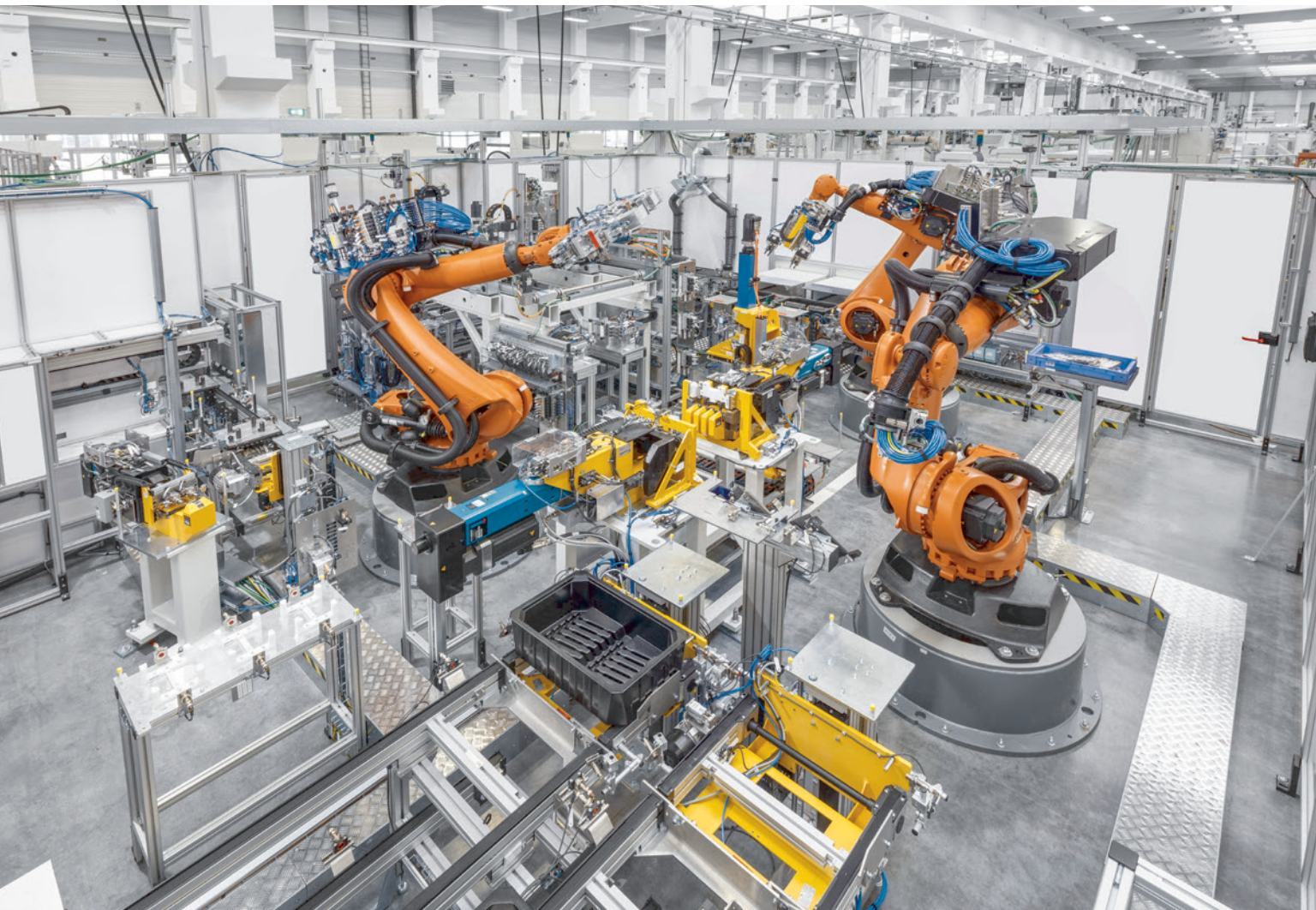


# Mass Production

## Experience and ingenuity fuel GROB Systems work in electrification and e-Mobility

Matthew Jaster, Senior Editor



*Battery module assembly. All photos courtesy of GROB Systems.*

GROB has always been synonymous with the development and manufacturing of machines and production lines. Its machining centers, including the Universal line, feature unique retractable spindles and a wide range of automation capabilities. Noteworthy, is the fact these machines are built right in Bluffton, OH. My visit to the company's booth during the last IMTS in Chicago, however, uncovered an electrification and e-Mobility strategy 10+ years in the making suitable for both our *PTE* and *Gear Technology* audiences.

"We have been pioneers in designing and building the world's first highly automated, mass production assembly equipment for manufacturing hairpin stators. We essentially developed the technology from scratch more than 10 years ago and since then have delivered over 80 production lines to customers worldwide," said Thomas Neubert, chief sales officer, GROB Systems Inc., Bluffton, OH. "In addition, we are continuing our R&D, as we always push further to be the leader in advanced technologies. Next, we developed assembly systems for rotors, drive units, battery packs and modules, and most recently machines for battery cell manufacturing."

Nearly every American car builder (established and pure EV companies) use GROB equipment for some of their e-Mobility production, according to Neubert.

“Most of them engage in strategic partnerships with us, and we co-develop products that go into cars and the equipment. This not only results in shorter time to market for our customers’ products, but also streamlines manufacturing processes that are cost-optimized, proven and highly reliable. Our customers highly value this synergistic approach,” he said.

## Challenge and Opportunities

There are two main challenges in building/developing machines for the manufacture of stators and rotors. “One is obviously the development cost for equipment, technologies and processes that have not previously existed for mass production. This is very capital intensive, and in my opinion, can only be managed by a company structured like GROB that does not pass on the development cost to customers,” Neubert said.

The second challenge, and this is probably a tougher one, is this technology is constantly evolving. Neubert said this is both challenging and exciting. Changes in materials, new ideas and formats are only a few of the things that make developing standardized equipment difficult. This is especially true for battery products, where everything, down to cell chemistry, is in a constant flux to improve.

“For example, this means that a station concept that worked for one project will not be applicable in another. But most of the time, changes are even more frequent, which makes designing stations/ equipment a huge challenge. The station design must be constantly updated according to product changes, yet the original, strict deadlines need to be adhered to. This is an incredible challenge that is only overcome through very close communication and collaboration between GROB and our customers.

Additionally, every customer is looking for a way to differentiate themselves from their competitors, so there is a whole range of different products. Luckily however, most of the core processes are similar.

## Electrification Realized

Neubert strongly believes e-Mobility is the future and a more sustainable way of transportation. Therefore, GROB Systems not only builds the equipment for such products, they “live” it.

In its “Electric Trucks for Company Transport” pilot project, GROB shows that trucks with an electric drive are already commercially viable, at least over short distances, while taking another step on the path towards the long-term reduction of carbon emissions by GROB.

“On one hand we invest in the usage of renewable energies and support moving forward to carbon neutrality. On the other hand, we promote the use of electric vehicles at GROB and our transportation/logistics partners. We use electric semi-trucks for the transportation of material between our global headquarters located in Mindelheim, Germany and Ulm, Germany, about 52 miles away. The semi-trucks which use electrical propulsion take this route multiple times a day without problems. Having worked in our China operations for five years, I can tell you we also use electric trucks for transport between our two plants in China, which are directly operated by GROB,” Neubert said.

Additionally, GROB is increasing the share of electric and hybrid

vehicles for the company car fleet worldwide. Many full EV vehicles are driven today even by executives and sales that typically cover a lot of miles.

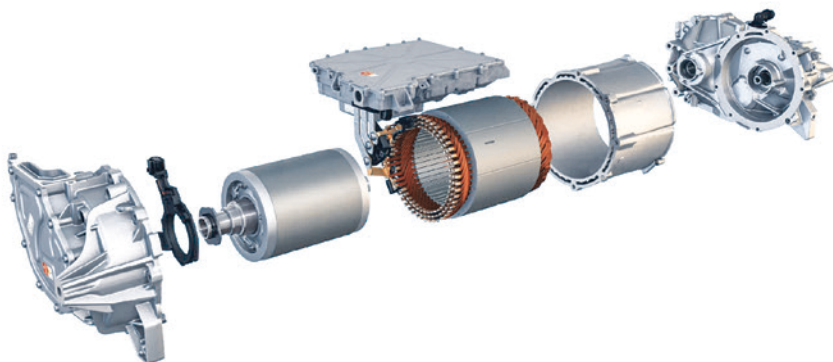
## Long-Term Strategies

Sustainability is one of GROB’s core values. They even changed their headline from “Advanced Technology Worldwide” into “Sustainable Technology Worldwide.”

“We started using a certain amount of renewable energy in our headquarters in Germany and even added an “energy center” to our campus. Sustainability is also one of our core KPIs which we constantly strive to improve. For example, we are monitoring our CO<sub>2</sub> emission footprint and actively reducing it,” Neubert said.

GROB masters all winding and assembly technologies to produce various electric drives and has extensive knowledge and experience in the production of highly complex battery module systems. For example, GROB has delivered more than 50 assembly lines for battery modules and packs, for all kinds of different cell types, such as prismatic, pouch and cylindrical. GROB assembly systems use highly automated complex process steps to assemble, fix and electrically connect battery modules in large, trough-like housing components. These battery pack systems represent a large part of the underbody of new electric cars.

When it comes to the construction of so-called gigafactories for battery cell production, GROB has been able to supply state-of-the-art



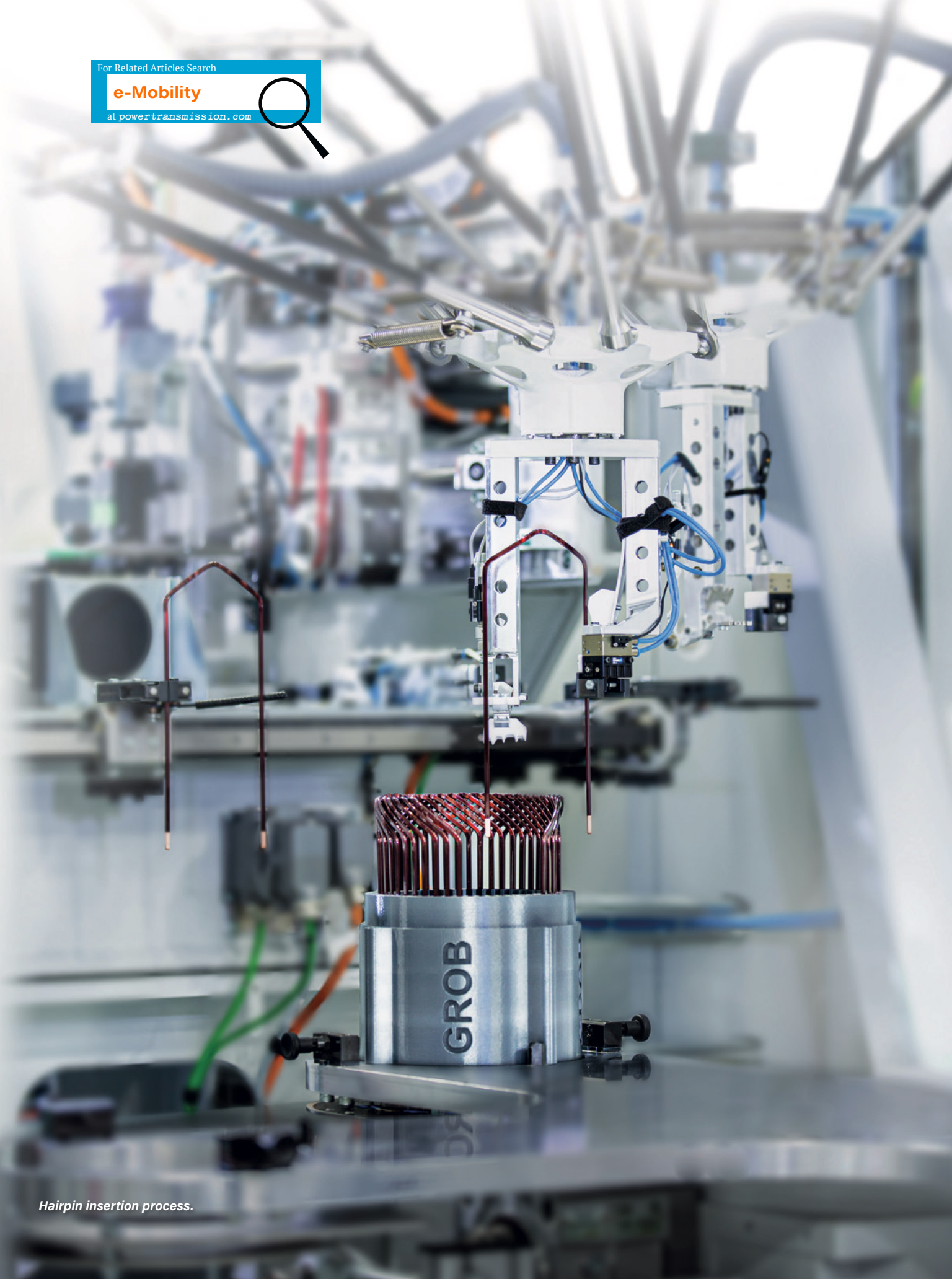
*Principal components of an electric motor.*



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machines and production systems for these groundbreaking technologies for several months. At the same time, GROB is continuing to invest in the improvement and evolution of battery technologies. Additionally, GROB is prepared for future fuel cell assembly opportunities.

The demand for e-Mobility projects continues to rise though in a slightly different direction than expected. “GROB is expanding its capacities for battery assembly equipment in the American and Chinese plants. In addition to ongoing investments in the Mindelheim main plant, the localization efforts at both the GROB plant in Bluffton, OH, and the GROB plant in Dalian, China, are being pushed forward at high pressure so we can serve the key American and Chinese markets local-to-local,” Neubert said.

The GROB plants in Mindelheim and Bluffton continue to lead the way in the company’s electromobility future.

“They are part of our expansion strategy and driven by the need for more space that is required by the size of battery projects. To give you a frame of reference, a typical battery assembly line comes with an investment in the range of tens of millions of dollars and has a footprint of up to 656 ft. x 262 ft. (200 m x 80 m). By expanding our facilities, it enables us to handle more projects for our customers,” Neubert added.

### **What’s Next in the e-Mobility Journey—Battery Cell Production**

In 2024, Dürr and GROB who have a strategic partnership, expanded their machine and system portfolios to produce battery cells and made them more efficient. Their partnership focuses on the automotive sector and the market for stationary battery storage systems. Stationary storage systems absorb surplus energy from solar and wind power so that fluctuations in the electricity supply can be balanced out. They also serve as home storage solutions for solar power from private systems.

Together, Dürr and GROB aim to minimize energy consumption in cell production and increase the quality of



***GROB offers a new generation of the Z-Folding Machine - with noticeable improvements in speed, efficiency and flexibility. The Z-Folding Machine offers safety standards for the handling of LFP and NMC cells, with an integrated inspection system that ensures quality in real time.***

the battery cells produced. For example, Dürr and GROB are supplying a cell manufacturer with machines for the production of high-performance battery cells. As reported in March of this year, Dürr was installing systems for the conventional wet coating of electrodes and is planning a pilot system for efficient and sustainable dry coating. GROB supplies the complete cell assembly based on innovative lamination technology, which enables a significant increase in production speed, resulting in low manufacturing costs.

### **Complete Turnkey Solutions**

GROB has always been setup to provide “turnkey solutions”, yet the sheer size of e-Mobility projects has taken it to a new level. Neubert said GROB has adjusted and improved their project management structure accordingly and added additional layers, ranging from program managers to project managers, project coordinators and project assistants. This makes sure that every aspect of the project can be kept track of while still having a single point of contact for customers.

“On the operational side, we have expanded our plant(s) to have enough space such as a recent 135K sq. ft. expansion in Bluffton, OH, to support the production of manufacturing systems for new technologies in the U.S. including, most importantly, systems for battery production,” he said.

### **Customer Evolution**

GROB has developed several machines that can build fuel cell components and are looking into advanced

battery technology. “We provide product and process SE’s (Simultaneous Engineering) to our customers. We do not wait for the future to happen—we design the future!” Neubert said.

Outside of e-Mobility, the company draws from a diverse customer base, so they are not too reliant on any single industry.

“In the metal cutting CNC business, we especially serve the aerospace and defense industry, as well as the semiconductor and medical markets. The common requirements all these industries share is the need for highly complex 5-axis machining and the highest accuracy and quality. In fact, we invest as much in R&D for metal cutting machines as we do for e-Mobility products. We also developed a machine for additive manufacturing that prints metal 10x as fast as traditional processes. This new technology has had an impressive market launch, and we are working with several customers on delivering the first machines. We estimate that this technology will constantly evolve and develop into another ‘pillar’ of business for GROB,” Neubert said.

For this article, however, we’ll remain focused on GROB’s long-term strategy on sustainability and electrification.

“I am a numbers guy and I’m always impressed when I see how many batteries and e-drives have been produced on GROB equipment,” Neubert said. “Every hour, more than 2,000 battery modules and packs are produced on our equipment worldwide, that’s 33 per minute or one every other second.”

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**PTE**