance, repairs
- Reproduction of machines
- Instruction and training



Schabmüller solutions keep equipment moving

Product spectrum:

- Generators and motors for hybrid systems
- Induction and PM synchronous motors
- DC – Direct current motors
- Integrated drive systems

This page shows just a few of the industries in which Schabmüller products play a valuable role.



Material handling

Motors for propulsion, lifting and steering (AC and DC) and integrated systems like motor-in-wheel-drives

Agricultural machines

Auxiliary motors (e.g. cooling, fan) and generators for electrical power conversion up to complete hybrid systems



Boat applications

Propulsion motors with diesel-engine coupling and efficient DC-/AC-bow thrusters for effective steering

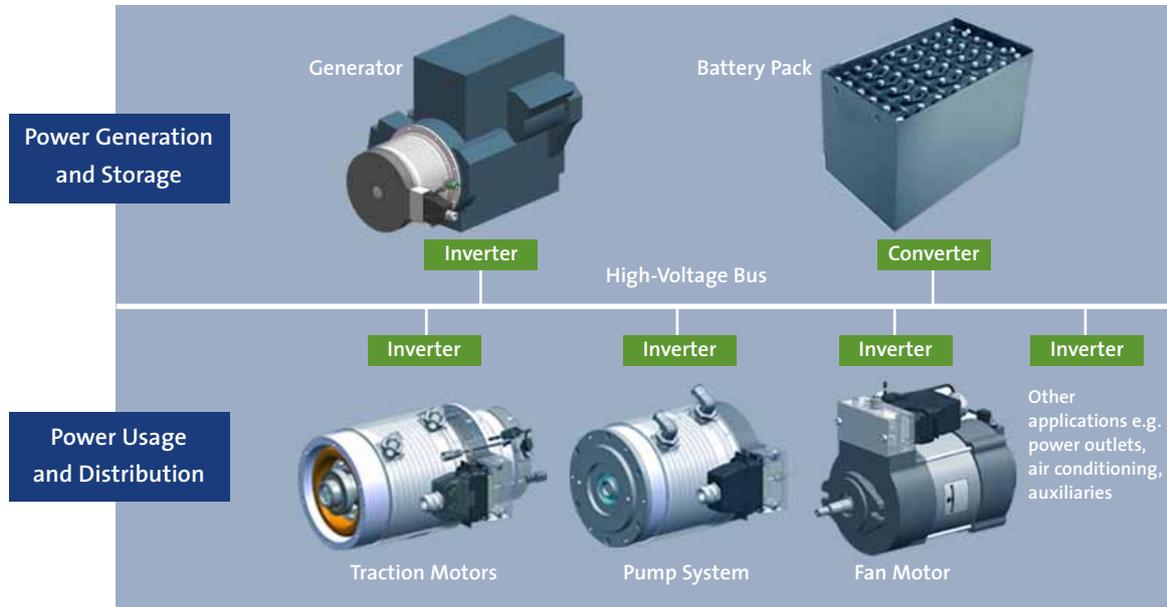
Construction machines

Induction and permanent magnet machines for main or auxiliary power units as well as generators for diesel-electric systems and hybrid concepts





Generators and drives for hybrid and diesel-electric systems



Environmental issues and application demands are dramatically boosting the use of hybrid systems. A significant saving of fuel can be achieved through optimized diesel-electric systems based on downsized combustion engines using an automatic start-up function and the reuse of energy (e.g. charging batteries when decelerating a vehicle).

Schabmüller offers complete hybrid/diesel-electric systems, consisting of:

- Efficient permanent magnet generators (either directly attached to the combustion engine or coupled with gears or belts)
- Traction, pump and auxiliary motors in various sizes and power ranges

An optimized hybrid system can only be designed by taking an integrated view of all components and adapting the system to the duty cycle of the

vehicle concerned. In such projects, we involve our cooperation partners (e.g. those responsible for electronic development) at a particularly early stage in the project.

Examples include:

- Replacement of a diesel-hydraulic system by a diesel-electric system in a skid-steer loader (generator, traction, pump and fan motors)
- Integration of a generator into an existing tractor engine/gear system (generator and fan motor)
- Replacement of a belt-driven alternator by a high performance generator in trucks and busses (generator and fan motor)
- Implementation of a direct drive unit into a forklift truck (including reuse of braking energy)



■ Induction and PM synchronous motors

Due to their compact design and the lack of wearing parts, induction and PM synchronous motors are widely used in the field of battery-driven vehicles. Based on more than 15 years of experience in this technology, we offer induction and PM synchronous motors that are both durable and optimized. With their externally exchangeable speed sensors and high quality production, our motors are literally indestructible.

Schabmüller offers a wide range of tailor-made induction and PM synchronous motors:

- Nominal voltage: 12 to 450 Volt
- Output power: up to 150 kW
- Speed: up to 10,000 rpm
- Outside diameter: 106 to 400 mm
- Optional pump units attached
- Optional brakes attached
- Different electrical configurations
- Integrated speed and thermal sensors
- End shields and shafts according to customers' requirements

Induction and PM synchronous motor applications:

- Generators
- Traction motors for battery driven vehicles
- Traction motors in hybrid systems
- Pump units for hydraulics
- Steering motors
- Fan and auxiliary motors





■ Direct current motors



Our DC motors show their unique capabilities in a wide variety of applications. Because of their high power density, the machines are particularly compact. Another well-known feature is that DC motors are especially easily controlled and furthermore, they possess high starting torque and extraordinary long brush lifetimes.

Our wide range of tailor-made DC motors is second to none:

- Nominal voltage: 12 to 80 Volt
- Output power: up to 50 kW
- Speed: up to 4,500 rpm
- Outside diameter: 80 to 325 mm
- Optional pump units attached
- Optional brakes attached
- Different operational modes (S1, S2, S3)
- Integrated thermal sensors
- End shields and shafts according to customers' requirements



DC motor applications:

- Traction motors for battery driven vehicles
- Pump units for hydraulics
- Steering motors
- Bow thrusters for yachts





■ Integrated drive systems

Schabmüller has been the market leader in the field of integrated drive systems for decades. Our products are widely used in AGV (automatic guided vehicles) applications and are to be found in production facilities throughout the world. Especially in this field of business, high reliability and durability of the drives is of utmost importance.

We base our drive systems on standardized modules and customize these to your individual requirements. With the highly-developed induction and DC motors fitted into one integrated unit together with gear, steering and controller, Schabmüller's products have repeatedly proven themselves as the optimum solution.

Different basic concepts are available:

- Motor-in-Wheel drives
- Direct/gearless drives
- Vertical drives
- Axles
- Customized solutions

We are able to cover wheel loads up to 4,000 kg and wheel diameters up to 406 mm with these products. The range of performance is up to 10 kW with operating voltages from 12 to 80 volt.



SCHABMÜLLER – DRIVE SOLUTIONS MADE IN GERMANY

- HYBRID SYSTEMS
- INDUCTION AND PM SYNCHRONOUS MOTORS
- DC MOTORS
- INTEGRATED DRIVE SYSTEMS
- WORLDWIDE SALES & SERVICE

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