EMAG news

NO. 31

SCHERER · KOEPFER · RICHARDON · ELDEC · LASERTEC · REINECKER · KARSTENS · KOPP · NAXOS-UNION · WEISS · SU · ECM

THE EMAG GROUP FOCUSES ON DIGITALIZATION AND PRODUCTION SYSTEMS FOR ELECTROMOBILITY.

New HMI for the vertical turning machines of the VL Series

The year 2020 changed a lot of things. Not least among them is the massive boost it has given to digitalization. We work digitally, we learn digitally, we communicate digitally, so it is only logical that we also increasingly manufacture digitally. The demand for digital products in the world of manufacturing has risen significantly in 2021. More and more decision-makers are recognizing the advantages that digital and data-based production offers and the optimization potential that results from it. One example is our customer MAT, which now fully relies on EMAG's IoT products. You can read more about this on pages 14/15.

It is not only the digital, but also electric mobility which drives us at EMAG. Just recently, we were able to implement a production system for rotor shafts for a large manufacturer. You can find more about this in the following spread. In addition, there is again a colorful mix of product presentations, user reports and news from the world of the EMAG Group.

We hope you enjoy reading it.

ROTOR SHAFT:
TURNKEY MANUFACTURING SOLUTION FOR HOLLOW ROTOR SHAFTS

The rising quantities of electric motors pose a challenge to production planners. In many applications, they must establish new solutions with which components such as the electric motor drive shaft can be manufactured more quickly and more efficiently – using holistic manufacturing systems. This shows what a solution of this nature can look like.

OP 30

Internal gearing

OP 10/20

VTC 200

4-axis pre-turning of the internal and external contours

LOADING

OP 90/100/110

Blowing, measuring, and destacking the rotor shafts in basket stacks

EMAG BLOG

Here you can find more information about the machining of the rotor shafts

OP 40

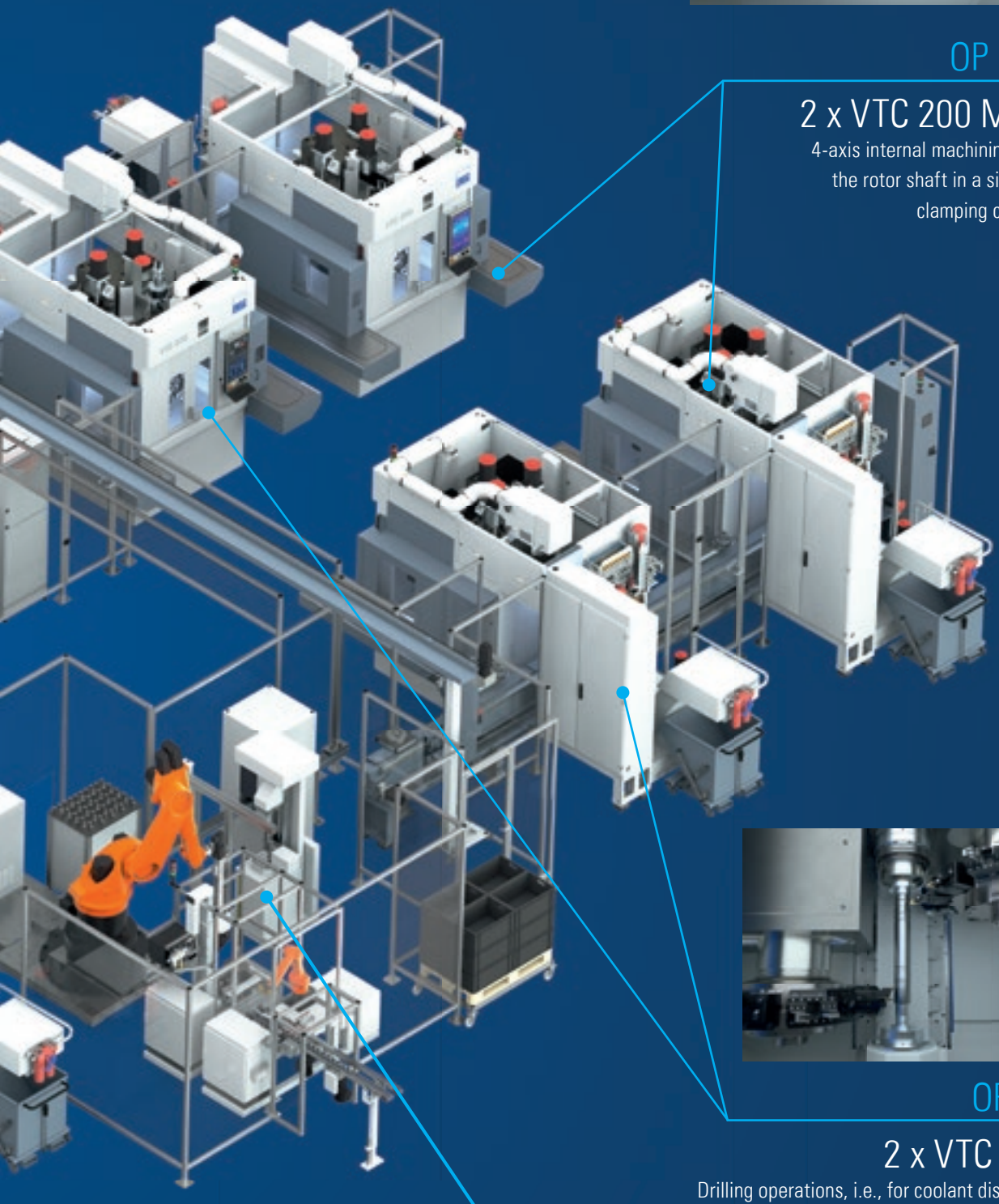
MIND-L 1000

Induction Hardening

OP 50

2 x VTC 200 MA

4-axis internal machining of the rotor shaft in a single clamping cycle



OP 60

2 x VTC 200

Drilling operations, i.e., for coolant discharge

OP 80

VTC 200

4-axis turning of collar and seats of the rotor shaft

OP 70

Joining machine

Joining suspension point for the metal package and other components

ROTOR SHAFT LINE

VTC 200 MA: CENTER-DRIVE LATHE MACHINE FOR SHAFT MACHINING

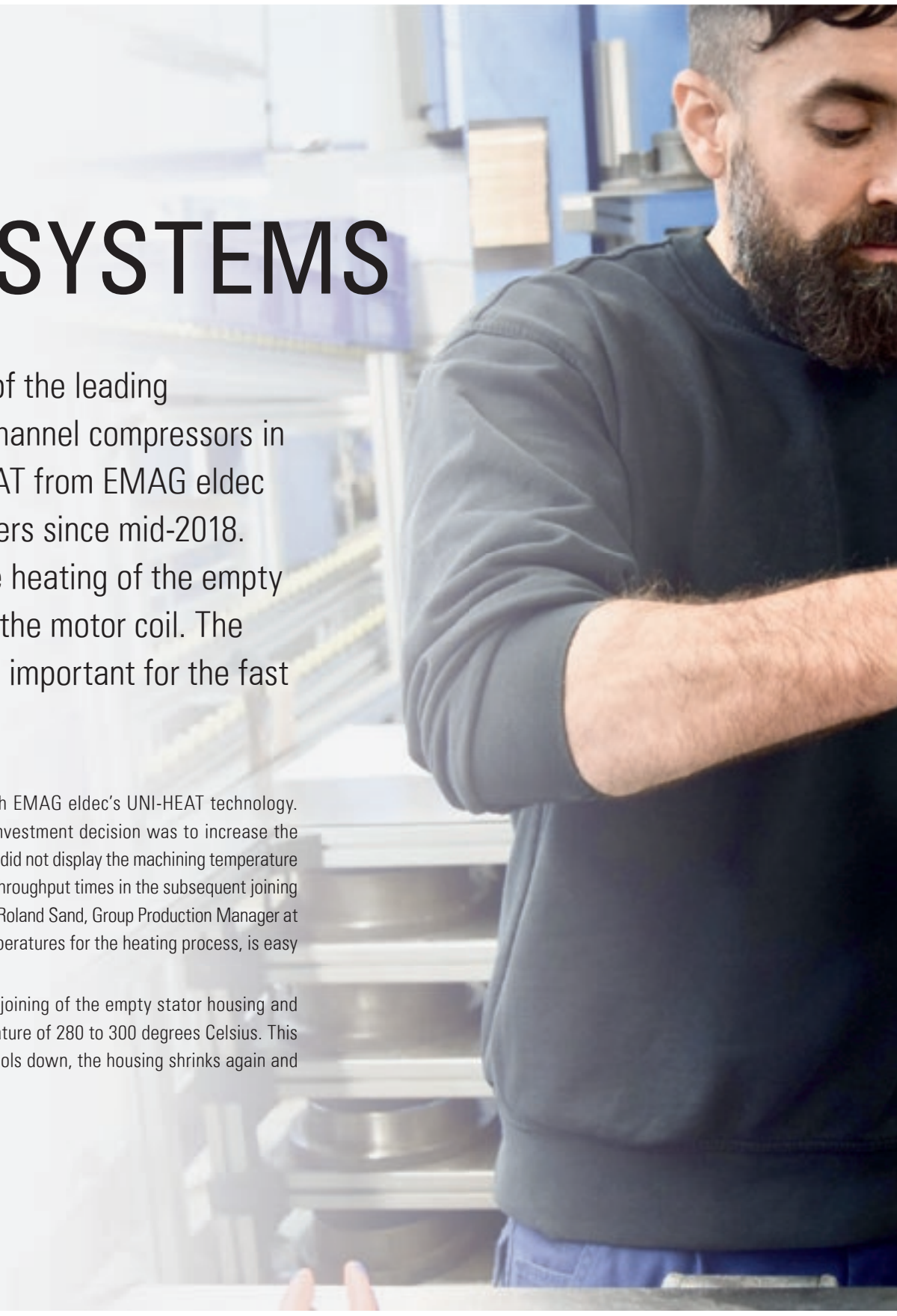
Center drive spindles are used when the workpiece is to be machined from both sides in one set-up, as is the case here with the rotor shaft. The workpiece is clamped in the center drive, then the outside diameter as well as the inside diameter of the workpiece ends can be machined. The user benefits from the 4-axis structure of the machine, whereby the two workpiece ends can be machined simultaneously, which means that optimal cycle times can be achieved.

SCROLL-FREE TURNING: HIGH SPEED MACHINING OF ROTOR METAL PACKAGES

The process, developed by EMAG, for machining rotor shaft metal packages delivers a whole series of benefits compared to the classic turning process. Firstly, scroll-free turning enables significantly higher feed rates per rotation and therefore reduces cycle times. The use of the entire blade also increases the service life of the tools and reduces the machining time. Finally, it has been demonstrated that significantly better surface qualities can be achieved and that these also have a positive influence on the conductivity of the metal package.

EMAG PAYS A VISIT TO:

ELEKTROR AIRSYSTEMS



Elektror airsystems based in Ostfildern is one of the leading manufacturers of industrial blowers and site-channel compressors in the world. Elektror has been using the UNI HEAT from EMAG eldec in the production of electric motors in its blowers since mid-2018. This system ensures the fast, precise inductive heating of the empty stator housing before the joining process with the motor coil. The reliability and flexibility of the entire process is important for the fast "one-piece flow" approach used by Elektror.

In 2018, the specialists decided to replace the outdated heating system with EMAG eldec's UNI-HEAT technology. So what was behind the decision? "One of our main objectives behind this investment decision was to increase the reliability level of the entire inductive heating process. For example, the old system did not display the machining temperature that had actually been reached on the component. In some cases, this led to longer throughput times in the subsequent joining process. Furthermore, the supply of spare parts was becoming more difficult," explains Roland Sand, Group Production Manager at Elektror. "Therefore, we were looking for a system which delivers very precise temperatures for the heating process, is easy to use for any operator, and whose processes are completely reliable.

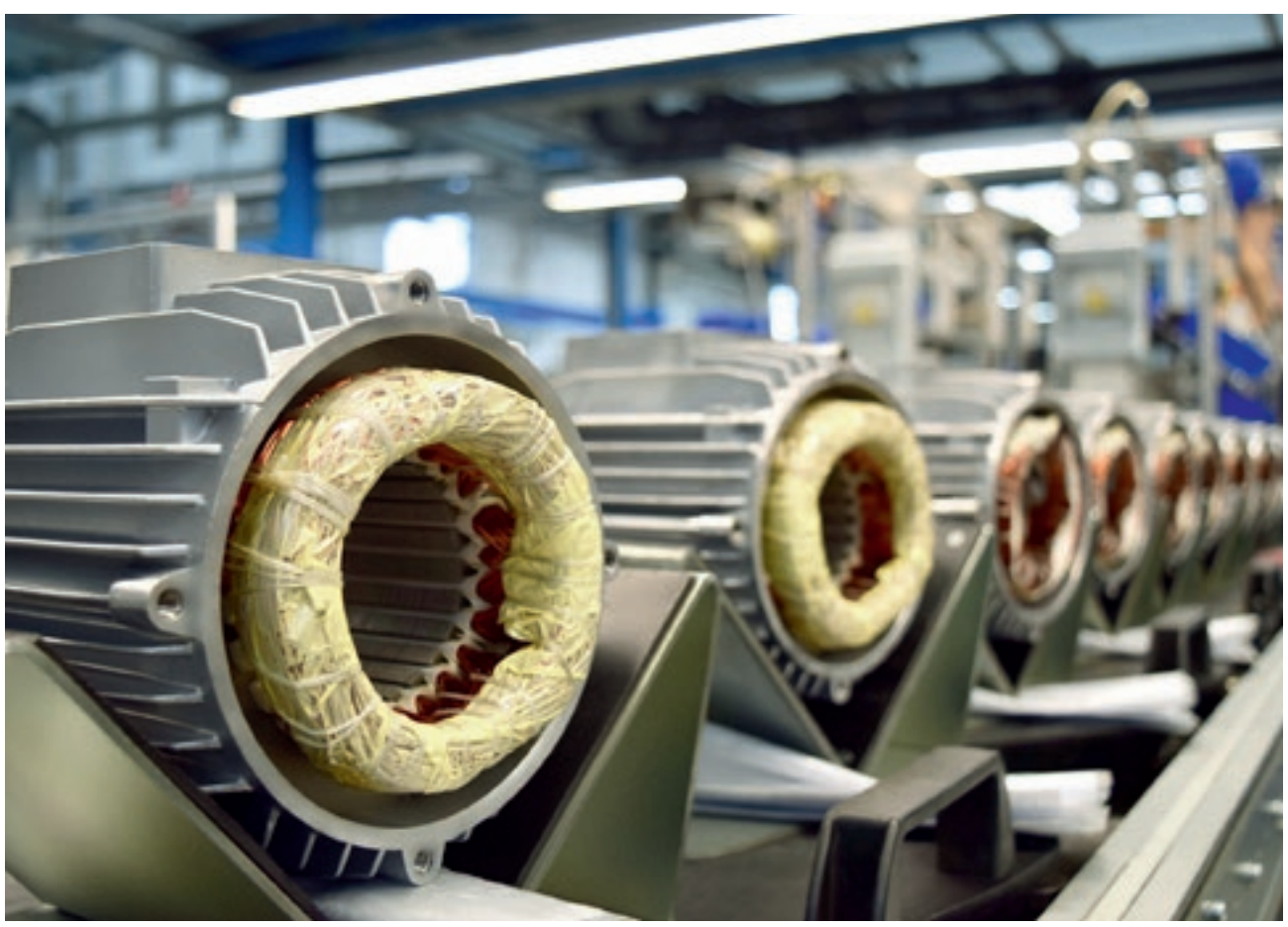
One of the central processes in the production of electric motors is the thermal joining of the empty stator housing and the motor coil. The housing is heated by an inductive heating system to a temperature of 280 to 300 degrees Celsius. This causes it to expand so that the motor coil can be inserted easily by hand. As it cools down, the housing shrinks again and forms a positive, secure connection with the coil.

"We produce around 250 motors per day using this technique," says Sand. "The component sizes vary significantly. Nevertheless, the process remains completely stable. Absolutely no problems or errors occur. Since the start of production in May 2018, we have had absolutely no faults," says Roland Sand in his final summary. "The minor start-up problems we experienced were quickly rectified by the eldec service team. We believe that our expectations in this investment decision have been fully confirmed."

EMAG VIDEO

Watch the video of our visit to Elektror airsystems here

> "We believe that our expectations in this investment decision have been fully confirmed"
>
> Roland Sand, Group Production Manager at Elektror



AIRSYSTEMS

ELEKTROR

ELDEC UNI HEAT HEATING SYSTEMS: COMPLETE SOLUTIONS FOR SOLDERING, HEATING, AND JOINING

eldec generators form the basis for reliable induction heating. In addition to the energy source, lots of applications need other components and fixtures which result in complete, semi-automated systems – UNI HEAT heating systems.

BENEFITS

- Robust IGBT transistor technology: short-circuit and open-circuit proof
- Automatic adjustment to resonance frequency and therefore inductor dimensions
- Circuit topology with output transformer: excellent user protection
- High speed PLC with eldec control print: short cycle frequencies for very high speed control
- Precision energy dosing (+/- 2%): high process capacity (reproducibility)
- Compact eldec transformers and throttles: excellent power density
- The largest frequency and power range and largest adjustment range on the market
- Maintenance-free
- Available as a single machine or integrated into the manufacturing process

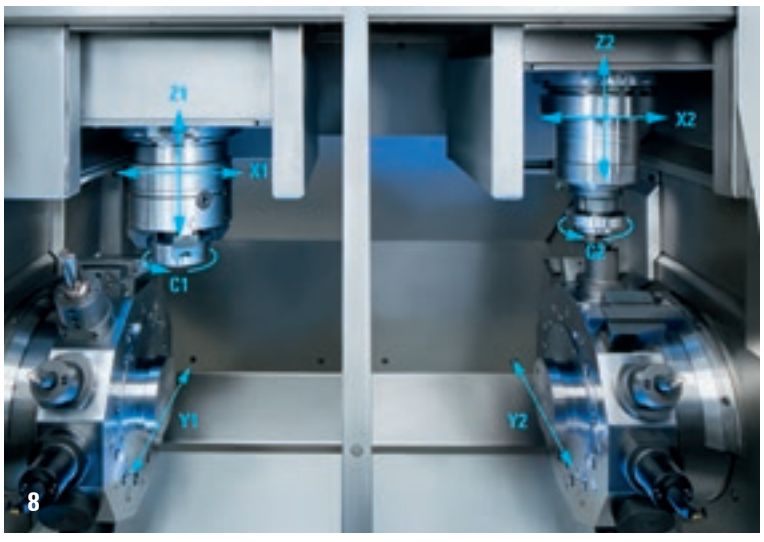
EMAG BLOG

A conversation with Roland Sand, Production Group Director at Elektror airsystems

VL 3 DUO: HIGH-VOLUME PRODUCTION OF BEVEL GEARS

The compact solution for the manufacturing of bevel gears presented here is designed for maximum productivity. The line consists of two VL 3 DUOs that are automated using robots.

This enables the maximum degree of freedom in the supply and removal of raw and finished parts, as well as in additional processes, such as the integration of a measuring station, as shown here. Due to workpiece handling being carried out in parallel to machining process, the line never stands still. Even when setting up, one machine at a time can continue to produce, which highlights the high output of this solution.



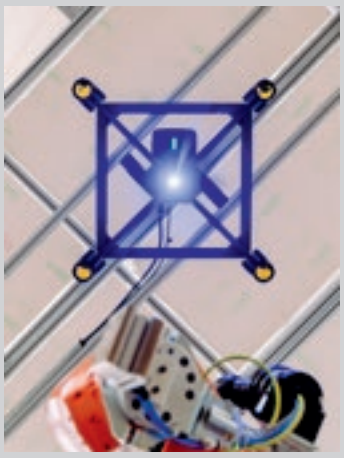
VL 3 DUO FOR MAXIMUM FLEXIBILITY

Can be used in the “DUO principle” OP 10/OP 20 or as in the use case in the “TWIN principle” OP 10/OP 10. You benefit from the doubling of the parts output, as well as the maximized economy of space!

The machining compartments are arranged in a mirror constellation and each has its own working spindle which, with a rating of up to 17.9 kW and torque of up to 144 Nm (at 40% duty cycle) (as an option: 32.4 kW/255 Nm at 40% duty cycle), has plenty of power for high-speed precision machining of bevel gears. In addition, each machining compartment features a tool turret with twelve tool positions (with either a VDI 40 or BMT 55 interface), which, in addition to turning tools, can also be fitted with driven tools and a Y-axis.

As a result, the problem-free, flexible use of roller burnishing tools for the inner bore, as well as for the spherical cap, is made possible.

VL 3 DUO



EMAG BIN-PICKING AUTOMATION

As an alternative to manual loading, the system can also be loaded using bin picking. EMAG bin-picking cells allow machines and manufacturing systems to be loaded direct from workpiece containers. The positions of the raw parts inside the container are identified in real-time using a 3-D camera system. These data are used to control a robot arm which picks the individual components one by one out of the container (bin picking) and then places them on the workpiece belt. Of course, the finished parts can also be stacked in prepared mesh boxes, where all options are open to the user.

FEATURES

- 3-D camera system
- Mobile control panel
- Roller shutter door for fast loading and unloading
- LED fill level indicator
- Gripper with collision monitor
- Individual gripper jaws to suit component contours

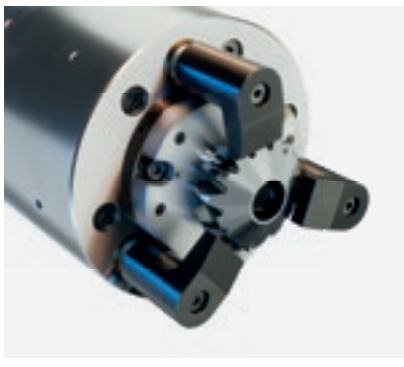
EMAG VIDEO

You can see the bin-picking cell in the video here

EMAG CLAMPING EQUIPMENT

All from a single source
Machines, robot handling, automation, peripherals, clamping equipment, tools, and technology support.

Clamping with a negative mold



Clamping with pins

TRUCK WHEEL HUBS:
PRODUCTION LINE FOR TRUCK WHEEL HUBS

VL Series machines, particularly the VL 6 and VL 8 models, are perfect for machining large components, such as truck wheel hubs, thanks to their powerful working spindles and large machining areas. The use of a driven tool turret means that drilling tools can also be used. This production line features short transport distances, sophisticated automation, and simple part handling.

OP 10 I VL 8

Soft turning

The external and internal contours of the wheel hub are turned in the first operation. The roughing and dressing of the first side take place in a single clamping cycle.

OP 20 I VL 8

Soft turning

The second side is then machined after the wheel hub has been turned. The use of a driven tool turret means that drilling operations for the screw holes can also be completed at this point.

OP 30 I VL 8

Finishing

Finally, the component is dressed and the grooves are milled. Once again, a driven tool turret is used to tap the threads in the boreholes.

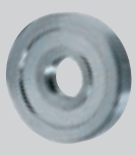
WORKPIECES

Differential housings

Flange

Sprocket

Truck Brake Drum



Gear

AUTOMATION

TrackMotion

TrackMotion is an automation solution which combines the previous concept of conveyor belts, pick-and-place units, and changers in a single system. The "TransLift" gripper system features a Z- and a B-axis for this purpose, allowing a stroke of up to 650 mm and enabling the parts to be turned in full.

TECHNICAL DATA

Further information on this solution can be found here

EMAG VIDEO

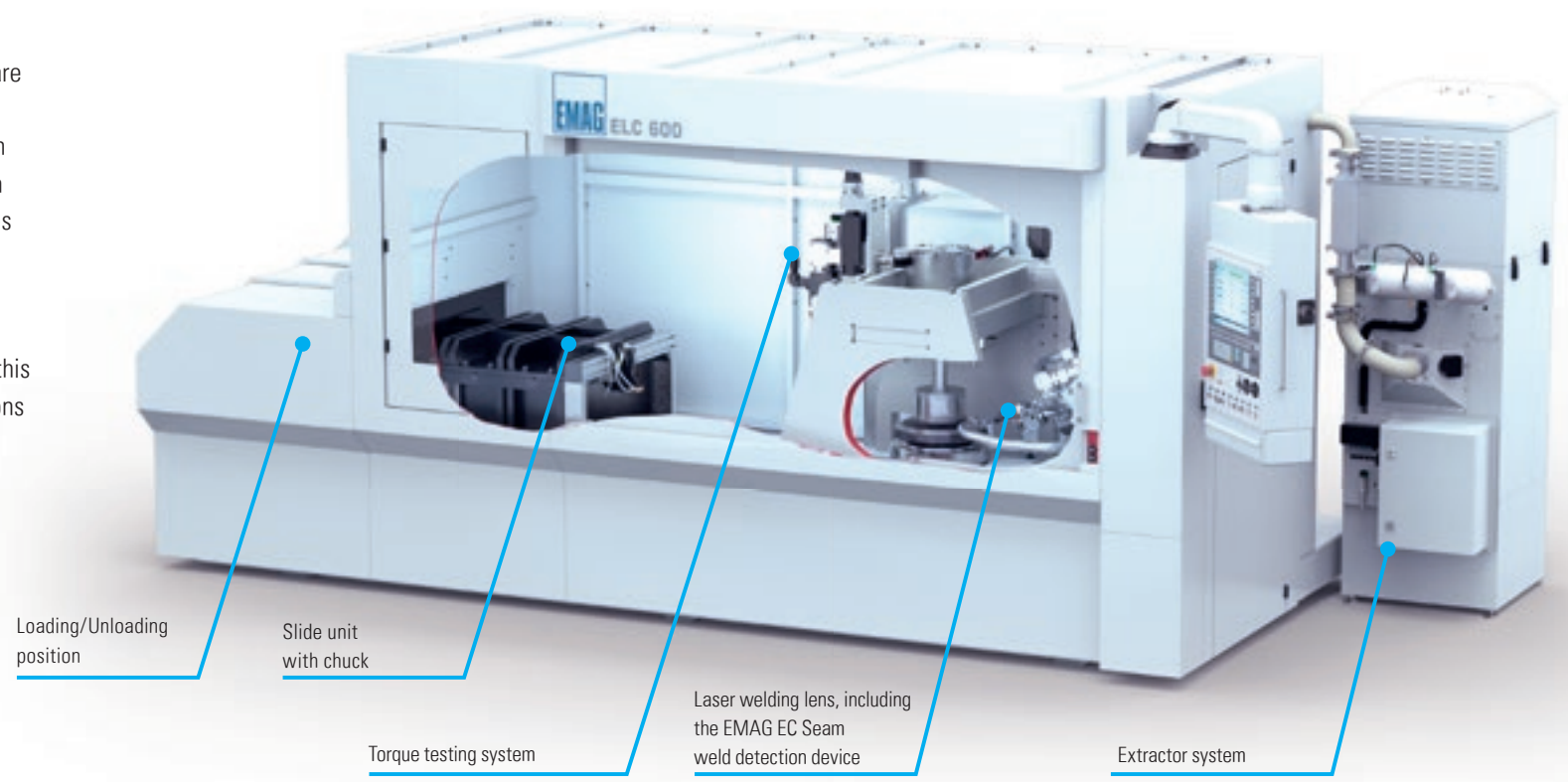
Watch the video about the manufacturing of wheel hubs

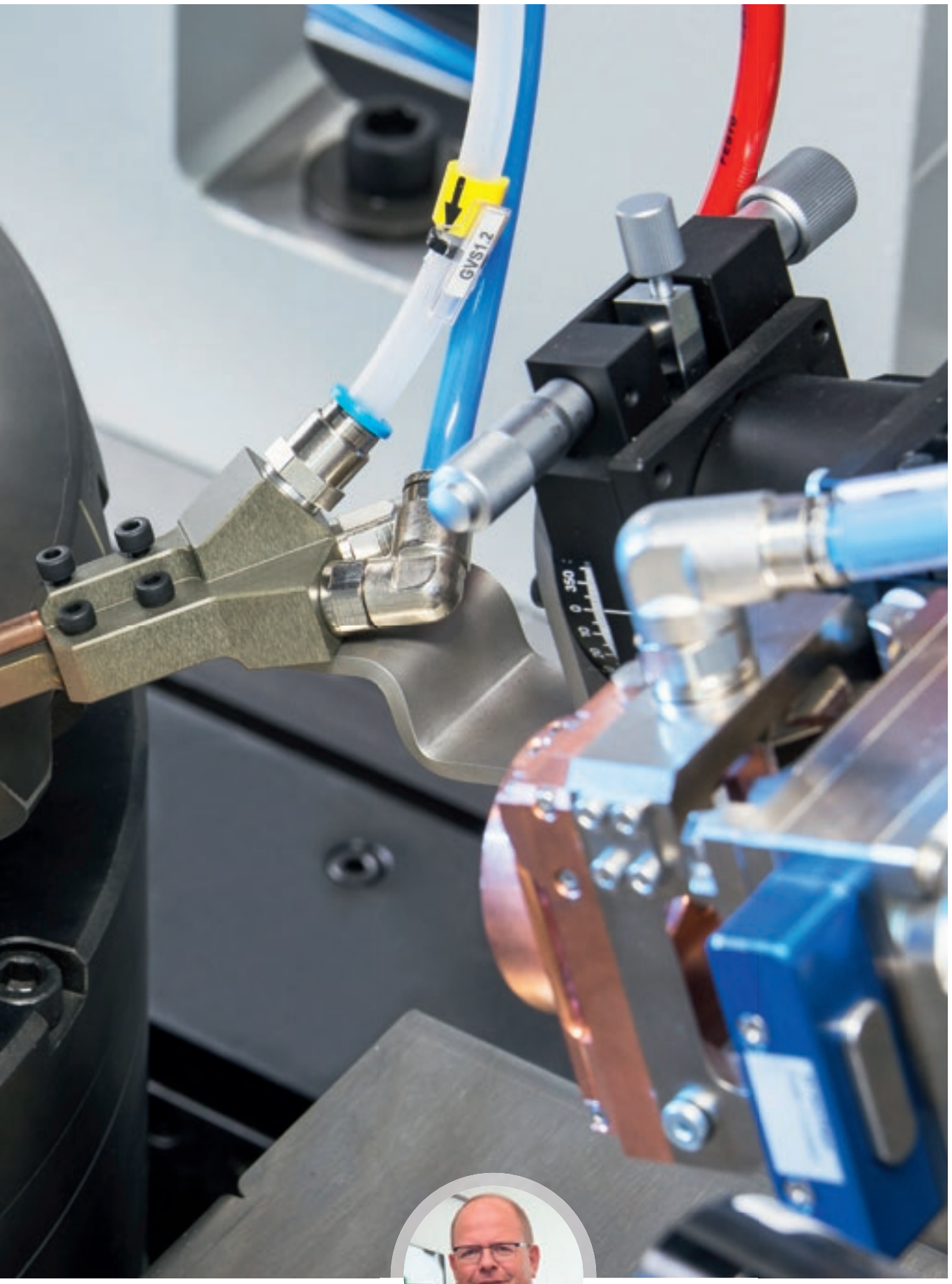
EMAG LASERTEC ELC 600:
PRODUCTION SOLUTION FOR LARGE COMPONENTS

With the ELC 600, EMAG LaserTec presents a system for laser welding of components up to 600 mm in diameter and is therefore ideal for components from the commercial vehicle segment. Sample differential housing for trucks: These components weigh up to 130 kilograms and have a diameter of up to 600 millimeters and are already being manufactured on the machine presented here.

Read more about the manufacturing solution for truck differentials developed by EMAG LaserTec:

In the ELC 600, the components are transported to the laser welding position in machine slides with an integral chuck and welded at high speeds, thanks to the precise axes and high-precision beam control system. Even cast steel and/or case-hardened steel connections with great depth are feasible on this machine. These are ideal conditions for using the ELC 600 in the commercial vehicle segment.





Dr. Mootz,
Managing Director at EMAG LaserTec

» Why have commercial vehicle manufacturers migrated to welding differentials?

Conventional differentials are bolted. In other words, simply by eliminating the screws, there is already an advantage in terms of the weight of the component. The bigger advantage that is made possible by eliminating the screws becomes evident when driving the truck. Differentials are completely enclosed during operation and "swim" in an oil bath, where they rotate while driving. The screws lead to resistance that is not insignificant in the oil and cause the constant swirling of the lubricant. The combination of these two effects results in a lower degree of efficiency, since the differential is used by braking practically all the time. This disadvantage is completely eliminated with a laser-welded differential. To put it simply, a laser-welded differential requires less drive energy from the engine to deliver the same power to the axles. Given the high mileage of trucks, there is an energy optimization potential that should not be underestimated. Especially when you think in the direction of e-trucks, where such a differential can contribute to a greater range.

ELC 600

LASER CLEANING

After being supplied through two separate loading stations, the two housing parts and the ring gear pass through two EMAG laser cleaning machines – a new in-house development which already has the character of a standard machine. The process is extremely fast and removes all residues, such as cutting fluids and preservatives, using a focused laser beam – and it does so locally, i.e., precisely where the weld will later be located.

The housing parts and the ring gear are cleaned on the newly developed EMAG laser cleaning machine before being welded.

	ELC 600
Working range	
» Max. workpiece diameter	600 mm 24 in
» NC axis	3 (XCW), optional + 2 XB (lens) + 1 torque test W
» Fixtures, max.	3
» Max. workpiece height	600 mm 24 in
Process modules	
» Weld counter bearing, 1x radial/ axial	1/3
» Max. welding clamping force	100 kN
» CNC controller	SIEMENS SINUMERIK 840D sl
Torque testing system	65 Nm 48 ft-lb
Laser technology (solid-state laser)	
» Max. solid-state laser	8 kW 10 hp
» Welding lens	PRECITEC YW52 or others
» Sensors	PRECITEC LWM, EMAG EC Seam weld detection device or others

EDNA IoT:

MAT MACHINING EUROPE IS PERFECTING HOUSING PRODUCTION WITH IOT PRODUCTS FROM EMAG

For many production planners, “Industry 4.0” is a visionary guiding principle: Machines form a holistic system that production planners monitor, control, and evaluate from a central point.

“We are well on our way to an increase in output of eleven percent.”

Axel Dräger,
Head of Engineering at
MAT Machining Europe

An impressive production solution at MAT Machining Europe, based in Immenhausen, Germany, shows that such an approach is no longer just wishful thinking. This supplier manufactures complex differential gear housings on fully automated EMAG production lines – including extensive data acquisition and evaluation. Objective: The output of the lines is slated to increase by around 11 percent, with process reliability to be significantly improved. The overall system has already been solidly implemented in the workflow.

“We generally rely on highly efficient state-of-the-art production solutions that we are constantly refining. Digitalization is, of course, an important topic,” says Axel Dräger, Head of Engineering at MAT Machining Europe. “At the time, we knew that EMAG has made great strides in connection with Industry 4.0 in recent years, and that it was fundamentally interested in testing new IoT solutions with users and receiving qualified feedback. So, the whole thing is a win-win situation for both companies.”

INCREASE IN OUTPUT

The data is administered by users with the help of the EDNA Lifeline Dashboard, on which the corresponding apps for various functions are installed – the user can configure what exactly can be seen and in which arrangement. “On the whole, the amount of data is actually so diverse that we have only analyzed part of it so far,” explains Dräger. “Nevertheless, the first results are impressive. For example, we have already eliminated various ‘time wasters’ and are well on our way to an increase in output of eleven percent. That is, of course, extremely valuable.”

EDNA

EDNA

Dr. Andreas Kühne
Senior Data Scientist at anacision Ltd.

"The EDNA Industry 4.0 solution, consisting of an IoT core, software, and a dashboard, has been available to all customers for some time. It is winning over more and more users and is constantly being refined," says Kühne, summarizing the current state of affairs of EDNA's development. "According to initial feedback, the OEE increases significantly with EDNA and we even estimate that a return on investment is possible after about a year if the data obtained is evaluated and used to underpin operations."

EMAG has been a strategic investor at anacision Ltd. since 2018. Together, we will develop innovative AI products and solutions for the mechanical engineering industry.

reddot award 2020
best of the best

AWARD-NOMINATED SOFTWARE ECOSYSTEM

Comprehensive functions and state-of-the-art usability – these EDNA approaches also convinced the juries of the UX Design Awards and the world-renowned Red Dot Award to nominate EMAG for each of these awards. EDNA was ultimately selected by the jury as one of the 42 "Best of the Best" from a total of 4,200 entries. In the second round of the competition, the southern German machine builders were once again successful: EDNA reached the final round of the "Luminary Award" along with only four other participants.

EMAG VIDEO

Watch the video of our visit to MAT Machining Europe

OP 30 I POLISHING

OP 20/20 I CHAMBERING

OP 10 I DEBURRING

FINAL CLEANING

PRESERVING

ELECTROCHEMICAL MACHINING

FULLY AUTOMATED COMPLETE MACHINING USING ECM TECHNOLOGY

WORKPIECES

Spur gear

Rotor bracket

Valve plate

Cylinder

Shaft

ECM

CYCLE TIME
60 sec.
per component

HIGHLIGHTS

- Robot control via job instructions
- IoT interface possible
- Data acquisition, evaluation and management
- Digital solutions (dashboard)
- Asynchronous processing of all OPs
- Traceability with an interface to the customer control system
- One controller for the the whole system
- Options:
  - Orientation using cameras or sensors
  - Cycle time-neutral loading by turntable
  - Integration of stack cells
  - Customized versions

Deburring, chambering and polishing ... all in just 60 seconds per component. In this example, the machining of a high pressure cylinder, the efficiency of the ECM technology becomes clear. EMAG ECM in Heubach specializes in these challenging machining processes and has extensive experience in process design. From a single machine to multi-stage, flexible machining systems. From large batch sizes to frequently changing families of parts – ECM technology can be used to implement a large number of production scenarios for a wide variety of components. The advantages of ECM technology are recognized and requested by more and more companies and offer an interesting alternative to mechanical machining.


Injector body


Housing


Scroll


Pump casing

EMAG MEDIA LIBRARY

You can find more information about ECM in our EMAG media library

EMAG PAYS A VISIT TO:

BÄRINGHAUS & HUNGER FROM GRÜNHAINICHEN NEAR CHEMNITZ

From a 3-person operation in a small warehouse to an established medium-sized enterprise with a workforce of 120 people in just 30 years – Bäringhaus & Hunger can look back at an impressive history of success. EMAG machines are responsible for at least some of that success. Today, the company machines lots of different parts in quantities between 1 and 200,000 per year. The range extends from turned parts such as ratchets, axle journals, and joints, heavy-duty machining parts such as knuckles, and even aluminium milled parts such as bottom crankcases.

«

Entirely different generations of EMAG machines operating the different production buildings: The precision machining of shafts is the domain of the VT 2-4.

"EMAG machines have certainly contributed to part of our success."

Managing Director Matthias Hunger

Almost exactly 27 years passed between these photos – the first generation VSC machine is still working though. Production Manager Jürgen Auerbach (in the left-hand photograph next to EMAG Sales Partner Dietmar Sauer) has been with the company since the very start (3rd from right).

PICK-UP TECHNOLOGY IMPRESSES THE FOUNDERS

The company's long term development started in 1991. Shortly after the fall of the Berlin Wall, Gerd Bäringhaus and Reiner Hunger opened the business on the site of a paper factory in Grünhainichen. The founders were initially satisfied with a small former warehouse in which they manufactured track width enlargement kits for cars using four used machines. The first expansion to the working area took place just two years later.

That also marked the start of the company's long term partnership with EMAG. A new VSC machine enabled them to soft-machine bevel hubs – although, this machine model had only been launched a short time earlier. At that time, EMAG was the only manufacturer that could supply a vertical turning machine whose suspended working spindle could be adjusted in the main axes. Every machine in the VSC series is a complete manufacturing cell which loads itself using the pick-up spindle – and that was precisely what impressed the managers of a relatively young east German company, as confirmed by shareholder Matthias Hunger, who is now part of the second generation management team along with his brother Sebastian. "First of all, I must emphasize that meeting deadlines, flexibility, and precision are our main priorities. Therefore, every new machine has to fit in with this philosophy. And that is precisely what this original version of the VSC machine series did. We acquired a high performance solution, including automation, at an excellent value for our money. The automation also helps speed things up. The operator places the blanks on the circulating belt and then removes them from the same belt when they have been finished. The machine does everything else including picking up the blanks and clamping them. There is also the added benefit that the machine guarantees high precision processes."

Small footprint and speed are positive features

The specialists have remained true to this approach throughout the company's trading history. In 2001, they invested in the EMAG VL 3 and VL 5 machines and when they purchased a VT 2 in 2015, they started to machine shafts on site – demonstrating once again that Bäringhaus & Hunger always chooses "state of the art." At that time, this machine was a new solution for shafts measuring up to 400 millimeters in length and 63 millimeters in diameter. It really comes into its own for high volumes because the automation guarantees very short chip-to-chip times. The actual turning process, including 4-axis simultaneous machining and short downtimes, is also completed in extremely short cycles. "The space requirement also played a role in this investment decision. The footprint of the VT 2-4 is very small because there is no need for additional storage facilities for blanks and finished parts," adds Matthias Hunger.

A joint success story

"We now have more than 20 EMAG machines. That means that almost all the vertical turning work at our company is carried out using standard technology from one source. That enables us to bundle our capacities to enable us to handle large orders." There is one more major advantage – the specialists based in the state of Saxony have an enormous amount of experience in the configuration of the pick-up production process. This means, for example, that the workpiece carriers for complicated components are designed in-house. The same applies to the process design of the machines. One final thing that should be mentioned is that the first EMAG machine we purchased is still in use at Bäringhaus & Hunger – almost 30 years after first starting production. In its dotage, it still manages to carry out simple turning work. "But we are still as satisfied with it today as we were on its first day," confirms Matthias Hunger.

The circulating conveyor belt with parts storage facility is a major benefit in the process. It means that the machine can be operated with low manpower.

EMAG BLOG

A conversation with the shareholders, Matthias and Sebastian Hunger

HAMBURG UNIVERSITY OF TECHNOLOGY (TUHH):

MANUFACTURING OF COMPONENTS FOR THE "FORMULA STUDENT" RACE CAR

VLC-Machines from EMAG at the TU Hamburg (TUHH)

"Every year, a new electrically-powered formula race car is developed."

Dr.-Ing. Wolfgang Hintze, Professor of Engineering

CHURNING OUT COMPONENTS FOR THE "FORMULA STUDENT" RACE CAR ON THE PICK-UP TURNING MACHINE

"We teach mechanical engineering to our students as a living thing that doesn't just happen at a desk. That is why we are concerned with research-based learning on real projects with the associated high-tech equipment," says Dr.-Ing. Wolfgang Hintze, Professor of Engineering at the Institute of Production Management and Technology (IPMT) of Hamburg University of Technology (TUHH), summarizing the goals of a project in which EMAG has also been involved since 2017.

PROBLEM-BASED LEARNING

It is interesting to see how the students have taken advantage of the EMAG machine, the VLC Series and its processes in the Formula Student competition over the years – i.e., largely independently. The IPMT calls this approach "problem-based learning." Its success is evident from the fact that the number of race car components produced with the VLC continues to grow: While the students "only" manufactured the (very complex) wheel hubs on the machine in 2017, in 2020 there were also center locks, bearing sleeves, the steering column, chassis brackets, a steering wheel locking hub, and much more.

VLC HAS PROVEN ITSELF

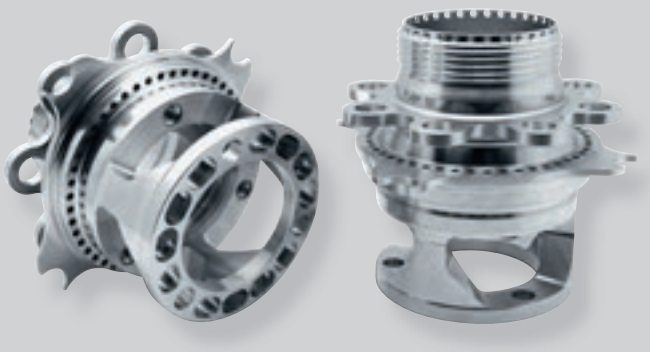
The integrated measuring probe, which is used to check the diameter and length of the component in the set-up after processing, ensures permanent process reliability and machining quality. The developers at EMAG attach particular importance to ease-of-use and accessibility: Therefore, large doors facilitate access to the machining area. Tools and clamping devices are accessible and can be changed quickly and easily. "The latter is very important to us," says Dr.-Ing. Wolfgang Hintze, Professor of Engineering.

(Source: e-gnition Formula Student Team)

EMAG AT HAMBURG UNIVERSITY OF TECHNOLOGY:

Convinced of the technical possibilities of the VLC from EMAG (from left): Student Alexander Wulsten (e-gnition Formula Student Team), Dr.-Ing. Kerstin Kuchta, Professor of Engineering and Vice President Academic Affairs at Hamburg University of Technology, and Dr.-Ing. Wolfgang Hintze, Professor of Engineering at the Institute of Production Management and Technology (IPMT).

The students have independently developed all production processes within the framework of the "Formula Student."



The highly complex wheel hub is machined from solid metal with a total of 15 different tools.

EMAG SAMPUTENSILI:

COMPLETELY PERFECT SURFACES EVERY SECOND

In the production of components for electric motors, perfect surfaces are important: They ensure smooth running at high torques. The example of "tooth flank grinding" with machines from EMAG SU makes it clear how suppliers, general gear manufacturers and OEMs can implement this requirement. The grinding specialists have, in the G 160 machine, access to a special axis concept, which ensures microscopically perfect surfaces. At the same time, the loading technology guarantees minimal cycle times. This is made possible by two workpiece tables that can be moved in parallel and that are moved alternately to the grinding wheel at high speed by means of linear motors. Because of this, the chip-to-chip time is only 1.6 seconds – an extremely short time.

CHIP-TO-CHIP TIME **1.6 SEC.**

TECHNICAL DATA

	G 160
Max. workpiece diameter	160 mm 6 in
Modulus	1.0 – 3.0
Max. workpiece length	300 mm 12 in
Max. tooth width	180 mm 7 in
Swivel angle	+95°/-45°
Max./Min. grinding wheel diameter	275/210 mm 11/8 in
Grinding wheel width	160 mm 6 in
Max. grinding speed	80 m/s
Dressing tool diameter	123 mm 5 in

WORKPIECES

Planet gear

Planet gear

Sun gear shaft

Gear wheel

TECHNICAL DATA

	G 250
Max. workpiece diameter	250 mm 10 in
Modulus	0.5 – 7.0
Max. workpiece length	550 mm 21 in
Max. tooth width	380 mm 15 in
Swivel angle	+45°/-45°
Max./Min. grinding wheel diameter	250/90 mm 10/3 in
Grinding wheel width	180 mm 7 in
Max. grinding speed	80 m/s
Dressing tool diameter	123 mm 5 in

G 160: VIRTUAL TANGENTIAL AXIS

The Y-axis and Z-axis of the machines presented here generate a “virtual” tangential axis through simultaneous movement. As a result, the grinding wheel is close to the pivot point of the indexing axis, which has a positive effect on the vibration behavior during grinding. The result: optimal surface structures of the finished components.

BLOG POST

Read the full interview here

“The high torque of electric motors leads to special surface requirements for shafts and gears. Even minimal ripples in the surface lead to static noise.”

Alexander Morhard of EMAG SAMPUTENSILI

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