



INTERNATIONAL

2022



**WITH INNOVATIVE CONCEPTS IN ELECTROMOBILITY,
GROB IS EXPANDING ITS GLOBAL MARKET POSITION, CREATING NEW JOBS
AND SECURING THE FUTURE OF THE COMPANY**



**Dear Employees,
Dear Business Partners,
Dear Friends of GROB,**

We are coming towards the end of another year that brought with it a great number of new challenges. While the coronavirus pandemic with all its restrictions has largely lost its fear factor, new crises have taken its place, such as global political tensions and huge disruptions in international trade relationships. The war in Ukraine with its emotionally draining news, the effects on the European economy, and rapidly rising inflation in the European Union are all influencing society as a whole. But, in spite of all these crises, we were able to reach a new record order intake this year. One of the main reasons for this are our new products, which we developed with great determination and at high speed, and which are the foundation of our outstanding performance in this very difficult market situation.

Our systems for hairpin electric drives have since catapulted us to a market leader, something of which we are particularly proud. At the same time, our systems for various battery storage technologies are targeting the largest growth market for the next decade. Our machining centers for the new components in the automotive industry are the third pillar of our new product groups and perfectly round-out the current GROB portfolio. This success is a huge motivation for the entire GROB team to continue working with great focus and speed on the continued development of our company and our ambitious goals. The quality and reliability of our systems are constantly supported by comprehensive and new process improvement measures across the entire product development process. These measures relate to the top topics of methods, digitalization, employees, simulations, and our change management.

And extensive investments in the GROB Group are also planned for the coming year. Investments, particularly in additional assembly areas in Mindelheim in the form of hall 14B, in a new assembly plant in Bangalore, India, and in the construction of an additional assembly hall in Bluffton, USA. In addition, we will continue to invest internally in new production facilities with a very high level of automation.

Thanks to all our activities, measures and decisive steps, today we can proudly say that our company is positioned for a successful future. We have developed a clear vision for the future, creating a solid foundation for securing our workplaces. The GROB Group therefore remains an attractive and reliable employer with dynamic growth that offers modern workplaces and fantastic development opportunities for its employees. Our innovation and diligence combined with the right strategic decisions have once again proven themselves at a time when conditions are changing rapidly. We will head into the new year with a high level of motivation and focus, as well as great confidence and look forward to successfully mastering the coming tasks and challenges.

Thank you for your continued commitment and the outstanding collaboration. We wish you and your families a merry Christmas season and a healthy 2023.

**Your Grob family and the Management Board of
GROB-WERKE GmbH & Co. KG**

THE MANAGEMENT BOARD INFORMS

HOLISTIC PROCESS DEVELOPMENTS AND CHANGE MANAGEMENT MEASURES

The transformation of the GROB Group and the very extensive new product developments have enormous influence on the value chain and its processes as well as on all departments. Over the past three years, GROB was able to constantly and highly successfully introduce emerging technologies for large-scale projects in the automotive industry. The high GROB quality and reliability of these large-scale systems is of particular importance in the mass production of electric drive units and battery storage systems.

Against this background, and in order to secure the ambitious goals, the management has defined nine top issues for further realignment and process optimization for the Mindelheim plant and the GROB Group in workshops with the entire management team. In superordinate control and coordination teams, progress and results are coordinated and further goals are defined in order to achieve a high implementation speed and efficiency for overall process improvement. The increase in efficiency and productivity is an important component of our future competitiveness.

Our products are highly innovative and are designed to meet the rapidly changing requirements of the automotive industry. In order to be able to continue to guarantee this dynamism and the necessary flexibility, our processes and procedures must be realigned at high speed. In this context, completely integrated digitalization across all areas of the company is of great importance.

GROB CHANGE MANAGEMENT MEASURES:

Methods – Developments

Structured processing of problematic topics

Simulation and virtual commissioning

Automation of our production plants GROB-NET⁴Industry

Production and space optimization

Digitalization of all order processing processes

Materials management and logistics

Change Management measures

Induction of new employees

The combination of new, innovative products and the high quality requirements of the automotive industry, coupled with lean and smooth processes in the value chain, are the ongoing goals of the GROB family company.

ANNUAL REVIEW

After the pandemic-related contact restrictions were largely relaxed, the year 2022 was characterized by personal encounters, finally also at trade fairs again, as well as new departures, successful developments and pioneering cooperation. The transformation in drive technology has gained additional momentum, and the technologies and processes developed by GROB in electromobility, but also in machining, are contributing more than ever to securing the future of our company.

2022

GROB WINS GERMAN IDEAS MANAGEMENT AWARD

At its very first participation, GROB was able to win the German Ideas Management Award – the highest award in ideas management in Germany – in the category "Best Idea in Production and Technology." With the idea "Pin-related pore analysis on the hairpin stator" of the employees Bernd Maier and Georg Knoll from the component analysis department, the manual three-day inspection process of welded joints of hairpins in the stator of an electric motor could be automated by a technique of computer tomography and reduced to 30 minutes.



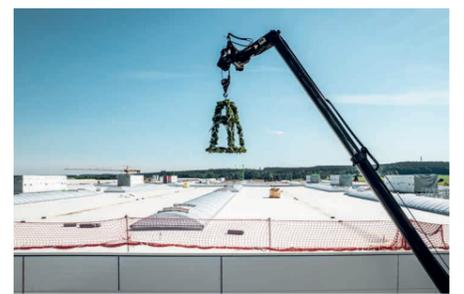
May – Laying of the foundation stone for the sixth GROB production plant in Bangalore, India.



July – With Marco Kusterer, the GROB main plant in Mindelheim reaches 5,000 employees.



August – Opening of GROB Plant II in China directly next to the existing Plant I.



August – Move into the new Hall 14A for the assembly of battery systems in Mindelheim.



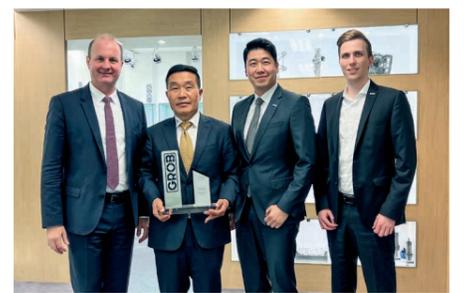
September – Dürr, GROB and Manz enter into unique cooperation in the field of production technology for Li-Ion batteries.



September – GROB is the only machinery supplier to receive the "Supplier of the Year Award" from the BOCAR Group.



October – Exciting insights into next-generation tool and mold making was provided at the GROB Technology Day on October 13.



November – GROB-Korea Branch Manager Yeong-Gyu Park hands over his duties to successor Hansung Kim after 15 successful years.



RECORD TRAINING YEAR AT GROB

With a total of 196 trainees, 88 of them in Mindelheim, 51 in China, 41 in the USA, twelve in Brazil and four in Italy, this year more trainees than ever before started their vocational training with the best prospects at GROB. In Mindelheim alone, GROB offers ten training specialties in addition to four dual study programs.

AUTOMATION

INDIVIDUAL AUTOMATION SOLUTIONS FROM GROB

With their extensive range of automation solutions, GROB machining centers develop their full potential and offer customers almost all technically feasible options for individualizing their production processes.



Drawer system of GRC-R12

COMPACT AT 2.60 m² – THE NEW GRC-R12

Small, compact and highly flexible: The new GROB GRC-R12 robot cell, with its six axes and its pneumatic single or double grippers, is the ideal complement to the G150 universal machining center. Its state-of-the-art production control software enables a longer unmanned production period and its innovative drawer system ensures loading and unloading of parts during the machine operation.

PALLET TOWER FOR TWO MACHINES – THE PSS-T300

The PSS-T300 variable pallet tower storage system is suitable as an automation solution for the G150 and G350 5-axis machines. It enables the connection of up to two machines as well as two setup stations and is characterized by a high storage density. The PSS-T300 can be configured in a modular way, is intuitive and easy to operate with its higher-level control software, and is particularly suitable for users who value autonomy and unmanned production in the 3-shift, night shift and weekend shift.



G350 with GRC-V

G150 with PSS-T300

PARTS HANDLING MADE EASY – THE GRC-V20/-V60

The new GRC-V vision robot cell represents maximum flexibility and individualization. It is best suited for contract and make-to-order manufacturing, where investments are usually smaller and only smaller amounts can be spent. The camera-controlled CNC automation of the GRC-V is ideally suited for series production of small to medium batch sizes. With its simple programming and straightforward HMI input screens, parts handling is made easy.

ADDITIVE MANUFACTURING

GROB LIQUID METAL PRINTING

At the beginning of November, the leading trade fair for additive manufacturing, Formnext, took place in Frankfurt, where GROB presented its first 3D printing series machine GMP300 in addition to numerous impressive components. At the trade fair, it became clear that additive manufacturing has long since gone beyond the scope of prototyping and tool manufacturing and is already being used successfully in many branches of industry for the production of small series with very individual requirements in terms of geometry and material.

With its GMP300 Liquid Metal Printing (LMP) machine, GROB is not only demonstrating its expertise in mechanical engineering, but is also showing a new and cost-effective 3D printing process that uses wire as a starting material. By processing various aluminum alloys, even small batches can be produced efficiently and economically that were previously manufactured using casting processes. However, individual parts can also be produced efficiently with LMP technology due to the system flexibility, the high degree of material utilization as well as the reduced post-processing effort.

Since the method used is a micro-casting process, the microstructure and material properties of the printed parts are comparable to those of a casting. The printed parts are also stress-free and require no thermal finishing steps. Not only because of its novelty, but also because of its many advantages and high technical potential, the market is already showing great interest in Liquid Metal Printing technology and the GMP300. GROB's development plan therefore includes not only further aluminum alloys, but also new materials such as copper, as well as the continuous further development of the process to increase component complexity and cost-effectiveness.



For consistently good material quality – The inert atmosphere in the construction chamber of GMP300 protects the component from oxidation.

GROB MINDELHEIM

IN THE FAST LANE WITH GROB SALES

Rising global demand for new projects in the e-mobility segment led to the highest order intake by GROB plants in their history this fiscal year, but also generated enormous challenges for the company across all its divisions. In the international sales business in particular, key markets are changing radically, requiring a new approach.

GROB recognized early on that the transformation in drive technology would not just require the creation of new production lines for machining and e-mobility, but that global sales would also require new structures. For example, the global marketing and sales activities were combined over a year ago, completely restructured, and GROB Sales 4.0 was established. These adapted structures have put GROB in a position to manage the sales activities for the largest order intake in its history, due primarily to a doubling of the orders in the e-mobility business. The other business units, that is to say, the classic systems business, the universal machining centers, and service continue to operate as planned. A development that, while foreseeable, is currently pushing GROB to the boundaries of what is possible, particularly in e-mobility.

ADAPTED SALES STRATEGY IN E-MOBILITY

In light of this, the GROB sales strategy was fundamentally modified. Now, contracts are awarded at multiple levels, no longer just in the one direction. Framework contracts are used to establish virtual capacity reserves. This meant that, this year, 85 percent of all e-mobility orders were issued based on strategic decisions rather than a classic award process. A development that shows that GROB is seen as a forward-looking e-mobility partner and that customers are pre-reserving their capacities with GROB to ensure security. Around 50 percent of e-mobility orders were received from Europe, 30 to 35 percent from North America, and up to 15 to 20 percent from Asia. To manage this breakdown, all GROB plants have been converted to e-mobility in recent years and the topic has been pushed globally on the sales side. GROB established a global sales network for OEMs as well as for Tier 1 customers.

STRONG REGIONALIZATION OF THE MARKETS

The regionalization of the markets has become an unstoppable phenomenon in the systems and universal machining center businesses as well as in e-mobility. This is essentially forcing GROB to increasingly produce its metal cutting machines locally. Yet, despite this, GROB continues to launch new technologies on the market. The best example of this are the new 4-axis machines that have enjoyed impressive sales success all over the world. The Centers of Excellence (CoE) for medical technology, aerospace, tool and mold making, digitalization, and automation installed in the markets ensure that all regions are at the same technological level in collaboration with Mindelheim and that the Sales department is supported with technical know-how worldwide. In recent years, the CoE have developed into a genuine model of success and they allow contacts with top companies to be enhanced, particularly in the medical technology and aerospace industries, to secure the largest orders.

NETWORKING, EXCHANGING IDEAS, AND CONTINUING OUR STRATEGIC WORK

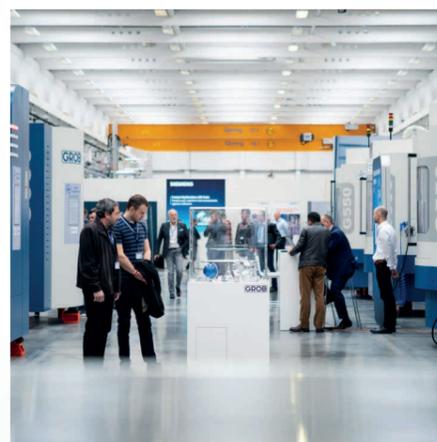
The measures taken mean that GROB Sales has an extremely good network and that exchange, technological advancement, and specific market focus all remain at a very high level despite the difficulties in the global economy and travel restrictions. What's more, a product manager has been installed in the universal machining centers division in Mindelheim, who will continuously examine and optimize the global product portfolio to identify trends in the various industries early on and advance them accordingly. The systems business was expanded at the premium end and elegantly complemented with the F series. The newly developed 9 series will allow GROB to machine large battery trays made of extruded profiles or castings as well as large giga-castings next year. Giga-castings present a massive challenge. In this procedure, large structural components, such as the front and rear vehicle undercarriage as well as the rear frame of a vehicle are reduced to the smallest number of structural castings as possible to enable the car body to be manufactured in a single cast.



Record – Around 2,500 visitors attended this year's GROB in-house exhibition in Mindelheim.



In-house exhibition premiere – Presentation of the new GMP300 Liquid Metal Printing Machine.



33 machines on 5,000 m² – GROB presented its broad product range at the in-house exhibition.



Centers of Excellence – GROB impressed at the AMB with industry-specific components.



Successful restart after long pause in exhibitions – The GROB team at the AMB 2022 in Stuttgart.

20 **GROB**
YEARS OPEN HOUSE

SAVE THE DATE: From March 21 to 24, 2023
GROB will be celebrating 20 years of
in-house exhibitions!

ELECTROMOBILITY

EXPANSION OF THE GLOBAL MARKET POSITION

With their new and further developments in the field of electromobility, GROB has not only established themselves in the international automotive industry as a full range supplier of systems for the production of electric powertrains, but has also become the world market leader within the shortest time with innovative solutions such as hairpin technology. In addition to machines and systems for e-drives, the portfolio of GROB includes state-of-the-art systems for the production of battery storage systems – one of the largest growth markets of the coming decade!

E-DRIVES MADE BY GROB

With its machines and systems for e-drives suitable for large-scale production, GROB covers all winding and assembly techniques for stator and rotor production. Continuous further developments ensure individualized and needs-based solutions for customers. 63 GROB-systems for stator and rotor production have already been sold so far.

Hairpin technology ensures competitiveness

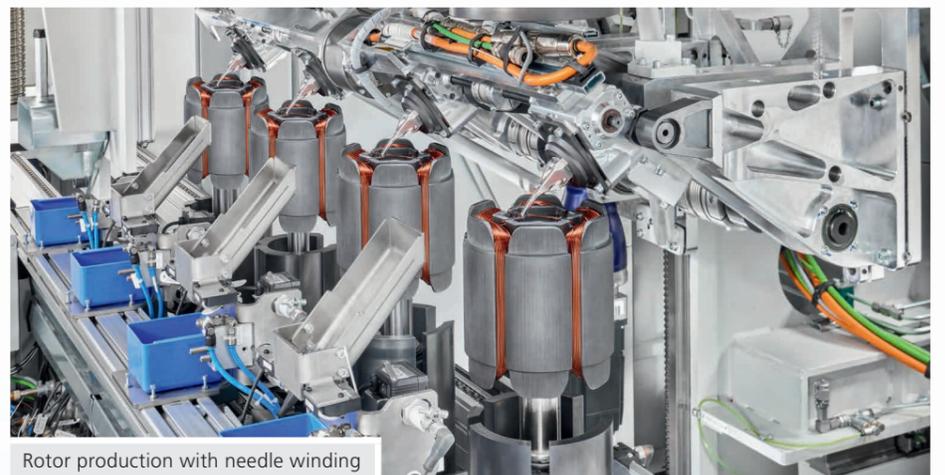
With their systems for stator production with hairpin technology, GROB is already in the third generation of development, which is characterized by an innovative concept and a high variety of variants. The GROB bending station, which is at the center of production, can bend and pre-insert all variants of hairpins and enables the production of high-quality stators with the highest degree of filling with an optimized cycle time of just 1.3 seconds.

Rotor production with needle winding

Together with GROB Italy, the GROB-WERKE Mindelheim are also predominant in the needle winding technology: Needle winding is a complex process for applying round wire to current-excited rotors. With a winding speed of up to 100m/min and a 4-fold winder, the GROB winding machine has a flexible structure, excellent accessibility, and needs-based control options.



Bending station for stator production with hairpin technology



Rotor production with needle winding



Needle Winding



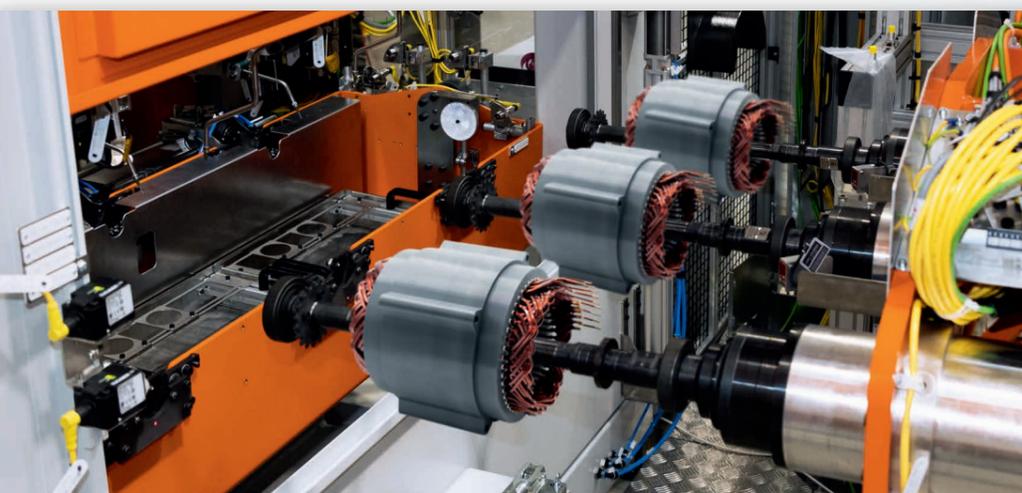
Insertion Technology



Hairpin



Continuous Hairpin



Impregnation of stators

To fix the stator winding in its position and for better dissipation of the generated heat, stators must be impregnated before further processing. For this purpose, liquid resin is applied to the preheated stators in a trickling process and then hardened in a subsequent gelling process. Continual turning of the stators during trickling and gelling prevents the resin from leaking out. The trickling time is typically between 6 and 12 minutes, the gelling time between 16 and 25 minutes, depending on the part.

BATTERY STORAGE SYSTEMS MADE BY GROB

Thanks to their early entry into the technology for battery storage systems, GROB now has in-depth know-how in the development and manufacture of highly complex systems and offers innovative concepts for the assembly of battery cells, modules, and packs. To expand this expertise further, this year GROB-WERKE entered into a unique European cooperation in the field of production technology for Li-ion batteries with the likewise industry leaders Dürr and Manz.



Systems for battery cell assembly

To meet the automotive industry's growing need for large-scale production systems for battery cells, GROB offers state-of-the-art systems for battery cell assembly with a focus on the assembly of prismatic cells and pouch cells. At the center of the manufacturing process are the stacking technologies of laminating and Z-folding, the pilot systems for which will go into operation at the beginning of 2023.

Lamination is a continuous process for manufacturing cell stacks for lithium-ion cells that are based on laminated mono-cells. With a cycle time of 0.2 seconds, five mono-cells or ten electrodes can be stacked per second and positioned exactly using innovative laser, lamination, and stacking technology.

Z-folding is a classic cell stacking technology that is already used in most gigafactories today. With a cycle time of 0.5 seconds per electrode and stack cell and the option of constructing the system with up to four stack cells in parallel, this technology achieves excellent overall cycle times in the battery cell manufacturing process.



Systems for battery module assembly

From the individual cell to the complete module: Prismatic cells or pouch cells are stacked and connected to battery modules of different sizes using intelligent concepts in the highly flexible and fully automated GROB assembly lines for battery modules. To implement the battery in the shape and size required by the customer, the appropriate frame components are assembled using robot-controlled welding, bonding, and riveting technology.

The batteries are then connected using laser technology via cell contact systems and cooling systems are supplemented using adhesive technology. Finally, quality assurance processes document the ability of the individual work steps and round off the GROB expertise in the highly complex battery module assembly. The success of this technology is reflected in the large number of systems sold.

Systems for battery pack assembly

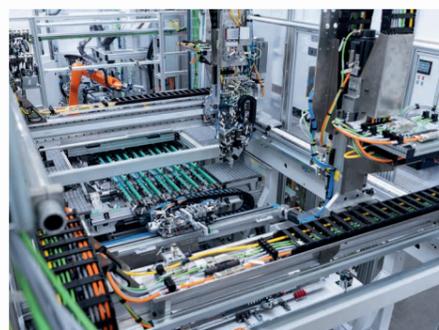
GROB also offers the right solution in the final assembly of complete battery pack systems with its systems suitable for large-scale production. In the GROB assembly systems, the finished battery modules are connected to each other fully automatically in a controlled manner, with the focus being on loading and unloading as well as assembling and fixing the individual battery modules.

Existing technology from GROB is used in a new dimension in the loading and unloading station of the battery pack system. Whereas the heavy-duty automation systems for loading the customer's parts from the transport boxes into the assembly line were previously purchased, these assemblies are now part of GROB's own product portfolio.

The centerpiece of the battery pack system is usually the assembly and fixing of the battery modules in the bottom of the housing. Depending on customer requirements, thermal paste is applied here depending on the surface profile of the components. Next, other robots fix the modules directly in the same station.



Welding station



Stacking station



Gluing station



Loading and unloading

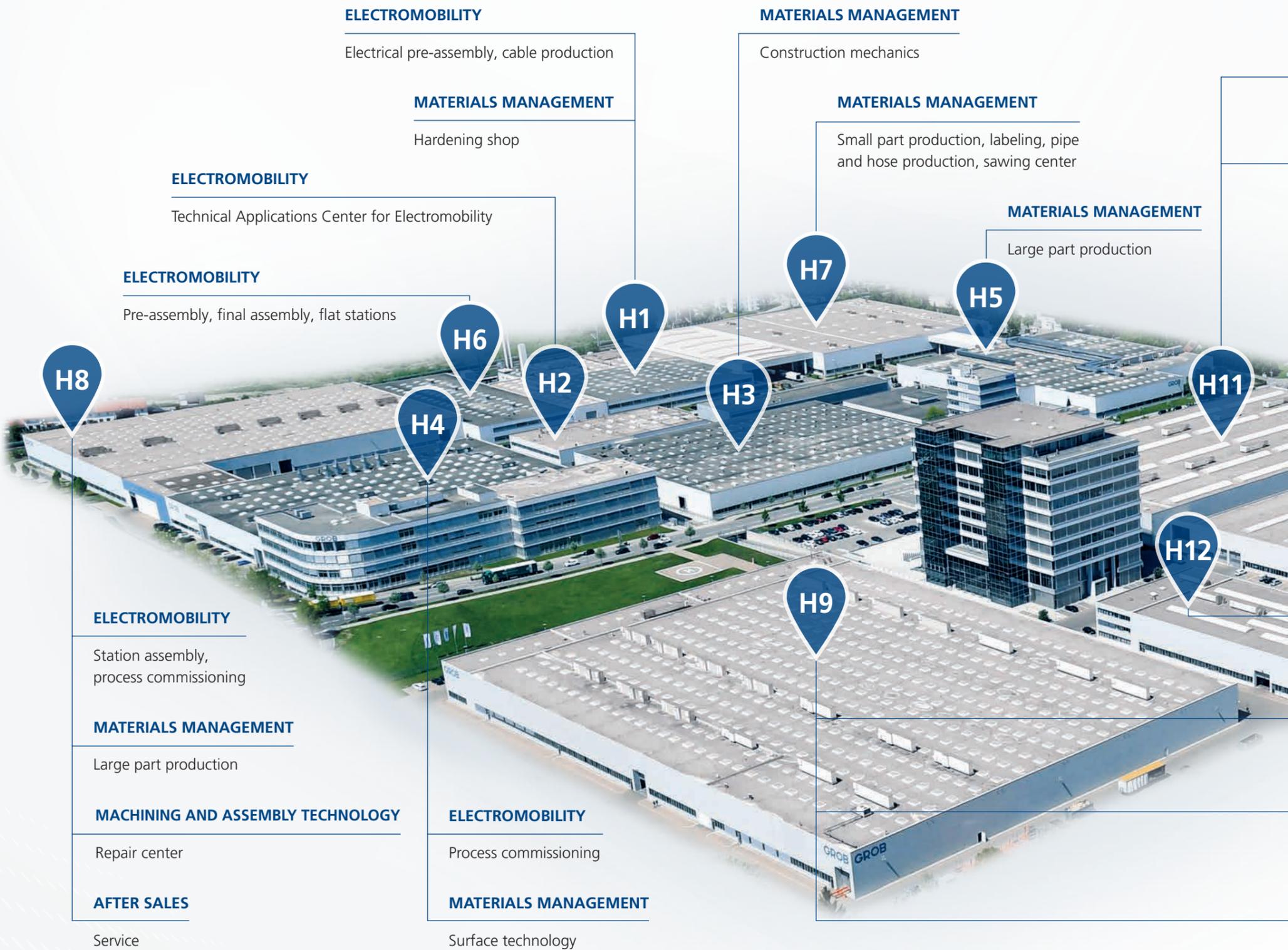


Assembly and fixing of the battery modules

GROB-WERKE AT A GLANCE

30 SOCCER FIELDS OF PRODUCTION SPACE IN MINDELHEIM

In almost all plants, the GROB Group's continuing growth momentum is reflected in additional investments in land and real estate. A dynamic that is particularly visible at the main plant in Mindelheim. This is because the increased space requirements for electromobility systems here have led to an expansion of the production area to a total of 199,000 square meters. This corresponds to an area of almost 30 soccer fields. Added to this is the usable floor space of the office and social facilities of 45,000 square meters.



HALL 9 BATTERY AND FUEL CELL TECHNOLOGY

Forward-looking technology with enormous development potential: Several pilot systems for battery and fuel cell assembly are currently being built in Hall 9. In addition to the lamination stacking technology, the system also includes a so-called mini-environment to eliminate large drying rooms in the future. Another technology is based on the Z-fold process, which is the most commonly chosen stacking process in the first gigafactories. In another part of the hall, optimization of an existing prototype system for PEM fuel cells with continuous stacking technology is also taking place.





HALL 14A MORE SPACE FOR ELECTROMOBILITY

In August of this year, the 16,200 m² assembly hall for electromobility was occupied. A new building was urgently needed in order to be able to cope with the extremely strong order intake in the area of electromobility. The new Hall 14A will be used primarily for process commissioning of battery projects and impregnation lines (12,000 m²) and for logistics and shipping (4,000 m²). By the end of 2022, three quarters of the hall are already occupied by a battery packing system for a major customer.

ELECTROMOBILITY

Process commissioning, battery and fuel cell application lab

MACHINING AND ASSEMBLY TECHNOLOGY

Pre-assembly of special-purpose assemblies

MATERIALS MANAGEMENT

Logistics

ELECTROMOBILITY

Process commissioning

MATERIALS MANAGEMENT

Warehouse logistics, small and large parts warehouses



H10

H13

H14
A

TRAINING CENTER

UNIVERSAL MACHINING CENTERS

Pre-assembly, final assembly

MACHINING AND ASSEMBLY TECHNOLOGY

Pre-assembly, final assembly, process commissioning, prototype production, automation pre-assembly

ELECTROMOBILITY

Process commissioning

UNIVERSAL MACHINING CENTERS

Commissioning, Technology and Applications Center for machining systems and universal machining centers, New and Quality-checked used machines Center, motorized spindle assembly, testing, service, customer training

MACHINING AND ASSEMBLY TECHNOLOGY

Process commissioning



HALL 9 NEW AND QUALITY-CHECKED USED MACHINES CENTER

Right next to the Technology and Applications Center, in the New and Quality-checked used machines Center in Hall 9, used GROB universal and demonstration machines are put through their paces with a 5-point inspection program and revamped for new customers. The test program includes professional cleaning and reprocessing (1), a function test with defect rectification (2), replacement of defective components with original spare parts (3), a geometry check and correction (4), and a final quality check (5). In addition, a selection of new machines ready at short notice is available as well.

GROB⁴JOBS

JOB PROFILES

Top 2023 Company



kununu

The transformation in drive technology at GROB has not only led to innovative developments in electromobility, but has also created new areas of responsibility and exciting job profiles. This year, for example, almost 1,000 new jobs were created in Mindelheim alone, and the need for motivated employees and skilled workers continues to rise due to the high volume of orders. Against this background, GROB-WERKE is particularly pleased about the renewed award as "kununu Top Company 2023".

Our GROB⁴Jobs job profiles present the occupational fields that are currently in the spotlight with their job descriptions, core tasks, and the expected hard and soft skills.



ELECTROMOBILITY & MACHINING COMMISSIONING ENGINEER

In the fields of electromobility and machining, commissioning engineers assume a central function by carrying out the mechanical or electrical commissioning of assembly and manufacturing equipment as well as automation systems. Since commissioning engineers at GROB are deployed worldwide, they can expect varied and demanding tasks. At the same time, they must be team players and flexible, as they spend the majority of their working hours directly on-site with customers worldwide, together with their colleagues, in order to successfully complete projects.

"As a commissioning engineer at GROB, every day starts with a new challenge, and no two days are the same. You have to focus on the tasks to find a quick, yet clean way to reach your target. For this, you need an accurate eye and a wide-ranging vision that's open to new challenges."

Kevin Dorn
Process commissioning engineer



DESIGN ENGINEER

Design engineers at GROB not only independently create new station concepts and technical solutions, but also take care of the calculation for dimensioning the parts and assemblies to be designed. From the idea to the design to the finished construction drawing, a lot of technical expertise is required, but also a lot of creativity and imagination. Design engineers are convincing in their reliability and diligence, but they are also cooperative and collegial, since in most cases they perform their tasks as part of a team.

"In the innovative environment at GROB, it's easy for me to stay motivated. There are enough challenges that drive me and that I can grow from. I can also feel this in the commitment and team spirit of my colleagues. Together, we create new things to keep advancing our technology."

Michael Sinner
Development engineer



PLC SOFTWARE DEVELOPER

At GROB, PLC software developers program controls, HMIs and interfaces to state-of-the-art subsystems. In the field of electromobility, the programmers' responsibilities also include control technology for GROB's innovative systems for electric drive, battery and fuel cell production. Their colleagues for artificial intelligence are responsible for the implementation as well as development of AI processes and AI algorithms in the assembly processes of electromobility. With varied and challenging tasks, PLC software developers take on responsibility and support the commissioning of plants in the factory as well as on-site with customers worldwide.

"Every day I have the opportunity to work with exciting and well-known clients, a challenging team and in a motivating and interesting workplace. At the same time, as a PLC programmer, I am very proud that the machines programmed by my team and me are paving the way for a sustainable and electric future. To become part of our team, your passion and innovative thinking are greatly welcomed at our company so we can continue to grow together."

Muhammed Fazil Prem Nazeer
Software engineer

SHAPING THE FUTURE OF MANUFACTURING

Discover our passion for mechanical engineering and high-quality products in our new corporate movie!



GROB CUSTOMER TECH STORY: AESCULAP

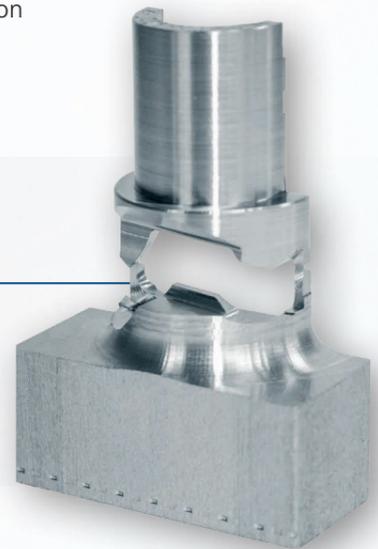
AUTOMATED MANUFACTURE OF LAMINATED HIP PROSTHESIS COVERINGS

Reliable to the nanometer despite high speeds and high production quantities, with few man-days and excellent service: as one of the world's leading medical technology manufacturers, Aesculap sets a very high bar for the minimum availability, repeat accuracy, process reliability, and last but not least, productivity requirements for machining units in their production lines.

As Aesculap, one of the most renowned manufacturers of medical devices and medical technologies, sets incredibly high standards in production, this needs to be matched by the level of sophistication of the machinery in the Tool and Prototype Manufacture division. Universal machining centers from GROB have already been part of this machinery since 2010. This makes Aesculap AG one of GROB's oldest as well as most satisfied customers from the medical sector.

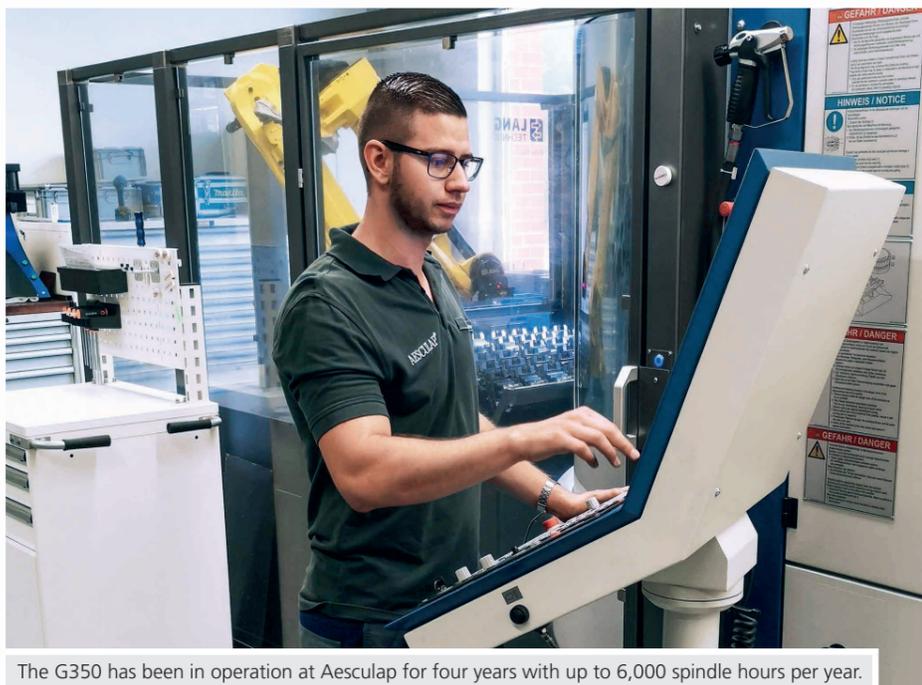
Despite the initial skepticism of Aesculap technicians of the unfamiliar horizontal machining, they quickly recognized the extremely high level of productivity of the GROB universal machining centers and the stable machine concept. A concept that is ideal for machining solid blocks of material, which is often the case for medical instruments due to the small lot sizes. The Aesculap technicians were

also impressed with the specific axis arrangement of the GROB universal machining centers, which enabled the application of short tools and their optimal use, with much long tool lives. Following a successful test run in the GROB Technology and Applications Center, a G350 was purchased for toolmaking. This machine was equipped with a Heidenhain TNC640 control system, an air-lubricated spindle with 16,000 rpm, a torque of 220 Nm and a double disk magazine for an HSK-A63 with 117 tool pockets. The automation system is a Lang Robo Trex with two automation trolleys, each with thirty 5-axis part clamps, whose individual control was able to be adapted thanks to the concerted collaboration between GROB, HEIDENHAIN, and Lang.



MEDICAL INDUSTRY

- The high speeds and the vibration-free operation of the G350 enable the automated manufacture of large quantities of coverings.



Every hour, the GROB G350 currently manufactures 30 covering devices for hip prostheses that will later be grafted into the femur. The material used is 1.4301. The covers are made from flat material in one clamping sequence. After this, a small amount of manual work is required to remove a small connection. The run times vary from between 20 and 85 minutes depending on the cover size. The machine has been running seven days a week with the least-possible man hours for the past four years.

"We have around 200 different hip prostheses, small, large and medium," explains Applications Engineer Thilo Hagen. "The run times vary depending on the size of the part. The longest run time is one hour and 25 minutes." He adds: "We've had this machine for four years now and never had a problem with it. With the extensive GROB service package, complete maintenance is carried out on the machine once per year, which is important for us, as we can total up to 6,000 spindle hours per year."

AESCULAP AG

Tuttlingen

Medical innovation makes things we would not have dreamed of possible. For over 150 years, Aesculap has not just simply been part of the medical progress, but has actively been driving it forward – in surgical, orthopedic, and interventional vascular medicine.

Since 1976, Aesculap has been part of the B. Braun Group, and so part of a family-owned business with 64,000 employees in 64 countries. B. Braun is one of the world's leading manufacturers of medical technologies and pharmaceutical products and services. Via constructive exchange, B. Braun develops high-quality product systems and services, leading and continuously going further – improving people's lives and health in the entire world.



GROB BRAZIL

THE SOMEWHAT DIFFERENT MECHANICAL ENGINEERING MARKET

GROB Brazil is currently confronted with a wide range of issues, for example, high prime rates that block further investments in the Brazilian automotive industry, an uncertain political development on the one hand, as well as full capacity utilization in production until April 2024 on the other.

The current economic conditions could hardly be more difficult for GROB Brazil in 2022: First of all, there is the challenge of achieving a turnaround in the economy, despite political tensions. And then of course there is the tense situation in the automotive industry with a production capacity of around five million vehicles and sales of only around 2.8 million vehicles. With a vaccination rate of 95 percent, coronavirus is currently no longer an issue; however, the difficult parts availability and logistics problems for suppliers resulting from the pandemic have not yet been solved. Despite this, Brazilian industry is recovering with an economic growth rate of around 3.5 percent. However, the question of how the country will continue to develop after the political right-left turnaround is uncertain.



Positive development – The universal machining center business is an important foothold for GROB Brazil.

BIG SUPPORT: 4-AXIS MACHINES

Due to the high prime rate of 13.75 percent, the dramatic devaluation of the Brazilian real, and current overcapacities, all investments in the automotive industry were stopped for the first time. Fortunately, GROB Brazil has done well in the universal machining center business with their 4- and 5-axis machining centers and has been able to attract many new customers. A track record that is quite impressive with 25 universal machining centers in the 2021/22 financial year and 21 machines in the current financial year. Other classic universal machining center markets, such as the sectors of mechanical engineering and the aerospace and medical technology, have also developed well for GROB Brazil.



Full utilization in production – GROB Brazil has a job order backlog until April 2024.

PLANT NETWORK: IMPORTANT Foothold FOR GROB BRAZIL

Traditionally, the GROB plant network for Brazil is not only an important instrument for securing their capacity utilization, but also strengthens their competitiveness. At the same time, GROB Brazil acts as a trustworthy partner supporting the GROB Group in the export business to the EU. Their importance can be seen in the current job order volume from the plant network, which adds up to around 80 percent of the total production capacity of GROB Brazil. To implement this volume with its tight delivery dates, the production capacity was increased by 20 percent. In total, GROB Brazil has a backlog of job orders up to and including April 2024. In the 2024/2025 financial year, around 60 percent of the capacity is already occupied. These are both customer orders and job orders from the GROB plant network.

IN LURKING: ELECTROMOBILITY

In terms of sales, Brazil is currently focusing on the manufacturers of industrial motors when it comes to electromobility and is already holding strategy meetings with the most important companies that want to invest in electromobility in Brazil. "We have already created a very good basis for electromobility in Brazil with the development of impregnation ovens and their delivery for e-mobility projects to the GROB Group," says Michael Bauer, President of B. GROB do Brasil, visibly proud. "And this despite the fact that there is not yet much activity in the Brazilian e-mobility market and our potential customers assume that it will take another five to ten years for these new technologies to become established in Brazil."



Valuable contribution – Brazil supports e-mobility projects with the development and production of impregnation ovens.

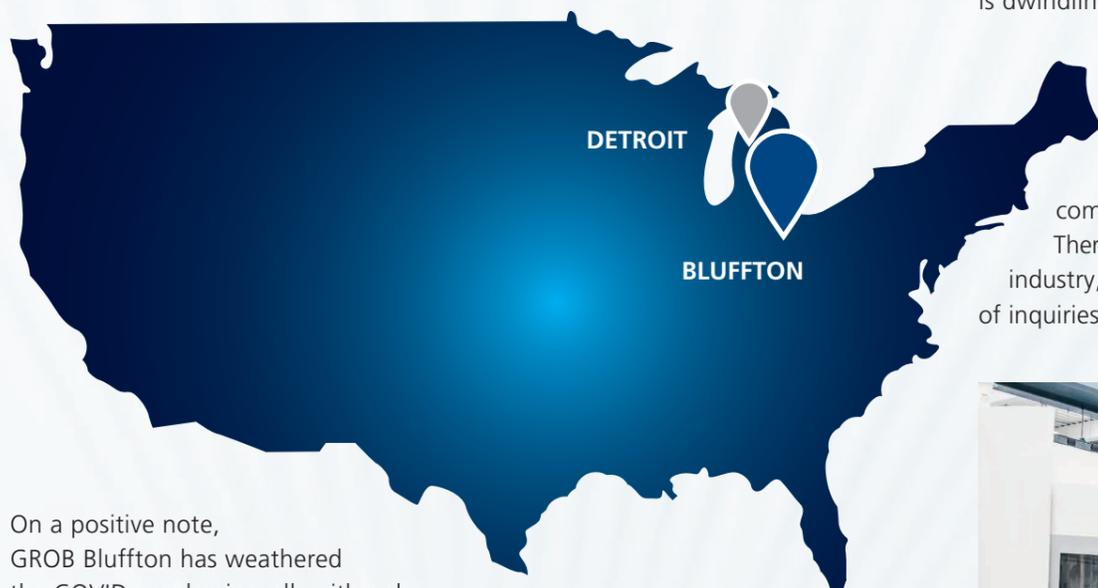
To be well-prepared for electromobility, a training program for electromobility was carried out two years ago in cooperation with Mindelheim and Bluffton in mechanical and electrical design.

"At the beginning of 2023, similar programs will be started in assembly for mechanics and commissioning," Bauer explains the procedure. "The employees will each work for a year in e-mobility projects in the GROB Group to gain practical experience so that GROB Brazil will be able to switch seamlessly from machining to e-mobility at the beginning of 2024."

GROB USA

ELECTROMOBILITY DEFINES THE U.S. VEHICLE MARKET

Booming electromobility and a historically high order backlog of more than 18 months, but also rising material and production costs as well as the incredibly great challenge of finding qualified personnel in the field of electromobility: The American market is currently not for the faint of heart.



On a positive note, GROB Bluffton has weathered the COVID pandemic well, with only a few severe cases and production still ramping up. This also allowed the entire order volume to be processed as scheduled with few delays. And yet, the shift to electric vehicles is demanding everything from our American colleagues. The search for qualified personnel is proving particularly problematic. "Although we began to train our own employees in the area of electromobility or hire new ones years ago, the pressure to recruit even more staff is also increasing as the number of orders increases," says Michael Hutecker, CEO of GROB Bluffton, describing the current challenge in the company.

ELECTROMOBILITY ARRIVES IN THE USA

It took a long time for the electric drive to arrive on the American market. What hardly anyone could have imagined a few years ago is now reality. Nearly all major automakers are investing in electric drive systems and smaller companies are also expanding their production capacities. Despite rising material and production costs, GROB Bluffton's order intake continues to grow.



Booming electromobility – The GROB plant in Bluffton currently has the highest order backlog in its history.

DIFFERENT DEVELOPMENTS IN THE MACHINING SECTOR

On the other hand, demand in the systems business among American automakers is dwindling. Only Tier 1 customers are placing new orders, which is rare.

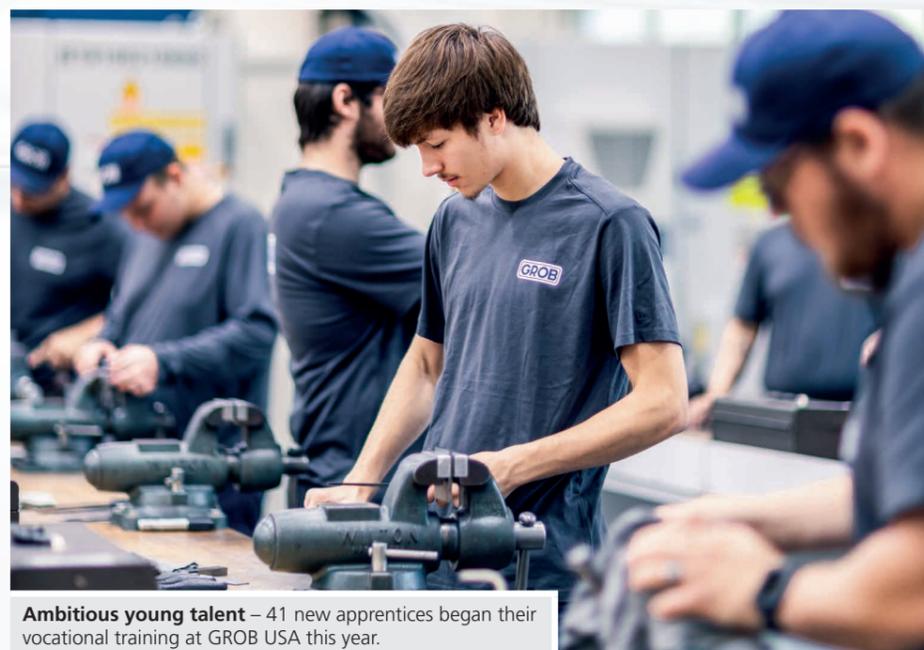
However, universal machine sales are rising. GROB Bluffton celebrated its most successful year in 2021 with 51 machines sold and expects to exceed this achievement in 2022 with at least 55 machines. "Especially in the field of automation, we can report a huge increase in orders," explains Michael Hutecker. "This is primarily due to the fact that many companies can't run their machines in multiple shifts due to staff shortages." There is also increased investment in the aerospace sector, in the semiconductor industry, and in medical technology. We have also received an increasing number of inquiries from the die and mold industries and automotive sectors.



On course for success – GROB USA's universal machine business is growing steadily.

INCREASED NUMBER OF EMPLOYEES AT GROB BLUFFTON

Like other American companies, GROB Bluffton is looking for employees in almost all areas to meet the increased demands. For example, additional service staff and engineers as well as technical personnel were recruited to reinforce key markets. Against the backdrop of the strategic realignment in sales, staff was also increased there. Today, 836 employees work at GROB Bluffton, an increase of 178 over pre-pandemic times.



Ambitious young talent – 41 new apprentices began their vocational training at GROB USA this year.

GROB CHINA

GROWTH COURSE DESPITE COVID AND DELIVERY BOTTLENECKS

GROB China is attempting to manage the highest order intake in its history with its new, second plant and the complete restructuring of the first plant. An order intake that has reflected the unique development of Chinese vehicle manufacturers in electromobility in the past two years.

For months, GROB China's day-to-day business has been marked by exceptional growth in electromobility as well as huge challenges due to repeated coronavirus lockdowns with increasingly stringent requirements and strained supply markets with considerable bottlenecks. All this means that our colleagues are virtually trying to achieve the impossible in order to manage critical delivery expectations. Nevertheless, GROB China has managed to construct a new plant in close proximity to plant I in record time and qualify 300 new employees. By the end of the year, the workforce will have increased by 30 percent to a total of around 1,300 employees. At the same time, they had to deal with a record order intake that included an output of five machines per week and the delivery of up to seven lines for stator and rotor assembly per year.



Chinese conditions. For instance, this allowed successful orders for stator and rotor assembly systems to be acquired in the electromobility segment. What is particularly pleasing is that we were also able to gain a foothold amongst local Tier 1 suppliers with two stator lines. Although there are a number of rapidly growing competitors in the area of assembly technology for stators in the lower and medium price segment, GROB China will continue to establish itself in this dynamic environment through constant advancements and long-term relationships with premium manufacturers, as well as its local manufacturing.

DECLINING SYSTEMS AND UNIVERSAL MACHINING CENTER BUSINESS

The advance of electromobility has led to a decline in classic manufacturing lines for engine components and so also the order intake in the systems business. Despite this development, GROB China was able to attract important orders for machining components for hybrid motors as well as e-motor housings. In addition, at the end of 2021, a record order for six turn-key lines for machining transmission cases was secured.

The universal machining center business was heavily influenced by delivery time problems. The high order volumes in electromobility meant that production was operating at capacity and, in some cases, even beyond. This is where, despite delivery deadline requests of between four and six months, GROB China was able to find special solutions with many customers and so still acquire orders.



Plant II – More space for the assembly of system machines and the production of 4- and 5-axis universal machining centers.

HISTORIC GROWTH

Despite an eleven-week coronavirus lockdown and an associated decline in May, it looks as if the historically high order intake from last year will be exceeded once again this year. A development that is based on the current "local for local" market trend. As a majority of customers prefer machines from China, GROB China has an advantage over the competition by offering the best quality under



GROB CHINA PLANT II AT A GLANCE:

Construction time: 10 months	Production area: 16,000m ²
Total investment: EUR 17.1 million	Property size: 35,000m ²
Workplaces: 300	Technical Application Center (TAC) with space for five machines: 500m ²
Office and social rooms: 3,000m ²	

GROB ITALY

ON TO NEW FIELDS OF ACTIVITY

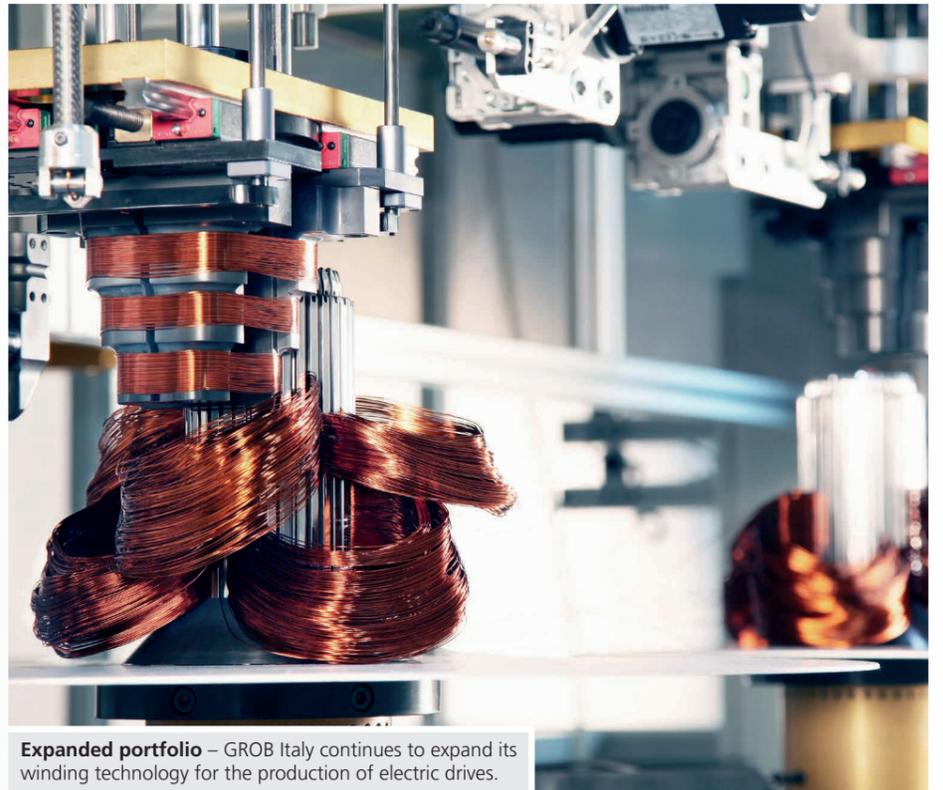
With a significantly broader positioning through direct sales for the fast-growing universal machining center and systems business, closer ties to Mindelheim, and a stronger presence in winding and insertion technology with round and rectangular wire, GROB Italy is increasingly becoming a strong partner in the GROB plant network.

In the last two years, GROB Italy has had to realign itself in almost all areas, and in particular strategically realign its sales. The core of this reorientation was the separation from its former sales company and the associated switch to direct sales. Thus, the Italian Machine Tool Division with its universal machining centers was divided into five independent territories, each under the control of a responsible salesperson.

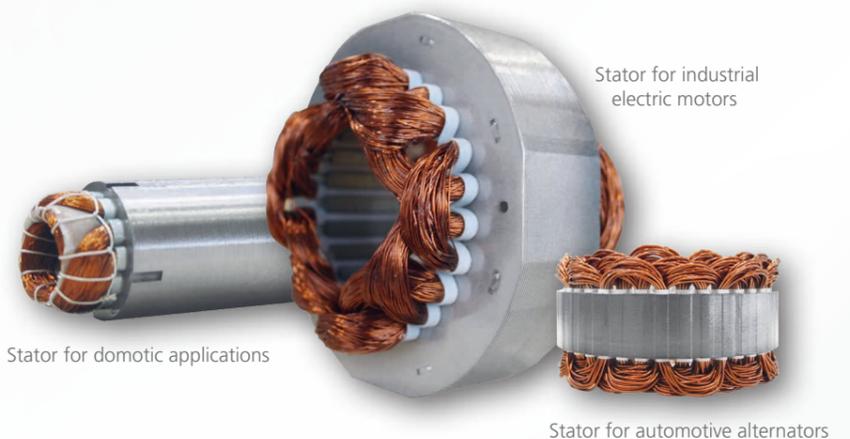
In the systems business, GROB Italy is supported directly from Mindelheim by technology-specific engineers and customer-specific sales staff, which demonstrates the necessity of the connection between the locations. Through direct sales, it is now possible to open up free sales territories and new customers, especially in the energy technology and aerospace sectors. Thanks to this new structure close to the customer, the Italian plant has already achieved its first successes during a booming industry in Italy and has listed itself as a potential supplier for further investments. The preferred machine types are the G550 and G750 machining centers, which are very often offered with automation from the GROB standard program.

EXPANDED PRODUCT PORTFOLIO IN THE MANUFACTURE OF ELECTRIC MOTORS

Through new developments in the area of laminated core production and the winding of coils for segmental and axial flux motors with round and rectangular wire, GROB Italy further expanded its product portfolio and significantly increased its sales reach in the market. Not least also through the installation of an additional salesperson in the Production Equipment Division for electric motors, through additional reinforcement in the office sales force, and through the presentation of the new orientation at trade fairs. "Thanks to an increased presence at trade fairs, we were able to make the name GROB Italy better known," explained GROB Italy Managing Director Klaus Eberts. "Now we're getting a lot of initial contacts and inquiries from the new market areas." Particularly in the case of production systems for rotors with permanent magnets or with wound rotors, GROB Italy has been able to arouse interest and, together with GROB Mindelheim, is offering some exciting projects in Europe. Most of the needle winders from GROB Italy are an integral part of the overall systems from Mindelheim.



Expanded portfolio – GROB Italy continues to expand its winding technology for the production of electric drives.



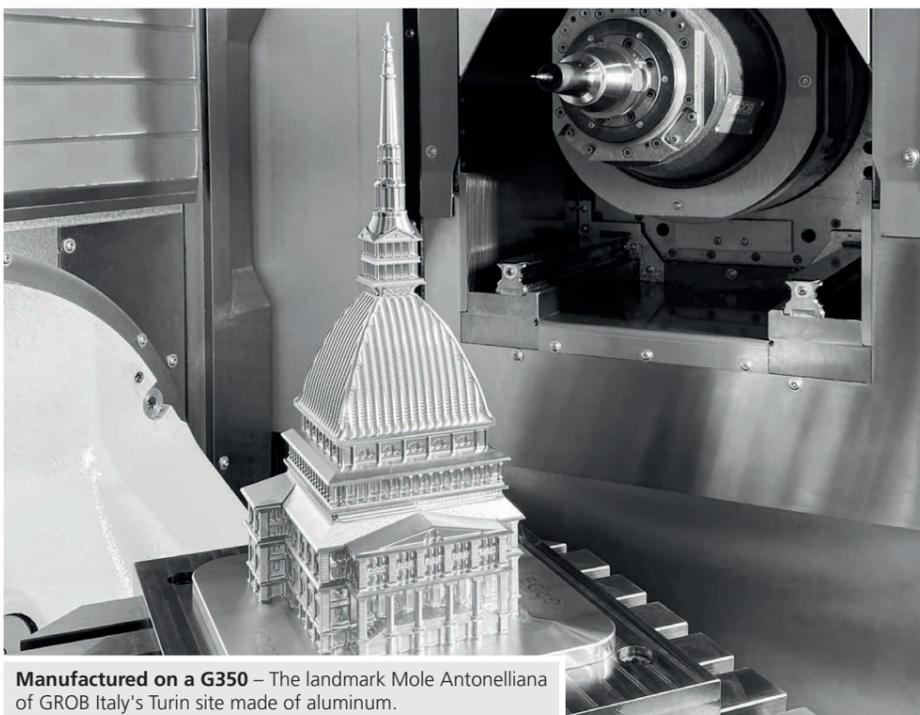
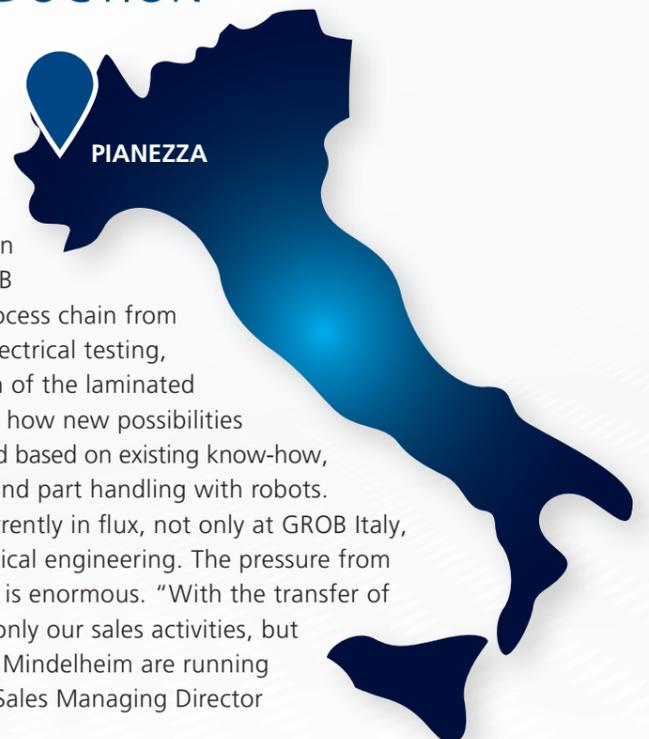
Stator for domestic applications

Stator for industrial electric motors

Stator for automotive alternators

LAMINATED CORES COMPLETE THE STATOR PRODUCTION

GROB Italy has created a further foothold in electromobility with equipment for the production of laminated cores, since the production of stators, for which GROB Italy already offers the process chain from insertion technology to electrical testing, also requires the provision of the laminated cores. A good example of how new possibilities were sought out and found based on existing know-how, for example in assembly and part handling with robots. Thus, many things are currently in flux, not only at GROB Italy, but also in Italian mechanical engineering. The pressure from the market on companies is enormous. "With the transfer of Klaus Eberts to Italy, not only our sales activities, but also the interactions with Mindelheim are running at the best level," GROB Sales Managing Director Christian Müller is certain.



Manufactured on a G350 – The landmark Mole Antonelliana of GROB Italy's Turin site made of aluminum.

GROB WORLDWIDE



NORTH AMERICA

Bluffton, Ohio, USA
 Detroit, Michigan, USA
 Querétaro, Mexico

SOUTH AMERICA

São Paulo, Brazil

EUROPE

Mindelheim, Germany
 Pianezza, Italy
 Birmingham, Great Britain
 Hengelo, Netherlands
 Senlis, France
 Baar, Switzerland
 Poznań, Poland
 Győr, Hungary

ASIA

Dalian, China
 Beijing, China
 Shanghai, China
 Yokohama, Japan
 Suwon, South Korea
 Haiphong, Vietnam
 Bangkok, Thailand
 Hyderabad, India

PRODUCTION PLANTS



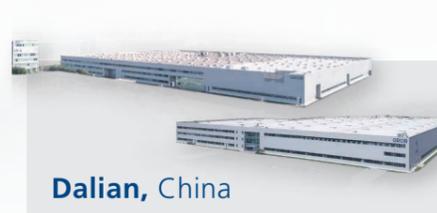
Mindelheim, Germany



São Paulo, Brazil



Bluffton, USA



Dalian, China



Pianezza, Italy



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PUBLISHER
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PERSON RESPONSIBLE FOR CONTENT
 MARKETING, Phone: +49 8261 996-0,
 E-mail: info@de.grobgroup.com

TEXTS
 Robert A. Thiem, Agentur T M E

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