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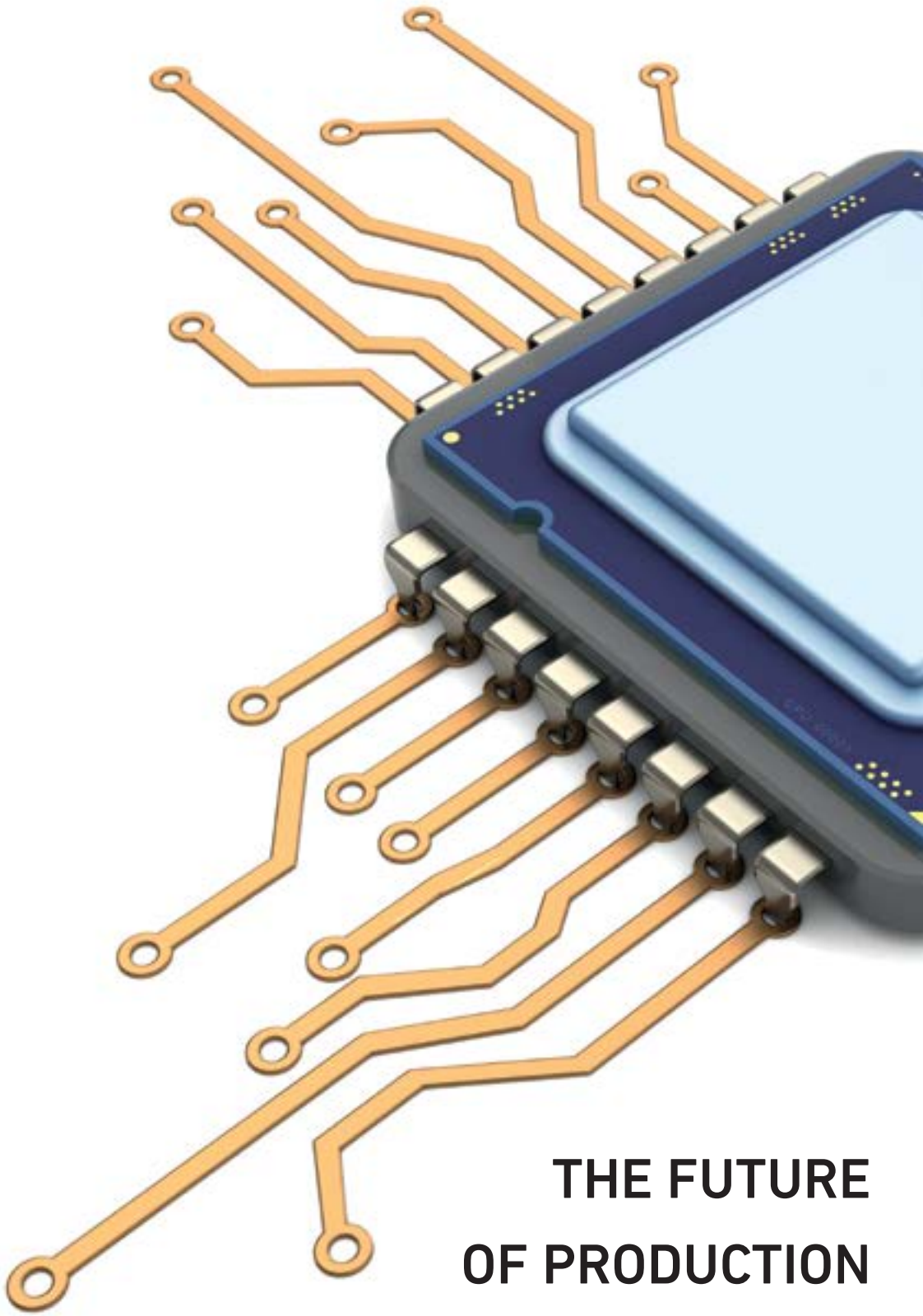
THE MAGAZINE OF
OTTO BIHLER
MASCHINENFABRIK
GMBH & CO. KG
2020/2021



THE FUTURE OF PRODUCTION

Shaping efficient processes

Production in the future will have to be fast, flexible, scalable and also cost-efficient. Consequently, it is necessary to rethink processes and design them to run more efficiently. Symbolized by the microchip, this approach provides solutions for everyday work in an environment characterized by ever shorter product lifecycles, growing numbers of product variants and an ever shorter time-to-market.

b. on top The magazine of Otto Bihler Maschinenfabrik GmbH & Co. KG

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“EFFICIENCY IS BECOMING A VITAL FACTOR OF SUCCESS”

Dear readers,

The period of the Covid pandemic has confronted us all with many changes and a lot of work still remains to be done. However, it has also given us the opportunity to rethink our existing strategies and directions of travel. One of the most important aspects of this is the chance to analyze our existing processes dispassionately and improve them wherever possible. This is true of all manufacturing companies and applies equally to Otto Bihler Maschinenfabrik. We have used the time to develop a new manufacturing concept for the production of the future. It is a modular, intercompatible and flexible complete system that will make your production operations even more reactive and powerful. In this way, you will achieve the necessary efficiency since this will become an even more crucial factor of success in the future.

At the same time, we will support and accompany you, our valued customers and partners, with our long-standing know-how and expertise - in one-to-one discussions or in the form of our Bihlerplanning web app which we make available to you for your production planning. This support has always been a central pillar of Bihler’s corporate philosophy and is something you can rely on at all times. In this way, we can implement new, pioneering projects, as the numerous examples in this edition show, and achieve success though our mutual cooperation. We hope you find the current edition inspiring,

Mathias Bihler
(Partner and Managing Director)

b.on top 2020/2021

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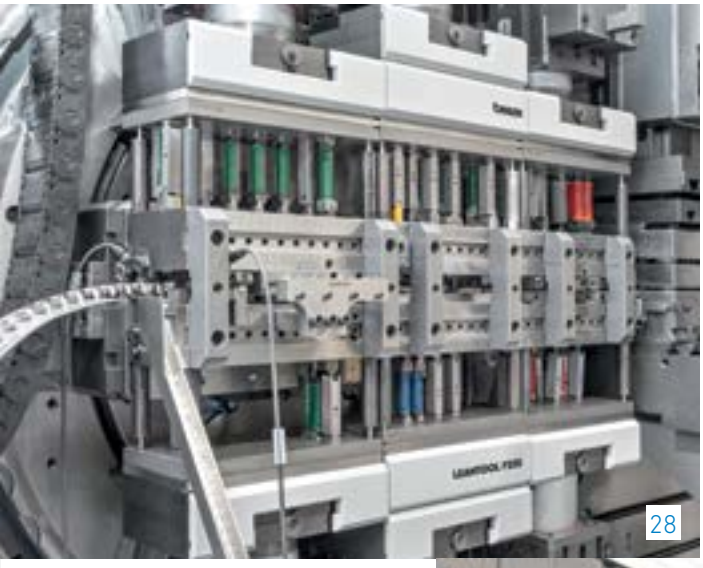

THE NEXT GENERATION FULL OF TALENT

From toolmakers to electronic engineers and product designers and on to industrial management assistants – training young people to fill highly-qualified specialist roles has always been one of Otto Bihler Maschinenfabrik's top priorities. It is not for nothing that the company has been designated as a business offering outstanding training opportunities by the Swabian Chamber of Trade and Industry for the eighth time in a row. Two young Bihler employees recently shone for their particularly impressive achievements, which placed them among the best in the entire Allgäu. Thus, the 20-year-old Johannes Keck completed his trade examination with 90 out of a total of 100 possible points and was immediately taken on by Bihler. He now works in the assembly department in Halblech. And Daniel Stich, who achieved as many as 96 of the possible 100 points as an electronic engineer for automation technology, was also commended for his outstanding performance. The 23-year-old is currently writing his bachelor thesis in Bihler's Control Technology department. These two talented young men are very much enjoying their work at Bihler and agree in saying: "The work is exciting and varied because we are always confronted with new tasks. "That makes it a lot of fun and never boring." ●

The best young skilled workers in the entire Allgäu: Daniel Stich, electronic engineer for automation technology (left), and Johannes Keck, toolmaker.

FOCUS ON THE CONNECTOR INDUSTRY

Since March 2020, Kay Wesendrup has been working for Otto Bihler Maschinenfabrik as a new Key Account Manager for Germany, Austria and Switzerland (DACH). His work focuses on supporting and further developing strategic relationships with Bihler customers involved more specifically in the plug connector industry.

In this role, the 42-year-old is also concerned with new developments in the technology and product fields as well as with analyzing the potential for future Bihler products. The state-certified toolmaker brings a wealth of experience with him. Thus, Kay Wesendrup previously worked as Group Head for New Tool Construction and as Deputy Design Manager for long-standing Bihler customers. "I'm looking forward to being the first point of contact for new tasks for both new and existing customers and working with them to build on our shared success in a spirit of partnership-based cooperation," explains Wesendrup. ●

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"Connector Industry"
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kay.wesendrup@bihler.de

A GLOBAL PRESENCE

Whether it's to find a technical document, how-to video, information flyer or company news – the Bihler homepage at www.bihler.de provides a wealth of information, knowledge and know-how covering every aspect of Bihler technology. This is the first port of call for many users, customers and prospects, who always find up-to-date, perfectly prepared articles on the subjects that interest them here. "The Bihler homepage is our company's business card and reflects the technological expertise, innovative strength and spirit of Otto Bihler Maschinenfabrik," emphasizes Pedro Gato López, Head of Corporate Communication & Marketing at Otto Bihler Maschinenfabrik. The website is constantly being extended with new, up-to-the-minute content and Bihler recently redesigned it to give it an even more global appeal. As a result, the Bihler homepage is available not only in German and English but also in Italian, French and Spanish. In early 2021, the Chinese pages will go online and a little later in the year, the Bihler homepage will also be available in Japanese. There are also special landing pages for users from the USA, Mexico and India. Take another look at www.bihler.de – it's worth it! ●

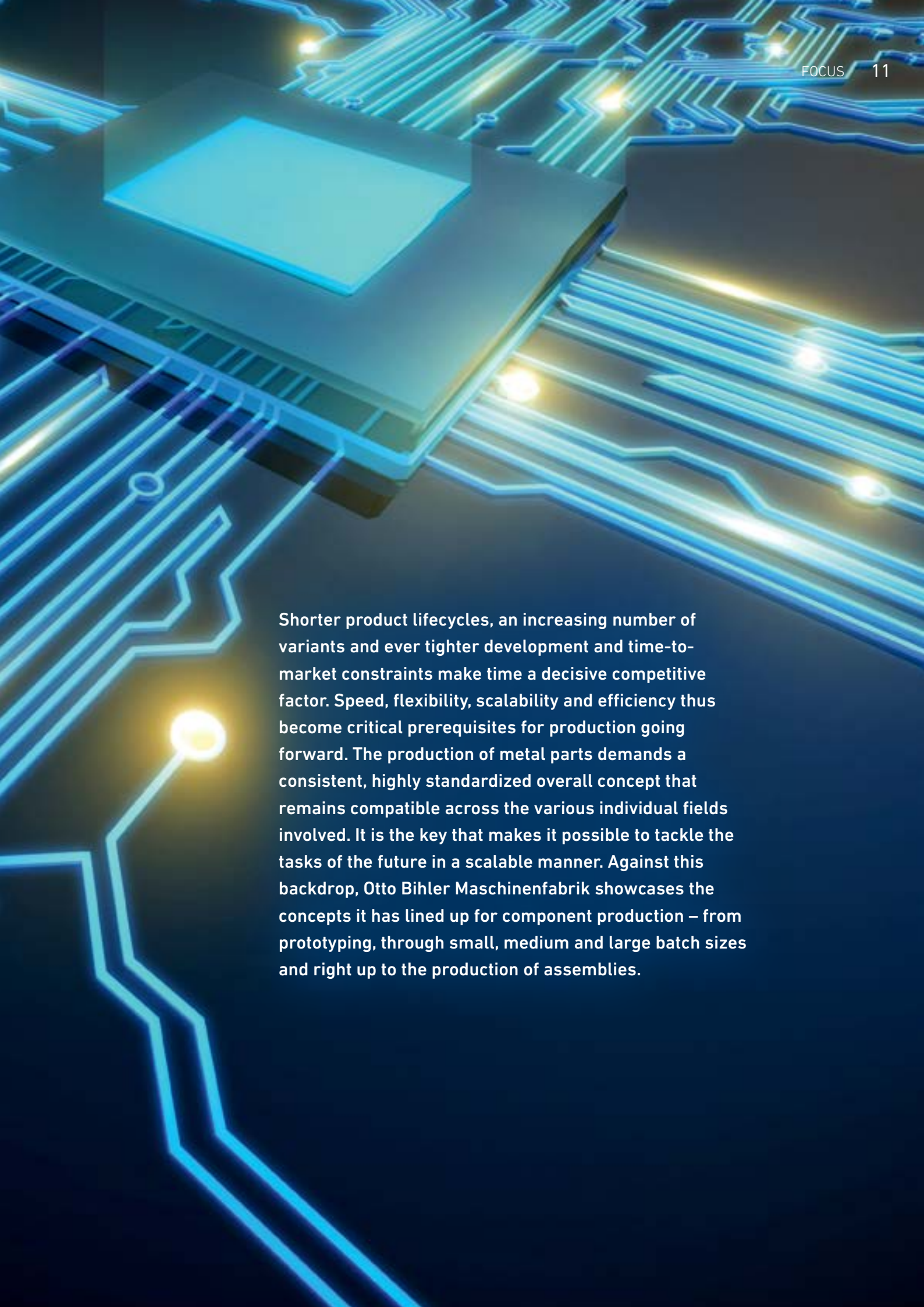
REVOLUTIONARY RESEARCH PROJECT

Otto Bihler Maschinenfabrik recently launched a research project in collaboration with the Institute for Metal Forming and Casting at Munich Technical University. The revolutionary objective: To compensate for the influence of fluctuations in material batches on parts quality by means of an in-process inline measurement concept. The background: Process-related interfering factors and variables are reliably kept in check, in particular when Bihler plant and equipment is used. By contrast, material fluctuations in the steel strip that is to be machined constitute a significant problem because these have an impact on the part's spring-back behavior. Indeed, any given coil will exhibit different thicknesses and mechanical characteristic values and these differences are only exacerbated when material is taken from different batches. In the past, it has not been possible to detect these fluctuations and, instead, they have had to be captured at process level – a time- and cost-intensive solution. The project, which is being run on a Bihler GRM-NC, analyzes the strip material using eddy current and capacitive sensors. Thanks to the characteristic values generated by this analysis, fluctuations in the batch can be detected directly in-process and taken into account during bending – thereby opening up the potential for considerable savings. ●

READY TO FACE THE CHALLENGES?

THE FUTURE OF PRODUCTION

SHAPING EFFICIENT PROCESSES

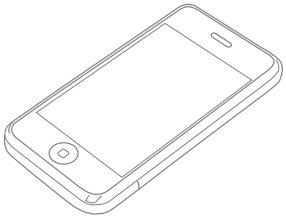


Shorter product lifecycles, an increasing number of variants and ever tighter development and time-to-market constraints make time a decisive competitive factor. Speed, flexibility, scalability and efficiency thus become critical prerequisites for production going forward. The production of metal parts demands a consistent, highly standardized overall concept that remains compatible across the various individual fields involved. It is the key that makes it possible to tackle the tasks of the future in a scalable manner. Against this backdrop, Otto Bihler Maschinenfabrik showcases the concepts it has lined up for component production – from prototyping, through small, medium and large batch sizes and right up to the production of assemblies.

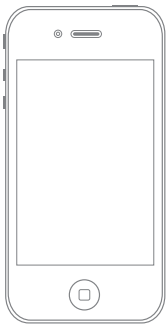
No matter whether we are talking about smartphones or cars, laptops or TVs, new products are coming onto the market at an increasingly rapid rate while at the same time, product lifecycles are becoming dramatically shorter. Nowadays, it is commonplace for new products such as laptops or desktops to appear after just three or four months thanks to a constant stream of innovations and enhanced performance options. And in the automotive sector, the average product lifecycle for a car in the 1970s was eight years, but by the 1990s this had fallen to a mere three years. Today, a car gets its first facelift after two to three years at the latest, while in the smartphone market the same timeframe sees the launch of completely new models. Reduced product lifecycles have seen an attendant slashing of development times. Shorter lifecycles and development times are driven not only by technical progress and customer demands, but also by competition. After all, there are countless suppliers for any given type of product on the global market, and in saturated markets in particular, manufacturers have to constantly offer new, innovative products in order to stand out from the crowd. In parallel with this trend, the number of variants of a product is increasing significantly. In the 1980s, for example, the Mercedes-Benz model range comprised only five models, whereas today it covers some 30 types. And even within each individual model type, there is an increasing range of options and configurations for the customer to choose from, with well over a thousand variants for the door trim or the headlining of a vehicle on offer for example.

Time: the key to success Ever shorter product lifecycles, the increasing number of variants and ever tighter development and time-to-market timeframes ultimately mean that time is becoming the crucial parameter that determines success – across the entire value chain. And this of course also applies to the production of metal components. "The time taken for process development from the initial idea to the finished product is increasingly playing a decisive role, and speed will be crucial in the future in order to acquire orders and manufacture successfully," explains Mathias Bihler. To achieve this speed in developing processes, it is imperative for manufacturers to design their development and value creation processes efficiently and thus be able to respond quickly, flexibly and hence also cost-efficiently to the given customer and market requirements – in other words, ultimately to differentiate themselves from the competition. And in manufacturing, the clock effectively starts running from the initial customer inquiry. Mathias Bihler: "Right from the initial inquiry for a component, the aim is to make judgments about feasibility as quickly and accurately as possible, as well as to quantify the costs for development, the tool, the processes and the component itself, including additional industrial production. Another crucial issue is how quickly the first sample parts can be delivered." Only those who can considerably reduce the time needed in the run-up to bidding have a chance of winning the contract. And afterwards it is still necessary to keep times to a minimum – for tool development up to the initial component samples just as much as in subsequent production, especially when the component goes into mass production or it evolves into an assembly.

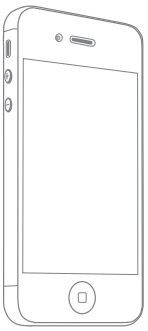
Highly efficient complete solution Otto Bihler Maschinenfabrik offers a consistent, highly standardized and fully intercompatible complete system to meet such demands. It is based on the latest Bihler machine and tool technology in the form of the Bihler LEANTOOL system in combination with the GRM-NC automatic servo stamping and bending machine, the new LM 2000-KT and LM 2000-NC stamping and bending machines, a BZ processing center currently under development and the BIMERIC servo production and assembly system. What makes this solution so special is that the central LEANTOOL tool can be used in a variety of ways on any of the Bihler systems without any need for adaptation. All users can thus produce assemblies as well as stamped and bended parts from strip and wire material extremely quickly and flexibly in practically any required batch size and quality. Mathias Bihler: "It is a flexible, modular and fully intercompatible complete system that represents the future of production and offers perfect coverage of all customer requirements." "It offers users all the manufacturing potential they desire, both as regards high part volumes and with respect to additional value-added steps." This scalability, coupled with the extreme speed, flexibility and efficiency of the overall system, is unmatched in the industry and opens up entirely new dimensions for the user in terms of competitiveness and market positioning.



November 2007:
iPhone (2G)



June 2010:
iPhone 4



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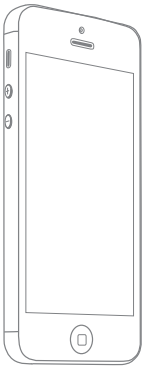
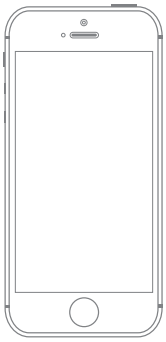
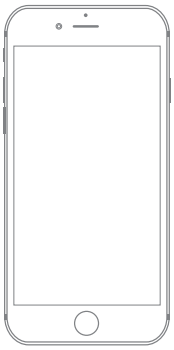
iPhone 4S



September 2012:
iPhone 5



September 2013:
iPhone 5s



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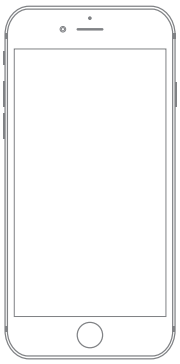
iPhone 6



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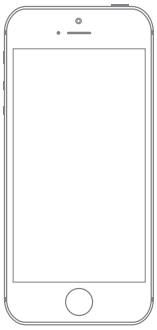
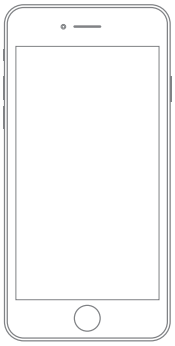
iPhone 6s



March 2016:
iPhone SE



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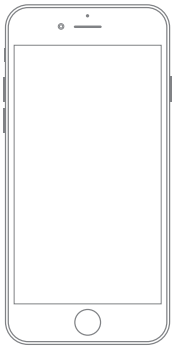
iPhone 7



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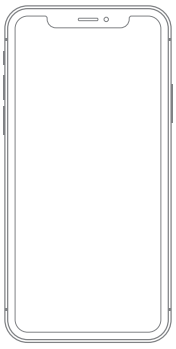
iPhone 8



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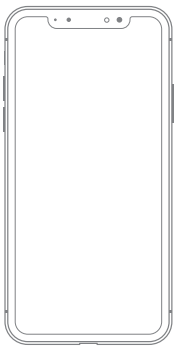
iPhone X



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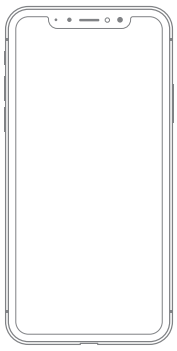
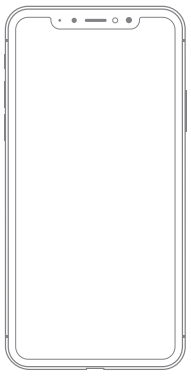
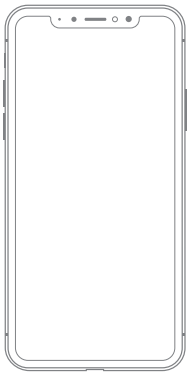
iPhone XS



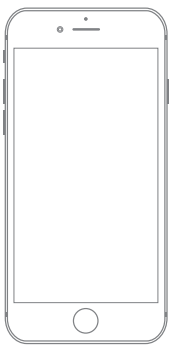
October 2018:
iPhone XR



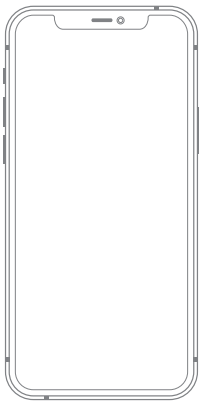
September 2019:
iPhone 11



September 2019:
iPhone 11 Pro



April 2020:
iPhone SE (2020)



October 2020:
iPhone 12

October 2020:
iPhone 12 Pro

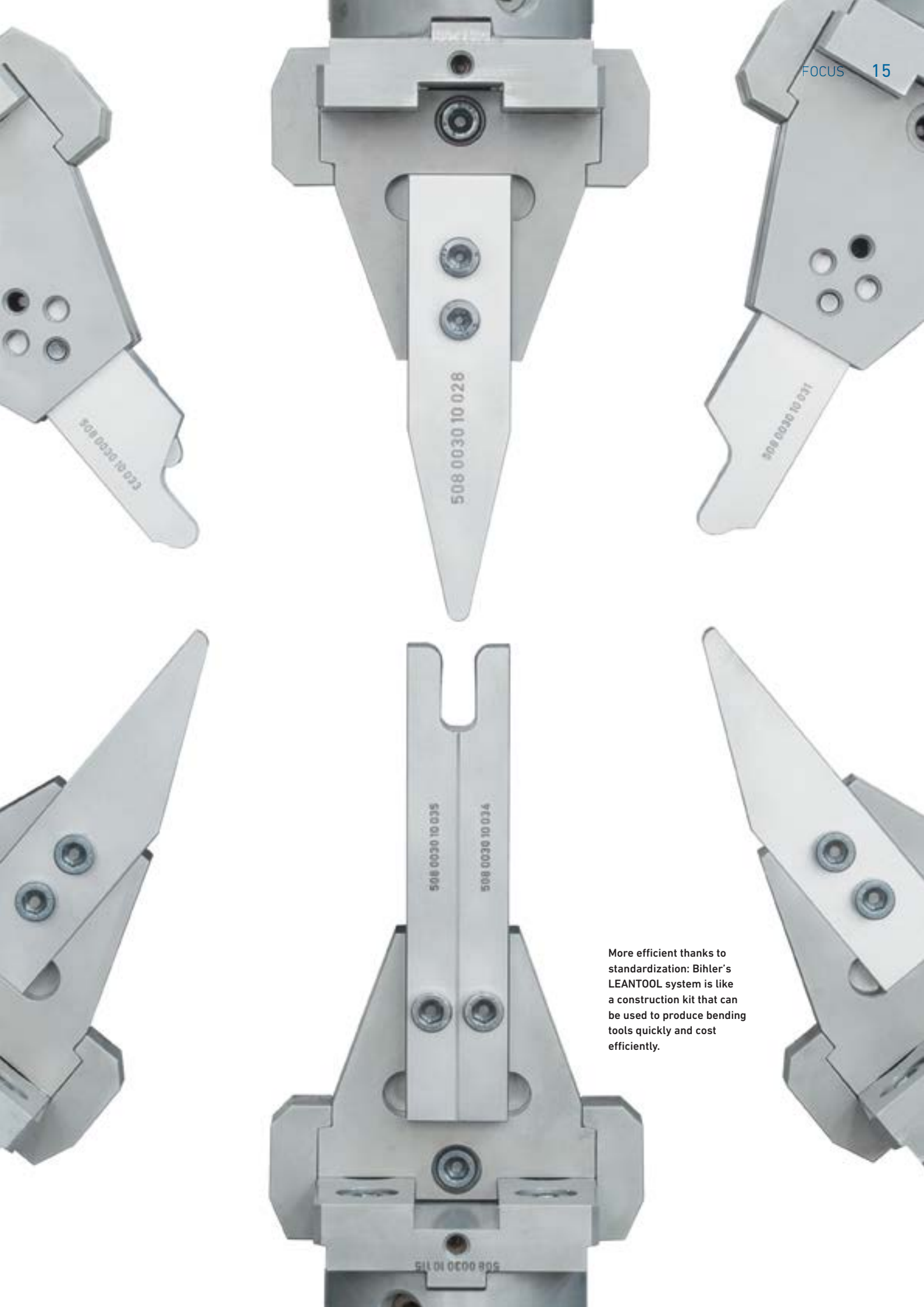
Rapid change through the generations: Since the first iPhone in 2007, almost 30 different models have been launched up to 2020. Some were new generations and some were model variants such as “S”, “Plus”, “Max” or “Mini” within one generation.

Standardized added value At the heart of the production solution of the future lies the standardized modular Bihler LEANTOOL system for developing tools based on radial or progressive principles. The outstanding feature of this system, which also includes the standardized Meusburger cutting frames that will be available shortly, is the wealth of standard parts that can be used to configure corresponding tools. This not only ensures that tools can be produced rapidly, which is of the essence, but also makes tool development particularly cost efficient. Furthermore, the large number of standard parts minimizes risks in up-front costing, as their costs are known precisely. Another major advantage is that the LEANTOOL system makes the development of a tool a far simpler and more transparent job than before because the standard parts and standardization of the machines allow the engineer to concentrate entirely on designing the stamping and bending process. The resulting LEANTOOL tool is compatible with all Bihler machines in the new complete system and can be used for prototype and sample production and then unchanged in subsequent series production and assembly. This eliminates the need for complex and costly custom tools, reduces errors during development and ensures 100-percent reproducibility of the components – all with a very short time to market.

Simple transfer of tools In practice, users can therefore easily transfer the tools they have developed for a Bihler GRM-NC automatic stamping and bending machine to all servo-controlled and cam-controlled Bihler systems in the complete system. The benefit of this is that all the movement profiles of the tools optimized on the GRM-NC can be used one-to-one to produce cams, and the user can thus migrate a fully developed NC concept directly to cam technology. And if the customer now needs to carry out further work on the component and thus ultimately produce complex assemblies, the user can carry over the tools onto the modular BIMERIC platform, where the corresponding value-added steps such as welding, thread cutting, screw insertion and parts handling can be performed.

Combined performance capabilities The intercompatibility of the Bihler systems guarantees very fast tool changes and retooling operations, usually in less than an hour. The simple and intuitive Bihler VariControl VC 1 controller forms the central control platform for all Bihler modules used. Importantly, the complete manufacturing solution also includes the many help and support services that Otto Bihler Maschinenfabrik offers all users throughout the entire manufacturing process. One highlight in this context is the Bihlerplanning web app. It provides valuable information on component design right at the start of the process, dramatically reducing the time it takes to prepare a quotation. In addition, comprehensive maintenance and service offerings provide valuable support and minimize machine downtime. These include the new Bihler AR Remote Service realtime streaming offering and the VR offerings for training and sales purposes, for example, as well as the tried and tested Bihler spare parts service.

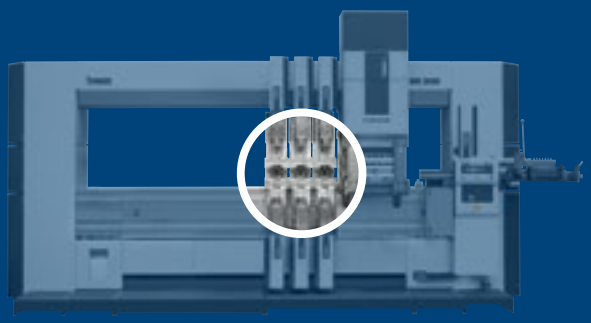
Universal deployment Another important aspect is that the Bihler LEANTOOL system in particular contains a whole host of help and support services that make it especially easy and attractive for younger employees to get to grips with Bihler technology. Another plus, especially for the younger workforce, is that the completely digitalized Bihler solution offers full networking capability and provides ideal conditions for digital production in line with the principles of Industry 4.0. "The entire manufacturing solution represents a universal standard in terms of both machine and tooling technology. This can be used regardless of location when tools are relocated across the globe by major corporations," says Mathias Bihler. "This ensures maximum flexibility and scalability, which is ideal for responding to decreasing batch sizes and increasing variant diversity, and all with extremely short setup times, reproducible results and cost efficiency." The use of NC technology guarantees the necessary quality of the components, which in turn provides the user with additional reliability in production. At the same time, the NC-based data, which is available in large quantities, forms the basis for future optimization and further developments. And Otto Bihler Maschinenfabrik is already working flat out on these. ●



More efficient thanks to standardization: Bihler's LEANTOOL system is like a construction kit that can be used to produce bending tools quickly and cost efficiently.

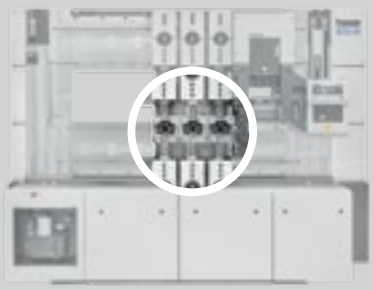
LEANTOOL: ALL-ROUND COMPATIBILITY

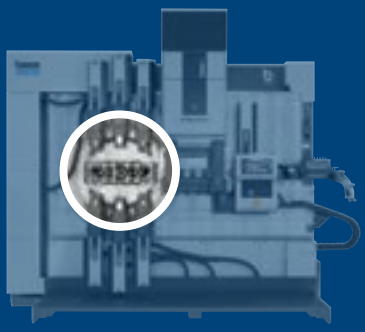
The Bihler production concept of the future is a modular, highly standardized and fully intercompatible complete system with the compatible LEANTOOL F250 tool at its heart.



BIMERIC MODULAR

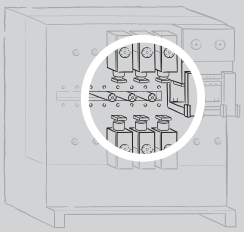
The Bihler LEANTOOL F250 tool can be quickly and easily transferred to the new BIMERIC Modular in order to produce assemblies.
For more information, have a look at page 20 onwards.





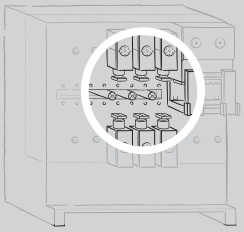
GRM-NC

The GRM-NC automatic stamping and bending machine is a universal machine that is suitable for LEANTOOL Radial and LEANTOOL F250 as well as for adapting GRM tools. (Prototype and sample part production, short and medium runs). For more information, have a look at page 18 onwards.



LM 2000-KT

Cam-controlled: The LM 2000-KT is the latest cost-efficient production system for small, medium and large batch sizes with a maximum cycle rate of 250/min and is compatible with the Bihler LEANTOOL F250 tool.
For more information, have a look at page 26 onwards.



LM 2000-NC

Servo-controlled: The LM 2000-NC is a cost-effective, NC-based stamping and bending machine for small to large batch sizes and has a maximum cycle speed of 250/min. For more information, have a look at page 26 onwards.

BZ 4000-KT

In development: For mass production with extremely high volumes (up to 700/min), the Bihler LEANTOOL F250 tool is being ported to the freely configurable BZ 4000-KT processing center.

COMPATIBLE AND FLEXIBLE

When it comes to the manufacture of small to medium batch sizes in a large number of different variants, then the multi-talented GRM-NC in combination with the Bihler LEANTOOL Radial and progressive tooling concept is the perfect solution. In this way, users can manufacture all their new tools simply and quickly and launch new products on the market significantly faster and more economically than their competitors.

The Bihler LEANTOOL F250 system for developing bending tools for progressive tooling technology is also used with the GRM-NC. This servo stamping and bending machine is equipped with the basic LEANTOOL variant. This provides the standardized interface to the tool and contains the tool holder and the LEANTOOL module. As standard, this includes the standardized parts for the rams and units, together with the blanks, the plate assembly and the other functional components such as securing elements and the basic equipment. GRM-NC machines built before 2019 which do not possess this basic variant can be equipped with a special upgrade for the Bihler LEANTOOL F250 system. The Bihler LEANTOOL F250 system consists of 60 to 70 percent standard parts, thereby reducing manufacturing costs by up to 50 percent compared to conventional progressive tools. In this way, all users can manufacture new tools extremely simply and quickly – and launch the corresponding components on the market significantly faster and more economically than their competitors.

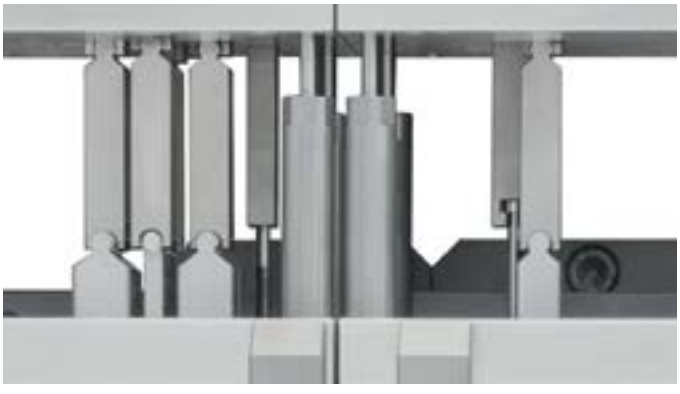
Dual standard On the GRM-NC, the LEANTOOL F250 tool is used in the form of independent bending units. With a total machining length of 1,400 mm, the basic configuration has space for a press and three bending units of a length of 250 mm each. Thanks to the LEANTOOL F250 system's standardized interfaces, these can be set up and changed particularly quickly, thereby further increasing the efficiency of the system. However, the high standardization level of the GRM-NC is not simply limited to bending but also increases the machine's productivity and economic efficiency during stamping or punching operations. This is because the new standardized SBH and SBP cutting

Thanks to the LEANTOOL F250 system's standardized interfaces, all the units can be set up and replaced extremely quickly and easily.

frames, which were developed by Otto Bihler Maschinenfabrik in cooperation with the Austrian manufacturer of standard parts Meusburger, are used for this. These relieve users of the cost- and time-intensive task of manufacturing individual tools, are significantly more economical than custom manufacturing and have the great benefit of ensuring rapid availability.

Flexible all-round machine The combination of the LEANTOOL F250 system for bending operations and the standardized cutting frames for punching work make the GRM-NC stamping and bending machines perfect for the linear production of small to medium batch sizes in large numbers of variants. The GRM-NC can be used as a genuinely all-round machine due to the fact that it combines a number of different tool technologies: Thus, legacy tools from the existing series of GRM mechanical machines can continue to be adapted as in the past, all LEANTOOL F250 Linear tools can be used, and LEANTOOL Radial can also be run. In practice, this high level of flexibility, combined with the extremely short machine setup times provides a number of crucial advantages. Thus, with the GRM-NC, Production Managers always have access to an all-round machine on which they can, in principle, set up any tool they want from the different tool technologies and start production – and do so quickly and easily to ensure very fast reaction times. In the Bihler product portfolio, the GRM-NC is positioned as a flexible all-round machine between the future BIMERIC Modular and the new Bihler LM 2000-KT, the Bihler LM 2000-NC and the BZ 4000-KT. ●

In the Bihler LEANTOOL F250 progressive tooling system, up to 70 percent of all the required components consist of cost-saving standard parts.



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VARIABLE VALUE

Anyone who uses the Bihler LEANTOOL F250 system for bending tools in the field of progressive tooling technology benefits from minimum development times, cost savings of more than half, and an extremely short time-to-market. The corresponding tools can also be used in combination with value-added machining and assembly processes – in the form of independent, standardized process modules running on the new BIMERIC Modular, a machine that can be extended as and when required.

In the past, whenever users wanted to create linear tools, they had to make do with dedicated tools that had to be laboriously developed for each individual project. Recently, Otto Bihler Maschinenfabrik introduced the Bihler LEANTOOL F250 system for this task. This is a standardized toolkit based on the proven Bihler LEANTOOL system, which makes the production of tools for linear bending operations significantly simpler, faster and more economical. In this way, all users can benefit from an end-to-end standard system with a defined structure and a high proportion of standard parts and blanks. A corresponding LEANTOOL F250 bending tool consists of up to 70 percent standard parts, irrespective of the production task in question. As a result, the manufacturing costs are up to 50 percent lower than for conventional progressive tools. Overall, the Bihler LEANTOOL F250 system is a unique toolbox for linear bending operations that makes possible minimum implementation times, cost savings of over a half and an extremely short time-to-market.

Autonomous units The Bihler LEANTOOL F250 system for bending tools in the field of progressive tooling technology can also be used on the Bihler BIMERIC servo production and assembly system in the form of an independent F250 bending module. It is part of the new Bihler BIMERIC Modular which will be available as of mid-2021. The Bihler BIMERIC Modular represents the next BIMERIC generation, which uses standardized process modules instead of individual modules. These bring together all the necessary individual components, interfaces and functions

ADDED

in a process-specific console. The modules are pre-mounted as complete units and attached to the unmodified BIMERIC platform. In addition to the F250 bending module, modules for the feeding and stamping processes are also available at the BIMERIC Modular. Within this system, each individual module is standardized on the basis of the same principle and designed for a strip width of 80 mm. The BIMERIC Modular also possesses so-called PLUS- empty locations. These are used to accommodate custom-built units for individual customer processes - in particular for assembly operations that (cannot yet) be standardized due to their exacting requirements. The advantage is that all the modules are optionally available for use depending on the task in question. In this way, the machine can be operated with a minimum hardware configuration, for example in the form of a single bending module. And if new processes have to be integrated some time in the future then the machine can subsequently be extended without difficulty. Consequently, and in contrast to the previous BM series, users can operate a BM platform at a low investment cost and then upgrade it again subsequently without difficulty. In practice, the increased level of standardization available with the new BIMERIC Modular permits shorter delivery times, simpler retrofitting, improved planning capabilities and therefore also greater production security. The use of the new process modules is optional and the BIMERIC can naturally also be used with custom-built units and individual applications without difficulty as in the past. ●

SERVO PROCESS MODULES

Bending module BMF-250

- Pre-mounted NC units with LEANTOOL-F250 interfaces for very short tool setup times
- Rapid (max. 250/min. depending on the travel profile), precise execution of tool movements
- Freely programmable movement profiles
- Maximum force (40 kN) freely selectable over the entire working area

Thread tapping units (GSE KS)

- Compact thread tapping unit
- Wide range of applications and compact handling
- Very high throughputs of up to 250 threads/min.

NC conveyor

- Flexibly configurable for the fast, reliable transportation and positioning of parts
- High process speeds of up to 150 cycles/min.
- Freely programmable transport paths of max. 100 mm

Servo lift-rotate unit (HDE)

- Versatile, flexible usage thanks to independent, programmable lifting and rotational axis
- Very fast lift-rotate unit

Multiple screw insertion unit (MSE)

- Compact, high-performance multiple screw insertion unit for reliable mass production
- Very high throughputs of up to 180/min.
- Fully-featured system for feeding, separating, positioning and screw insertion

THE BIMERIC

MODULAR

Control

With the VariControl VC 1 machine and process controller, Bihler is taking the criteria of "operator comfort" and "process reliability" to a new, higher level. State-of-the-art software and hardware features make the intelligent controller the control platform for all tasks and guarantee more efficient production. The highly flexible control platform makes it possible to control an extremely varied range of process steps intuitively and reliably – on all Bihler machine types.

Pick & Place units (PPE)

- High-performance Pick & Place units for process-compliant mass production
- Very short cycle times, high speed, maximum repeat accuracy
- Large vertical and horizontal travel paths

"Quickchange" contact welding units

- Flexible in application for the welding of all weldable contact material alloys
- Process-compliant mass production of contact components with very high throughputs of up to 800 welds/min.
- "Quickchange" system for very short setup times

Servo press PM400

- Pre-mounted 400-kN screw press
- High throughputs of up to 250/min.
- Use of standardized Meusburger cutting frame possible

NC linear actuator

- Patented welding module for the precision welding of round and profiled contacts in one precisely controllable linear movement
- Current conduction mechanism integrated in the actuator and directly connected to the transformer (repositioning during the welding process)
- NC travel and force control

RZV 2.1 radial gripper feed

- Non-slip feed system for highly dynamic, precise feeding and positioning of strip and wire material
- Variable feed lengths from zero to infinite
- Multiple clamping for gentle material handing

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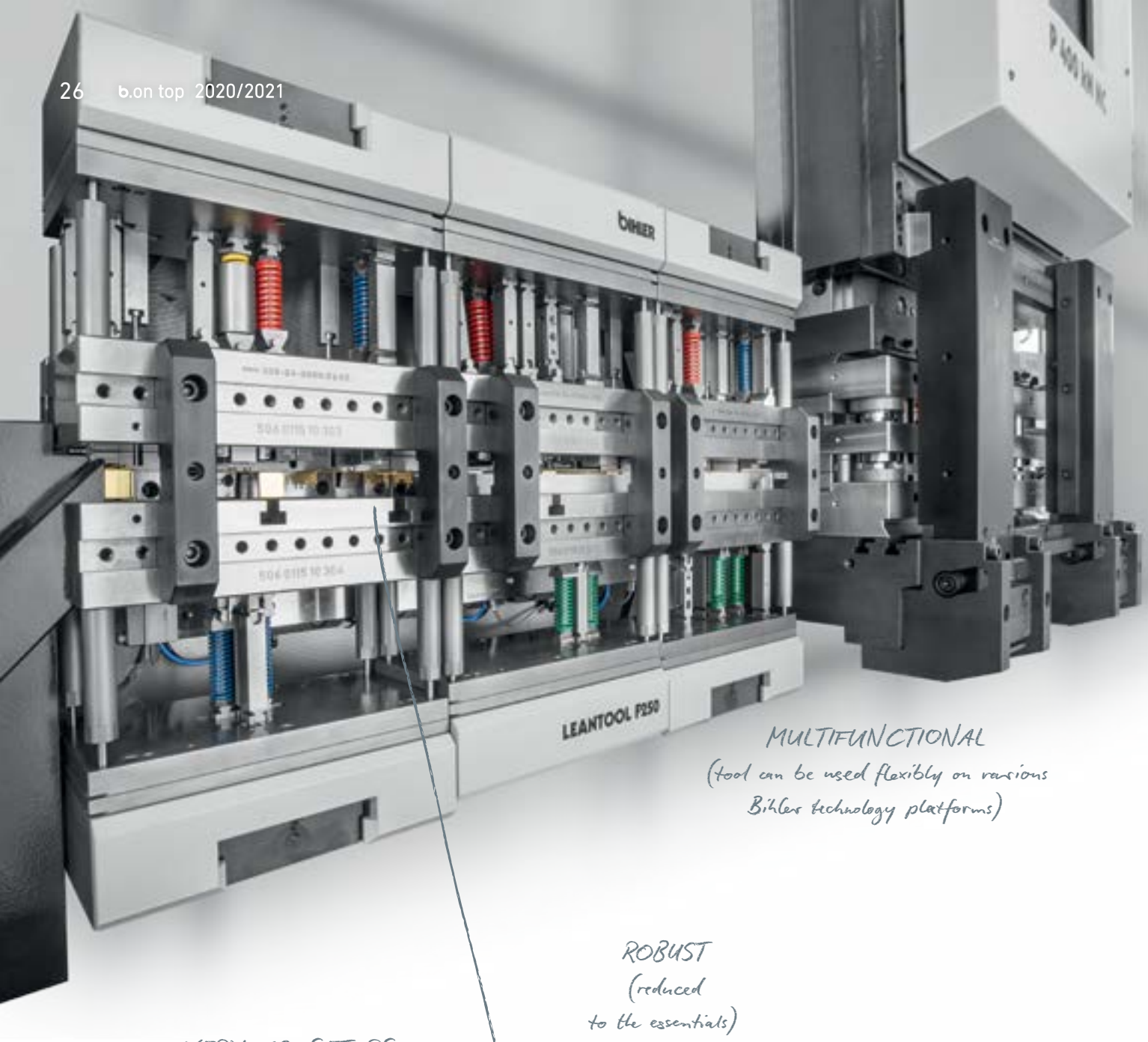
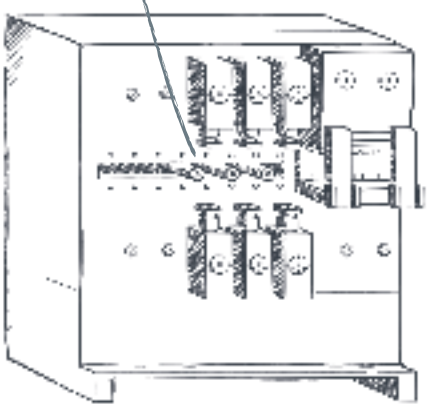


MULTIFUNCTIONAL
(tool can be used flexibly on various Bihler technology platforms)

ROBUST
(reduced to the essentials)

VERY FAST SETUPS
(Tool setup in under an hour)

VERY HIGH THROUGHPUT
(up to 250/min., for small, mid-sized and large batches)



COMPATIBLE WITH LEANTOOL F250
(high proportion of standardized parts and lower tool costs)

FURTHER PROCESS MODULES ARE BEING DEVELOPED
(greater value added)

INTEGRATED MACHINE MONITORING (predictive maintenance)

COMPATIBLE WITH THE GRM-NC AND BM MODULAR
(a safe path to the FUTURE)

SOLUTION FOR INCREASING BATCH SIZES

The new Bihler LM 2000-KT and -NC stamping and bending machines round off the Bihler system portfolio for the LEANTOOL F250 toolmaking series by adding further machine solutions with cams and servo drive. These systems, which have been designed for small, mid-sized and also large batches, are particularly simple and robust and have been slimmed down to the most important functions.

The new Bihler LM 2000-KT and Bihler LM 2000-NC, which will be available as of 2022, are the most recent developments in the Otto Bihler Maschinenfabrik portfolio of standard machines. They have been designed as pure linear tool machines with cams or servo units for the manufacture of stamped and bended parts from strip material. In designing them, the focus has been placed on small, medium and very large batch sizes. What makes these solutions so special is that unlike in conventional mechanical machines with their highly complex individual tools, the two solutions will be fully compatible with the Bihler LEANTOOL F250 system. As a result, all the tools developed using this standard can run on the LM 2000-KT and -NC. "They are completely mechanical machines that are fully compatible with the LEANTOOL system. They are based on Bihler's proven machine technology but carry this forward into a completely new, modern dimension of standardization," explains Christoph Schäfer, Head of Product Management at Otto Bihler Maschinenfabrik. Customers who, for example, have previously manufactured mid-sized order runs on the GRM-NC and now need to deliver higher volumes, will benefit from this standardization. In the future, they will simply need to fit their tool into the new LM 2000-KT or -NC and will immediately be able to start production. However, it will be equally possible to convert tools to the future Bihler BIMERIC Modular, for example if further value-added operations have to be integrated in the manufacturing process. In this way, as high-performance solutions for increasing batch sizes with only limited numbers of variants, the new LM 2000-KT and -NC round off the Bihler machine portfolio for the LEANTOOL F250 toolmaking series.

Simple & robust In line with their clearly-defined range of applications and tasks, the LM 2000-KT and -NC have been designed to be particularly robust and simple and will be reduced to the most vital functions in terms of stamping and bending. Consequently, the systems will have a simple, compact machine body with an integral construction. According to the current planning, this will house the feed mechanism, press, three bending modules (cam- or servo-controlled) as well as the central die. These can be extended to include further process modules such as thread cutting. The electrical hardware for the machine, drive elements and the VC 1 controller will be integrated in the machine body. As a result, the side-operated standalone systems will not require an additional control cabinet. The setup operation for three bending modules, six cams (in the LM 2000-KT) and the repositioning of two central dies and a cutting tool can be completed in less than 60 minutes.

Seamless integration The new Bihler LM 2000-KT and-NC will not be limited to only stamping and bending but will also permit many other further-reaching value-added applications. Consequently, if required, the systems can also be extended by the process modules thread cutting, screw insertion and contact welding under NC control via the B 20K welding controller. As a result, it will be possible to integrate these process modules seamlessly into the basic machines and manufacturing sequences – including high-speed setups and changeovers. At the same time, it will also be possible to use the new Meusburger SBH and SBP cutting frames as standard for press operations. ●

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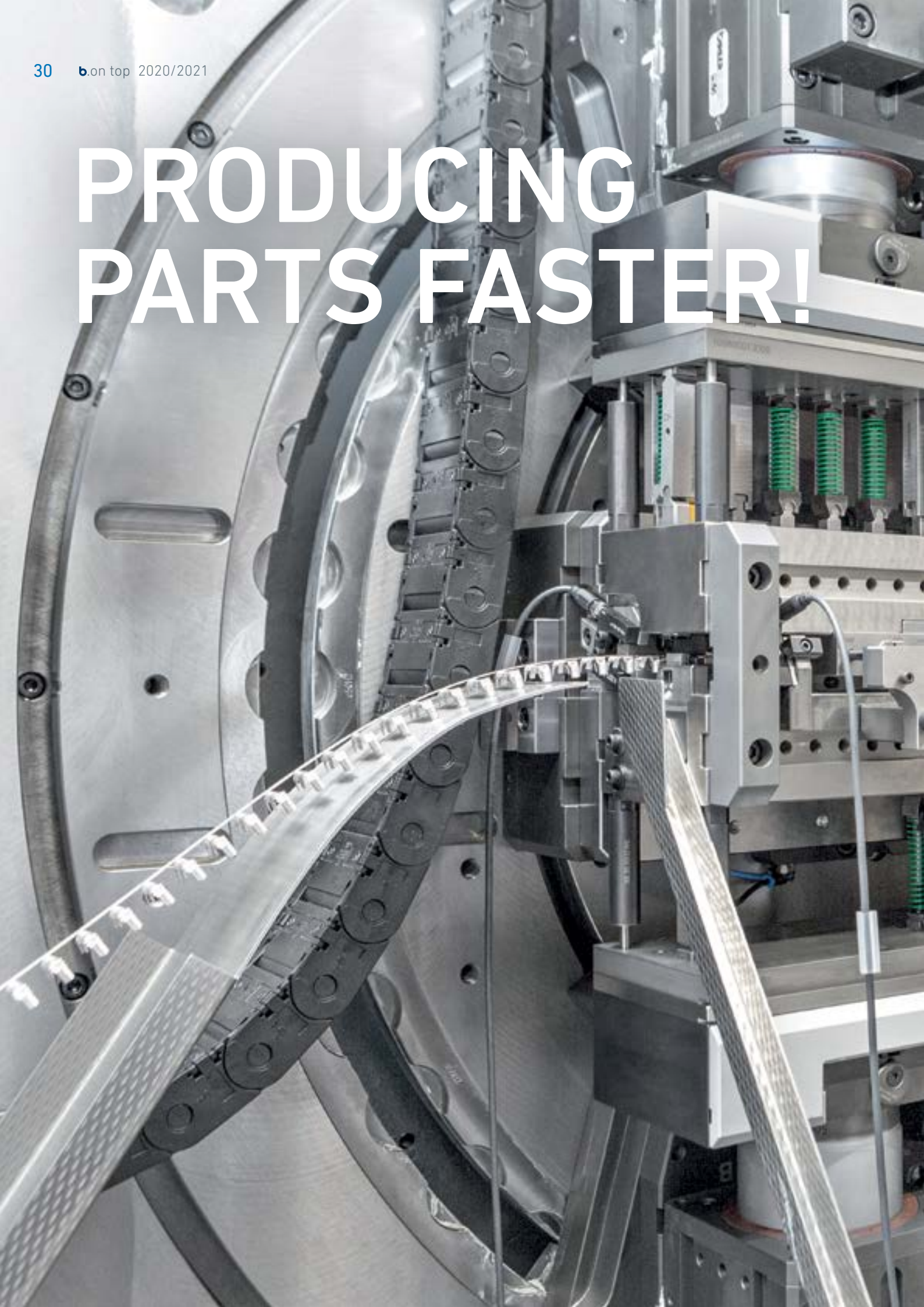
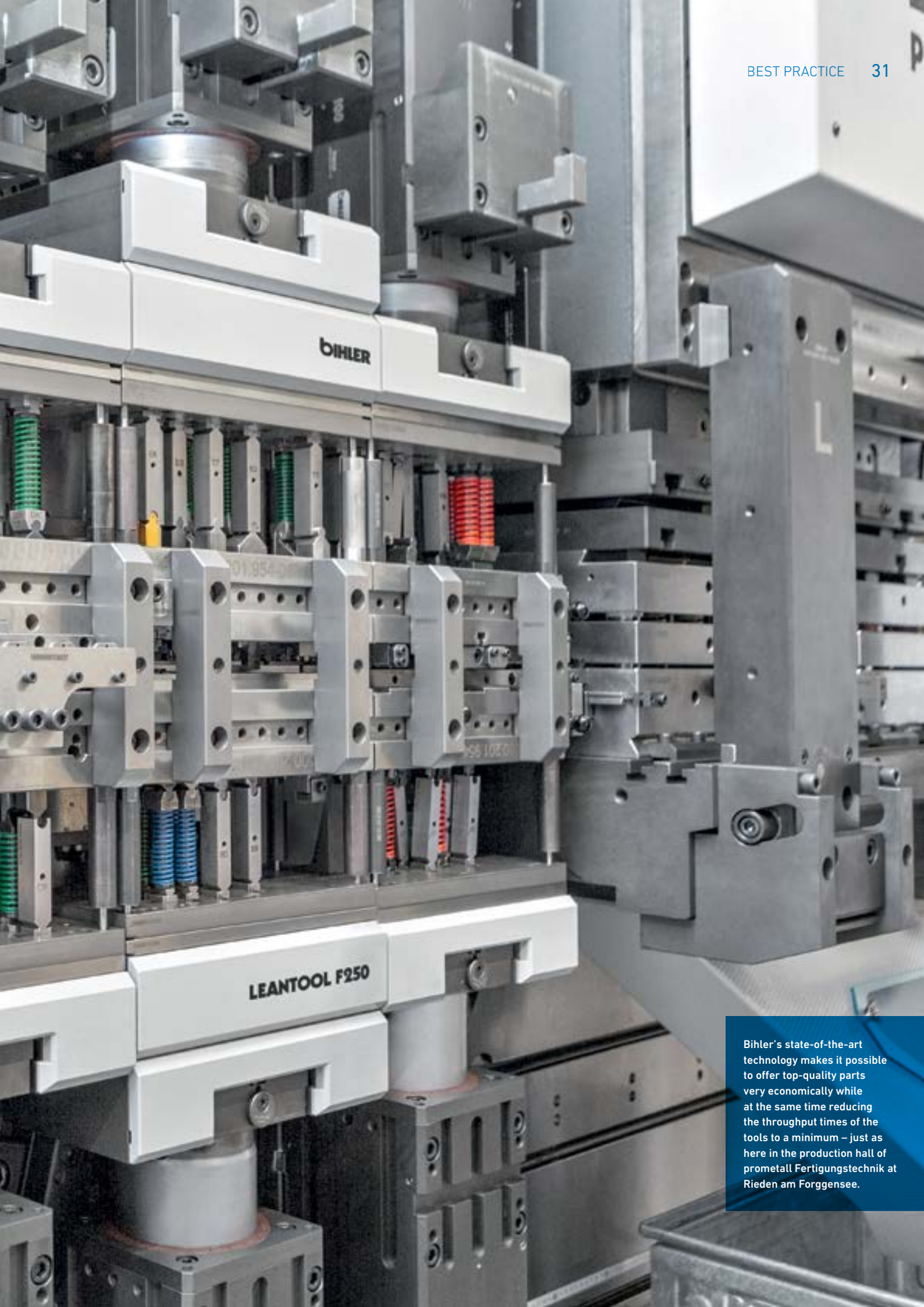
UP TO SPEED?

You have to be up to speed to thrive in today's competitive market. To do this, it is vital to possess the right manufacturing equipment – in order to win new orders and process them profitably.

PRODUCING PARTS FASTER!





Bihler's state-of-the-art technology makes it possible to offer top-quality parts very economically while at the same time reducing the throughput times of the tools to a minimum – just as here in the production hall of prometall Fertigungstechnik at Rieden am Forggensee.

Many parts can be manufactured quickly and economically in outstanding quality using Bihler technology – a fact that has been well known at prometall Fertigungstechnik GmbH in Rieden am Forggensee for many years. And for a recent order for the manufacture of automotive connectors, it was vitally important for the company to use Bihler technology – in the form of a new Bihler GRM-NC servo stamping and bending machine combined with the Bihler LEANTOOL Radial and progressive tooling system.

At prometall, the combination of the Bihler GRM-NC and the Bihler LEANTOOL system has helped cut tool costs by 30 percent, reduced tool manufacturing time by a third and shortened setup times by a half or more depending on the tool.

A lot is going on at prometall Fertigungstechnik GmbH in Rieden am Forggensee. From the milling and lathing machine through the wire and spark erosion systems and on to the punching machine, Bihler stamping and bending machine and a combination stamping/laser machine, almost all the equipment in the ultra-modern prometall machine pool is in use. The company supplies hinges and drawer guides for the furniture industry as well as contacts for the electronics industry and utensils for kitchen use. "Things are going well and we are very happy with the current order levels," reports Andreas Hofer, Managing Partner at prometall Fertigungstechnik GmbH. "One of the secrets of our success is that we have a very broad range of activities, plan and act with an eye to the future, always meet our deadlines and make sure we achieve the highest quality standards." From the very beginning, prometall has been supported in this by technology from Otto Bihler Maschinenfabrik. Andreas Hofer started his training at Bihler in Halblech exactly 50 years ago, at that time still with Otto Bihler. And when Andreas Hofer founded his first company, prometall Werkzeugbau GmbH, as a pure contract manufacturer in 1987, the first series production of stamped and bended parts three years later naturally got underway on a Bihler machine. "Even back then, there were parts that could only be produced on Bihler systems because only these could deliver high production speeds coupled with accuracy of a hundredth of a millimeter," explains Hofer.

Clear decision Technology from Otto Bihler Maschinenfabrik was therefore even then a guarantee for the successful securing of orders – and it still is today.. "At the start of the year, we received a new order for the production of electric contacts for automotive communication," reports Hofer. "We were selected ahead of a number of our competitors because it was clear that we would use Bihler technology to produce the parts, meaning that top component quality was assured." However, it was equally clear that prometall would first have to make the corresponding investments, more specifically in the form of a

Bihler GRM-NC servo stamping and bending machine and the LEANTOOL Radial and progressive tooling system. Andreas Hofer was in no doubt about this decision: "Only businesses that use and fully understand the most recent technology will reap the opportunities present in the market and succeed in the future," says the founder of the company, in which his two sons, Michael and Andreas, now also work. Michael Hofer is responsible for planning new tools, while his brother Andreas heads the design engineering department at prometall.

Perfect technology The decisive factor in the investment in the Bihler GRM-NC and the LEANTOOL system was not just the required quality but also the fact that the contacts could only be produced at the desired speed using the Bihler technology. This is because the highly complex, pairwise module requires a very large number of demanding operations. These include the shaping of an internal bushing in the galvanized part, which is coated with a noble metal, as well as the zero-play insertion of a rolled internal spring which is first stamped and bended from a copper strip measuring one tenth of a millimeter in thickness. The manufacturing process also involves feeding in a plastic pin as a contact protector and, of course, everything is completely oil and grease-free. "The technology is simply perfect for this application," explains Andreas Hofer.

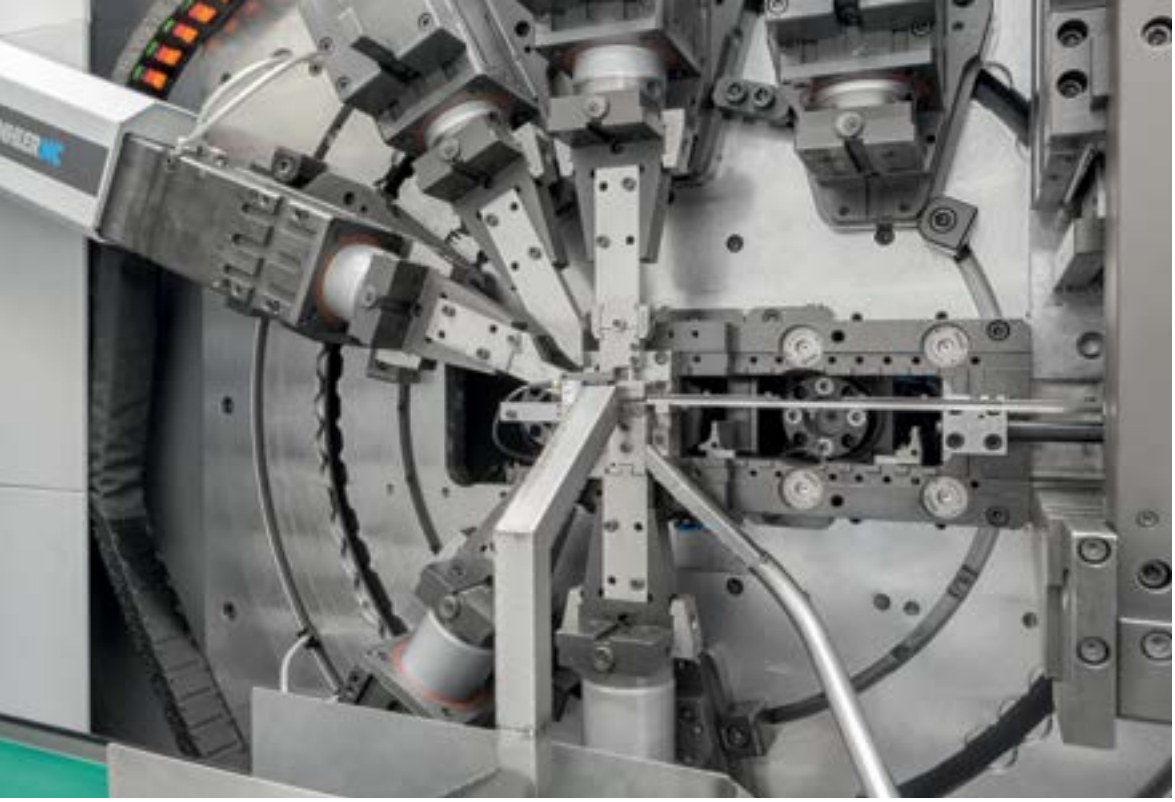
Concrete benefits As usual, prometall produced the entire design and all the tools for the new automotive contact itself – however, on this occasion also on the basis of the Bihler LEANTOOL concept for radial and progressive manufacturing. The advantages of this system were soon demonstrated in practice, even independently of the new contact production order: "In combination with the GRM-NC, the LEANTOOL modular system makes it possible to produce sample parts and small runs particularly economically and in top quality, while simultaneously reducing the tool throughput times to a minimum," says Michael Hofer. "More concretely, this solution enables us to save 30 percent in terms of tool costs, while also being able to manufacture

Only businesses that use and fully understand the most recent technology will reap the opportunities present in the market and succeed in the future – that is the firm conviction of the company's founder Andreas Hofer.

the tools themselves in only two-thirds of the time it used to take. And in the production hall, the setup times have been more than halved to an average of two to six hours," confirms Andreas Hofer junior.

On-time delivery Alongside the high component quality and reduced costs, this time saving is another secret of the success of this company, which now already has two Bihler GRM-NC machines. "With Bihler, we are simply faster and more economical for certain parts," says the company's founder Andreas Hofer summing up. As a result, prometall was able to keep to the extremely short delivery period of only four months for the automotive contacts. Since then, it has also been possible to manufacture other LEANTOOL tools equally speedily, including eight items just for the different variants of the new connector.

The stamped, bended and formed parts produced by prometall Fertigungstechnik GmbH are used by customers in the furniture, automotive, electronics, solar technology and construction industries as well as in the domestic sector.



With the Bihler GRM-NC and the Bihler LEANTOOL system for radial and progressive manufacture, it was possible to manufacture the new connector not just in the required quality but also at the necessary production speed.

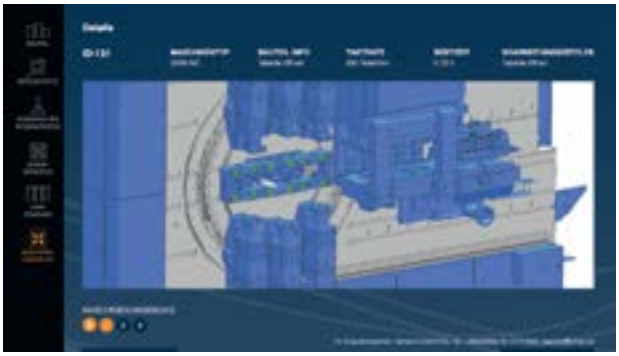
Definitely the right path It is clear that the implementation of the LEANTOOL system went equally swiftly. "It took us twelve weeks from starting work with LEANTOOL through to the first finished part," reports Andreas Hofer. "And it must also be remembered that the more we use it, the better able we are to exploit the potential of the system for our purposes." The use of the GRM-NC and the LEANTOOL Radial and progressive tooling system has also been warmly welcomed by the workforce and the new technology has been very positively received by the younger employees, in particular. All in all, this new chapter in the company's history, which has been ushered in by prometall with the Bihler GRM-NC and LEANTOOL system, is a complete success and Andreas Hofer has no doubts: "In this way, we have been able to win new orders and continue to shape our future success. With this new Bihler technology, we are definitely on the right path". ●

pro metall Fertigungstechnik

prometall Fertigungstechnik GmbH was founded in 1987 by Andreas Hofer under the name prometall Werkzeugbau GmbH. prometall Fertigungstechnik GmbH was founded in 2008. This family company, which has a workforce of 100 employees, focuses on stamping, forming and bending, and prometall accepts all types of commission from prototype production through through the manufacture of samples and engineering design work and on to tool making and module assembly. The parts are used by customers from the furniture, automotive, electronics, solar technology and construction industries as well as in the domestic sector.

www.prometall-fertigungstechnik.de

VALUABLE PLANNING TOOL



Just like a large database, the Bihlerplanning web app contains a very large quantity of parts-related and engineering know-how. With it, all users have rapid access to precise information on parts planning and tool design and are consequently able to prepare feasibility assessments and offers with no loss of time. The Bihlerplanning web app, which is being constantly extended, is available free of charge to registered users.

Coming to conclusions about the feasibility of the processes and determining the estimated cost and effort required for development and the part itself are vital steps in parts production that take place immediately after the initial customer inquiry. Just as important at this point is information about the unit price during subsequent production, including for variants. It is also clearly necessary to calculate when the first prototypes and sample series can be delivered to the customer. These factors, which are essential for the preparation of offers and securing contracts, can be determined quickly and easily using the Bihlerplanning web app. "The Bihlerplanning web app is an ideal tool for planners and design engineers and helps them to identify the required process, prepare their offers and design LEANTOOL Radial and progressive tools," explains Pius Niklas from the Bihler Process Planning Team. The web app not only delivers concrete information regarding the technical feasibility of an enormous variety of stamped and bended strip and wire parts. More importantly, it also provides information about the required machine type, the necessary standardized tool components, the achievable throughputs, the setup times and the machining times as a function of batch size. All users are able to use the Bihlerplanning web app to perform detailed calculations prior to production and decisively improve their market reactivity. The tool costs, in particular, can be quantified extremely precisely on the basis of the defined proportions of standard parts, blanks and custom parts.

Step by step In this way, the Bihlerplanning web app acts as an extensive library and database of example solutions. In STEP format, it provides Bihler's collected expertise in the field of stamping and bending processes and tool engineering, all of which has been gathered by the company over a period of decades. Using the stored knowledge from more than 65 case examples, it is possible to determine all the required parts-related information by searching for and identifying similarities. The app guides the user step-by-step through the entire planning and design process. First of all, a bended part similar to the

The Bihlerplanning web app provides step-by-step support for all users – from parts planning through process selection and offer preparation and on to the engineering design of the LEANTOOL production tools.

required part is searched for and selected, for example a shielding sleeve. The appropriate production system, throughput and setup time are then automatically displayed for this part together with the machining time, including the setup for the required batch size. In the next step, the web app displays all the necessary bending steps in the animated 3D design together with the appropriate bending tool and its usage on the corresponding production system. An animation of the proposed manufacturing sequence is also provided. After this, all the standard components or LEANTOOL standard parts are displayed together with the setup and positioning on the machine. Finally, the user is able to observe the completed tool, the LEANTOOL standards and the machine environment in detail. In the future, the web app will contain additional icons that provide further information including video tutorials and support PDFs for Bihler solutions.

The team behind the Bihlerplanning web app: Norbert Immler, Andreas Sieber, David Walk, Reinhard Böck, Katrin Zapf, Pius Niklas, Kaelum Poulson, Florian Sprenzel (from left to right).

Cost-free use Ever since it was introduced in 2016, the Bihlerplanning web app has been growing in popularity. Consequently, more than 1,300 planners and design engineers are now already using the tool in their everyday work. And the best thing of all? After registration, the app is available for use free-of-charge at www.bihlerplanning.de. It is also continuously being extended by new component examples and features and, as an online solution, is naturally available round-the-clock. The Bihler team responsible for the app is also available to customers and provides support on-site. You can find further information on the web app and its operation, together with a video, on the Bihler-Homepage at www.bihler.de. ●

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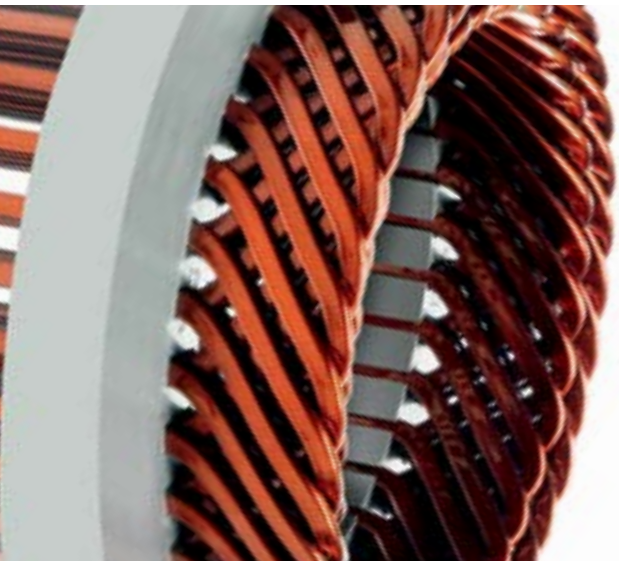
COMPACT, FLEX

The production of hairpins for electric motors demands dynamic machine solutions that ensure optimized throughput and are nevertheless flexible enough to cope with changing variants. Only in this way will it be possible to manufacture the volumes required in the future at market-compatible prices. At the same time, it is is not only top quality that is essential; space-saving dimensions also contribute to resource-friendly production.

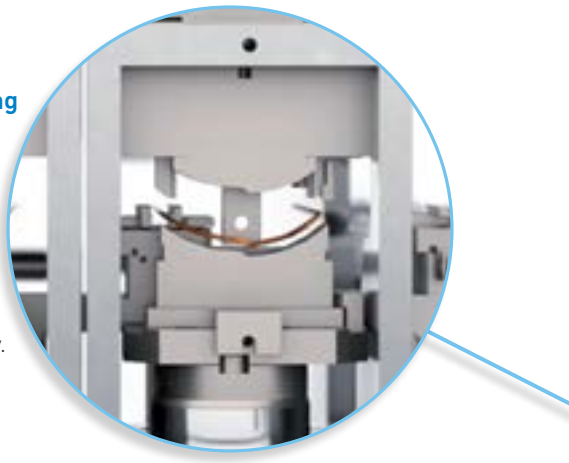
The efficient manufacture of electric motors makes use of so-called hairpins which are installed in the stators and replace the coil.



Thanks to its 30 years of experience, Bihler can offer new prospects for the industrialization of production processes as part of an automated end-to-end solution for the manufacture of hairpins. To do this, the BIMERIC production system brings together all the process steps in standardized form. These extend from the highly dynamic, slip-free infeed of the wire, through the NC-controlled, dimensionally accurate mechanical removal of the isolating lacquer, the simultaneous

IBLE, FAST

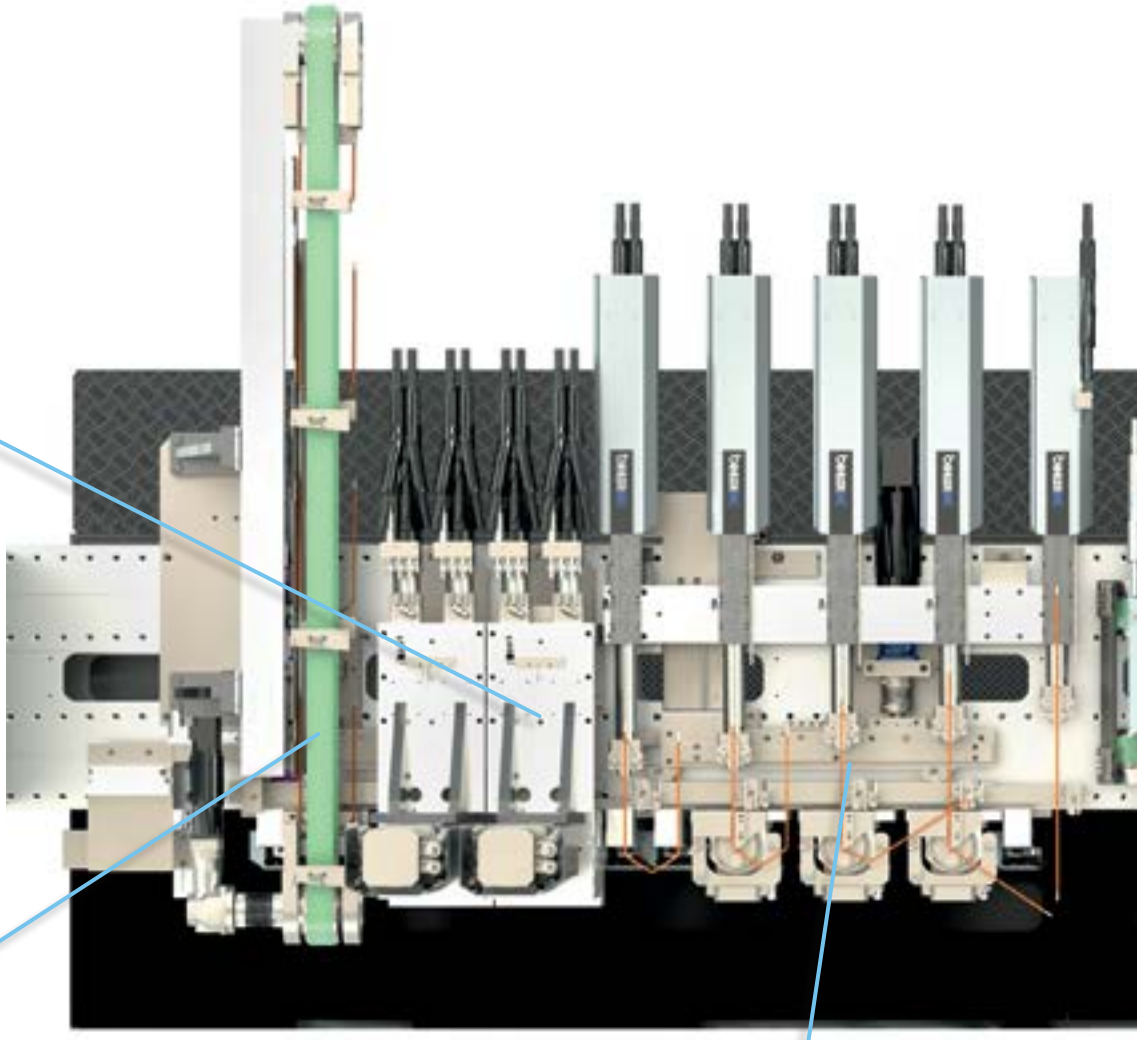
chamfering of the pin ends, the 2D preliminary bending and 3D die-bending and on through to the possible final measurement of the component geometry and inline adjustment.
The end-to-end manufacturing solution on a single production system saves additional equipment and the space this would require. To produce hairpins, the BIMERIC can take up round or flat wire directly from the coil. With an output of 60 to 120 finished parts per minute, it offers three times the throughput of sequential systems. Changes between variants can be performed "on the fly", i.e. without slowing down the machine's throughput, without shutting down the machine and without any intervention on the part of the operator. The BIMERIC is operated and controlled easily and securely using the VariControl VC 1 controller.
The hairpin machine is based on the BIMERIC production system which brings together all the standardized process components in a modular arrangement on the basic machine body. Depending on the requirements that arise, the arrangement of the modules can be subsequently adapted or extended by further modules. ●

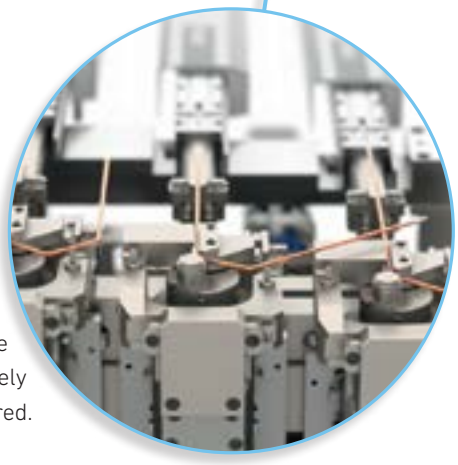


3D die-bending
The high-precision 3D die-bending process gives the heads of the hairpins their final shape. The top-quality characteristics and precise control of the process module ensure one hundred percent reproducibility.

HAIRPINS ON THE FLY

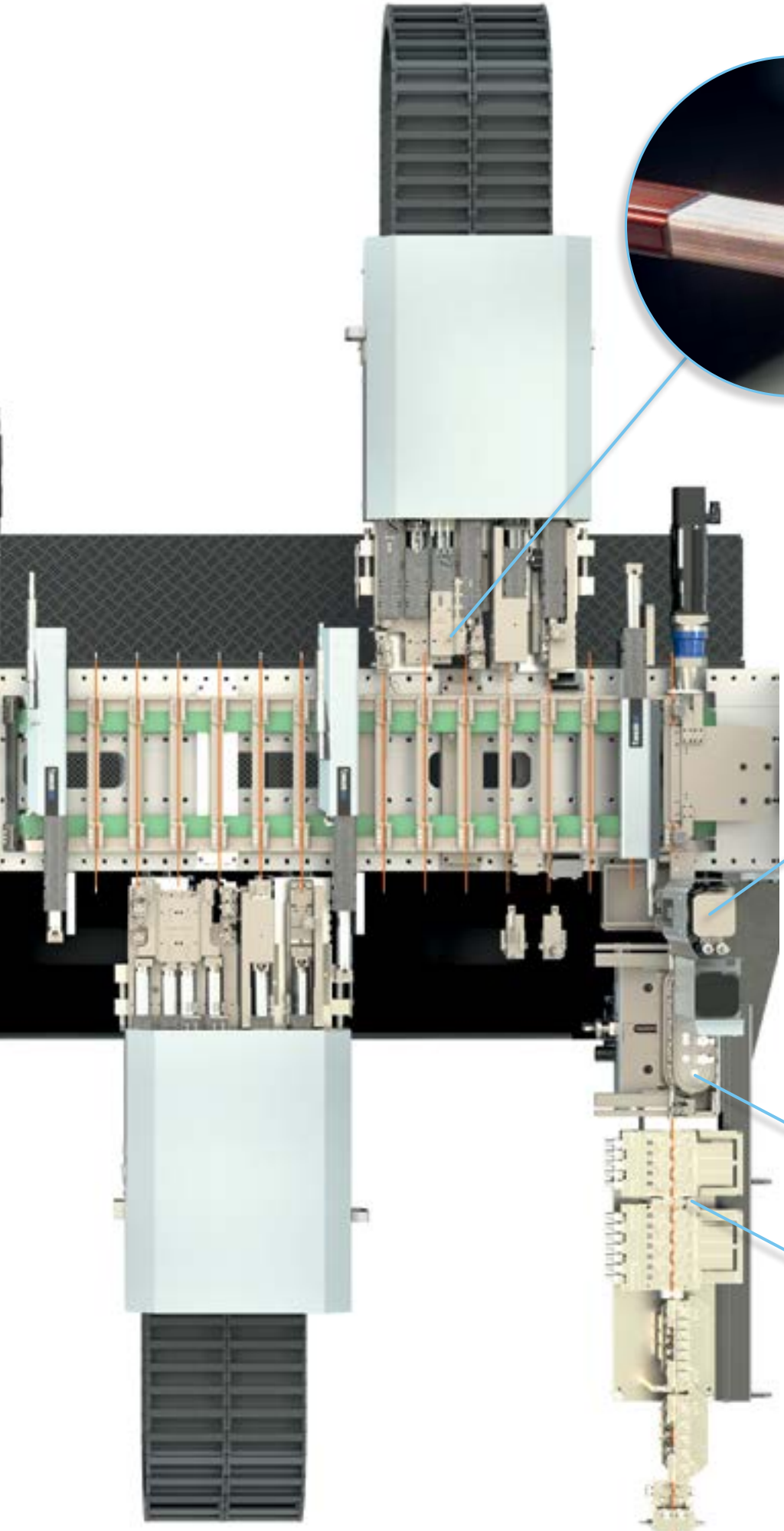
Transport and mono-component storage
The finished hairpins are ejected via a conveyor belt for unmixed, mono-component storage. The module is also equipped with open interfaces for further customer connections.

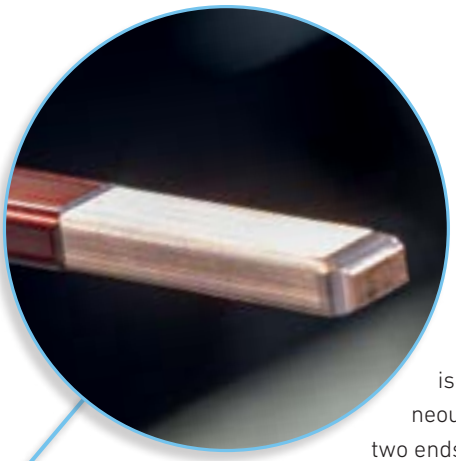




2D preliminary bending

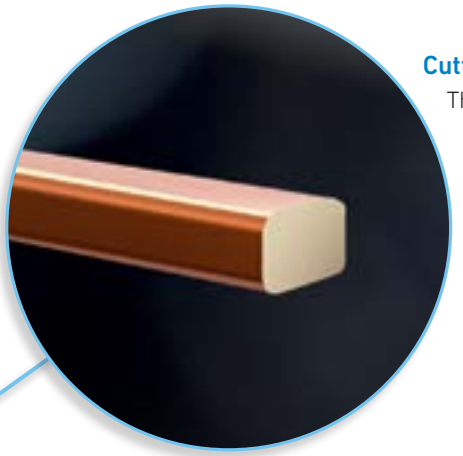
During 2D preliminary bending, powerful servo units for the fast, accurate execution of multi-step tool movements ensure the correct geometry values, which can be freely programmed if required.





Mechanical isolation removal

The automatic removal of the isolation and simultaneous chamfering of the two ends of the enameled copper wire are performed mechanically. Online measurements guarantee a consistent copper core. During this process, the overall cross-sectional loss is less than 0.05 millimeters.



Cutting

The enameled copper wire is cut accurately and cleanly to its stretched length – in exactly the way required for subsequent processing.

With throughput of between 60 and 120 finished hairpins per minute, the BIMERIC offers three times the production performance of sequential systems.

Wire infeed after alignment

The precise alignment of the enameled copper wire contributes to the highly dynamic, slip-free infeed of up to a maximum of 3.2 m/sec. The repeat accuracy achieved during this process is +/- 0.01 millimeters.

BIHLER e-mobility

PARADIGM SHIFT IN E-MOBILITY

The automotive industry is in a state of change and e-mobility is in the fast lane. Carmakers and suppliers are searching for solutions that permit industrial, automated, economic production. Bihler provides platforms and technologies for the manufacture of precision parts for key components of the drive, battery and power supply. That is why, for example, manufacturers of bus bars for battery production are turning to Bihler's stamping and bending technology.

Expertise in e-mobility: Stefan Krug, Martin Lehmann, Thomas Zettlmeier (left to right).

The requirements imposed by the market were ambitious: The creation of production capability for 14 parts within three-quarters of a year while simultaneously fulfilling the most exacting demands in terms of material efficiency. Demanding but still achievable thanks to implementation of the tooling using the Bihler LEANTOOL system. The efficient, flexible manufacturing solution that is now used for the production of busbars for battery manufacture by a leading global automotive industry supplier as part of its shift towards e-mobility has brought about the desired result: Half of the parts are produced using the radial system, in which the raw material width is the same as the part width. In the case of busbars manufactured from pure copper of four millimeters in width, this saves approximately 30 percent in materials costs compared to the use of wide strip material. The other half of the parts are produced using a progressive linear approach, sometimes involving process lengths of over two meters. To produce the different parts, the manufacturer needs only one GRM-NC servo stamping and bending machine equipped with the new, modular, highly standardized LEANTOOL tool concept. However, it was not just the choice of a suitable manufacturing method that was decisive for this collaboration. It was also necessary to cope with the short timeframe available. Thanks to its large network of partners with experience of using LEANTOOL, Bihler was able to fulfill the tooling requirements and provide the customer with a single-source solution.

In stators, the so-called hairpins replace the conventional coil used in electric motors.

Focus on individual requirements Commissioning of the system at the manufacturer is planned for the third quarter of 2021. Currently, the various Bihler tools are being prototyped. "And here again, Bihler is proving itself to be a strong partner," explains Martin Lehmann, Key Account Manager responsible for e-mobility at Bihler. Because three GRM-NC systems are currently operating in parallel at the factory in Halblech in order to keep the timeframe as short as possible before one of the GRM-NC systems is finally installed on-site at the manufacturer and can be equipped with the various tool modules. According to Lehmann: "The interplay of efficient technology and comprehensive service represents an all-round package which allows our partner companies to equip themselves optimally for the tasks of the future. In this way, they are in the perfect position to supply their customers, for example in the automotive sector.

Wide range of applications "With the GRM-NC, Otto Bihler Maschinenfabrik is providing a powerful production solution for the most varied areas of e-vehicle technology," explains Lehmann. In addition to busbars, it is also possible to manufacture smaller conductor rails or shielding sleeves in high precision, quickly and economically. Further components for the drive, power supply and battery can be manufactured on the BIMERIC servo production and assembly system. In this way, for example, the hairpins that are used in the drive can be produced in unsurpassed numbers of up to 120 parts per minute. The BIMERIC also shows off its performance capabilities in the manufac-

With the GRM-NC, Bihler can supply a powerful solution for the production of an enormous variety of parts – such as busbars – for the construction of electric vehicles.

ture of busbars – fully automated and with high throughput rates of up to 60 parts per minute. Beyond this, the BIMERIC also makes it possible to manufacture hybrid metal/plastic components, for example power distributors for stators, cell connectors and high-voltage connectors. The production of the metal parts, the insertion of the plastic parts, and final assembly are all performed in a single end-to-end production process. "The use of our NC units on this machine platform makes it possible to put together a manufacturing solution that is perfect for the customer from the numerous process modules in our modular system," explains Lehmann. What is more, unlike mechanical drives, NC technology makes it possible to downcycle or operate in double-stroke mode, thus providing another way of increasing the potential production capabilities.

Shorter time-to-market "At both the GRM-NC and the BIMERIC, standardized components and the innovative LEANTOOL tool concept with its high proportion of standard parts which can be positioned and fixed to the machine very rapidly by means of a zero-point clamping system ensure reduced design and tool costs," continues Lehmann. "This vastly reduces the time to market". In this way, companies are optimally equipped not only to react to the needs of the emerging e-mobility market but also to help shape this in decisive ways with their own innovations. Lehman continues: "To ensure that our partners can be successful in the competition for the best market positions, we support them not only with the right production equipment but also with extensive support and services – from the initial idea right through to the start of series production." ●

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OUTSTANDINGLY CONSISTENT

With welding frequencies of up to 20 KHz, the B 20K welding controller offers a particularly wide range of options for high-precision current, power and voltage regulation. Features found nowhere else, such as the non-linear proportional adjustment, make this ultra-precise regulation possible and ensure optimally configured process parameters. This guarantees constant welding processes at uniform high quality – even when the process windows are extremely short.

Welding technology has long been one of the core competences of Otto Bihler Maschinenfabrik and the B 20K welding controller, which has been available since mid-2018, is the latest Bihler system designed specifically for resistance welding. In contrast to the B 5000, the B 20K is able to generate welding frequencies of up to 20 Khz. At this high frequency, the number of half-cycles is high – and so too, therefore, are the number of possible interventions. This permits particularly fast regulation and correction operations. The B 20K exploits this outstanding regulation capability in its many innovative features and functions. These include the five measuring channels which are integrated by default as well as the patented NC-controlled linear actuator. However, what gives the B 20K its particularly outstanding performance capabilities are its various newly optimized control and adjustment capabilities. For example, the B 20K possesses welding current or welding power control, partial RMS control and mains voltage control. The purpose of each of these control functions is to calculate the actual value of the dimension to be regulated in comparison to the nominal value and to regulate this to the setpoint value by adapting the parameters accordingly. Thanks to the four different control capabilities, it is possible to optimally adjust all the process variables for each welding task and achieve high, constant and uniform welding quality.

Free from overshoots Unlike in conventional controllers, in the B 20K, the welding current and welding power, that is to say the fundamental process parameters, are adjusted particularly quickly and precisely thanks to minimized time lags. This is because the B 20 K's sophisticated off-state regulation cuts the time lag, also known as the idle time, by half. This is a newly developed feature which is unique worldwide. Another newly developed and unique feature takes the form of the non-linear proportional control which is implemented in the B 20K and depends on the current profile and output demands. In the case of small deviations, this produces a high amplification, while a small amplification is produced for large deviations. This algorithm prevents any control circuit overshoot despite the high

As the diagram clearly shows: The B 20K's output control combined with the RMS control was activated as of part number 650. In such cases, these control mechanisms ensure that the contact resistance – a vital quality feature in current the production task – remains exceptionally constant.

control speed and control quality. In the B 20K, this ensures uniform, high welding quality – even in the case of exceptionally short welding processes of less than 1 millisecond. This is achieved by activating the partial RMS control feature which assists in welding current and output profile control. The control mechanism uses the characteristic current or output value for the last six produced parts and corrects the control of the next part prospectively in the light of these values. In particular, this provides the perfect way of countering process changes that occur over the medium or long term, such as gradual wear to the electrodes.

Optimized voltage protection The mains power protection at welding currents greater than 20 KA is another important quality feature of the B 20K. This was recently further optimized and now provides even more reliable protection against mains voltage fluctuations. What's new about this? The function compares the actual with the nominal mains voltage even before starting the welding job, calculates the corresponding correction value in advance and integrates this during ongoing control operation. This correction operation is then performed repeatedly during the welding process. In the case of welding currents below 20 KA, by contrast, the B 20K's active power supply circuit provides secure, reliable protection against mains fluctuations. Taken together, all these control features make the B 20K the ideal welding controller for achieving optimum parameter settings and minimizing any disruptive influences. ●

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CHARTING NEW COURSES

Digitized production and the use of Artificial Intelligence are the answer to three of the major tasks facing the world of forming and bending technology. To succeed in this, manufacturing companies have to chart entirely new courses according to Professor Wolfram Volk.

What are the current tasks facing forming and bending technology?
One key issue facing the world of forming and bending technology lies in the ability to adapt to changing constraints such as fluctuations in materials, temperatures or friction. The task here is to further develop active error correction and improve precision. The second task lies in minimizing waste and reducing the number of defective parts. The focus here is on one hundred percent automated error control with the aim of guaranteeing freedom from defects. Thirdly, it is becoming ever more important to trace data from the materials supplier through to the finished part in order to be able to track down the causes of any errors unambiguously in the event of a complaint.

What role do digitalization and Artificial Intelligence (AI) have to play in this?
The digitalization of production is one of the main responses to the current tasks. This is based on the use of inline sensor systems which record all the relevant data. First of all, the sensor data creates the necessary system transparency by providing a digital shadow. Equipment that is flexible and accessible like Bihler's systems provides the perfect framework for sensor integration. Artificial Intelligence is then involved in the processing of the data in the form of learning models and data correlations. These make it possible to consider chains of cause and effect as well as to detect errors and threshold values. The corresponding AI applications can then react independently if required, for example in the form of actuators which automatically take remedial action when emergent quality problems are detected. Commercial AI applications of this sort are available in the IT field and the most pressing task for manufacturing technology now is to couple these with a robust sensor system and appropriate actuators.

What aspects of digitalized production are relevant to users?
The entry barriers to the use of AI in production are relatively low and it is possible to achieve significant success very quickly as long as you have the corresponding expertise. However, to do this, it is necessary to chart new courses through the entire field of data management and be open to new ideas. Solutions such as the coronavirus app show that this is perfectly possible while respecting all the data protection requirements. From this point of view as well, I am convinced that Bihler is a serious domestic digitalization partner with which manufacturing companies can generate crucial value added for themselves. ●

Professor Wolfram Volk
Professor Wolfram Volk (*1968) studied Physics and Mechanics at the Technical University of Darmstadt and graduated in 1999 from the Stuttgart Institute of Mechanics. He then worked at BMW AG in Munich. Since 2011, he has been a full professor at the Institute for Metal Forming and Casting (utg) at Munich Technical University and since 2016, he has also been a member of the Institutional Management of the Fraunhofer Institute for Casting, Composite and Processing Technology (IGCV).

HIGH-SPEED SAILING IS LIKE SOLVING A PUZZLE

Innovative designs, new technologies and modern production methods – in the field of high-performance sport, the demands placed on the equipment are also increasing in order to bring success that bit nearer. Star class skipper Robert Stanjek knows that to achieve a focused team effort, you need creativity, flexibility and efficiency.

Next year, you are entering a competition with an IMOCA class boat and design and technological development will be vital for success. What exactly are these factors of success?
We talk about a one-design class. There is a box rule which describes the boundaries within which the designers can show off their talents. Ultimately, the vessel must fit inside this defined box, i.e., it must have a certain length, width and draft and the mast must be of a certain height. Then you work with the team to develop a philosophy about how the yacht should perform in certain competitive situations. So you can build it fast for little or high wind, for a certain angle to the wind, for a wave pattern – all of this flows into the design.

What does this process look like in practice?
Ideally, if the finances permit, you put together a team of technical experts consisting of designers, sailors, technical managers, boat builders and so on. They develop an idea of the ship, draw and compute draft versions, build models, test them in water tanks and wind tunnels and perform flow calculations. This gradually reveals what the hull should look like, the foils, the sort of rig to be used and how the sails should be designed. All the parts of this puzzle are brought together and simulated during an intensive computational process – in various maritime areas and with differing meteorological data. Again and again and again. And when everything has been decided, you have the boat built in a shipyard.

And when things are less than ideal?
For example, we've bought a successful boat and are now modernizing it. We have attached a new keel with a different shape and weight, we are making a new mast and developing new sails. However, the most important thing will be to develop new foils. These are the small bearing surfaces that lift the boat out of the water – it's important that we come up with a good foil design. These have a complex 3D geometry – length, bending, radius, camber – here, sailing as a sport is doing some really pioneering work. Another major consideration is the yacht's on-board electronics, the many sensors and powerful processors that handle large quantities of information very quickly so that the autopilot can control the yacht reliably at high speeds. Optimizing these is an ongoing process.

As skipper, how do you put your team together?
We have all known one another for a long time and so we also discuss as a team who is going to take part. So we decide together on designers or other team members. This has to be done with both sports and human considerations in mind. When you sail around the world in a 20-meter yacht, you place all your trust in the hands of others. In a competition like that, nothing can be done by one person, only by the team. ●

Robert Stanjek

Star boat world champion Robert Stanjek is the inspiration behind and Team Captain of the Offshore Team Germany. As skipper, he will have overall responsibility for the boat and the crew when the team takes to the sea as of October 2022 to compete in "The Ocean Race", the world's toughest multi-leg sailing event. At the moment, the team is fine-tuning the boat. Because such high-tech boats are not available off-the-shelf, their development demands creative, focused teamwork.

A NOBLE BEARING

Whether in agricultural machinery, domestic appliances or industrial systems: Wherever two surfaces move relative to one another, plain bearings are used. The most frequent type is the **cylindrical plain bearing bush**, which allows even parts subject to heavy loads to rotate relative to one another with only a minimum of friction and wear. The best values are achieved when the bearings are made from sintered material, that is to say metal powder compacted into the required shape under high pressure. Their pores can be filled with lubricant which is then released in response to load. In addition, solid lubricants can be introduced into the perforated inside of the bushes to further increase the functioning, service life and freedom from maintenance of the plain bearings. Cylindrical plain bearing bushes made from composite sintered material as in the model shown here can be produced perfectly using the **Bihler BIMERIC BM 3000 servo production and assembly system**. The process includes various steps, including the cutting, bending and calibration of the sintered strip. The bush can be manufactured with or without flange – at output rates of up to 80 parts per minute. This performance capability, coupled with outstanding parts quality and low parts costs, makes the **Bihler BIMERIC BM 3000** the ideal production solution for plain bearings. ●

SECURE GROUNDING

Grounding and the dissipation of electric currents play an important role in the electrical engineering field. They ensure that no contact voltages arise in systems and equipment, that parasitic currents are dissipated and that disruptive electrical couplings are avoided. Grounding is usually performed by means of a permanent screw connection. Recently, however, a plug-in solution has also become available. The heart of such grounding connectors is the **grounding contact**, with ground pin and ground spring as shown here. These can be manufactured in large volumes using Bihler technology – for example on a **Bihler GRM 80P stamping and bending machine** which provides throughput of 100 parts per minute. The system, which provides an extra-large machining space for the mass production of larger precision stamped and bended parts and assemblies, starts the process by drawing in the strip from the coil. The strip is then cut and the collar drawn. Thread cutting is performed next with the two outer M3 threads and the central M4 thread. The threads are then centerpunched and the entire part is bended, cut and ejected onto the conveyor for OK parts. In addition to the high output volumes, the solution also excels through its particularly short setup times. ●

A PERFECTLY SHAPED CONNECTION

The new **ring-shaped contact lamella**, which was recently developed for high-current contacts in transformers, switchgear cabinets and circuit breakers, looks almost like a work of art. It consists of a sprung stainless steel carrier strip with riveted lamellar bands and, compared with conventional coil spring contacts, has the advantage of ensuring a constant, low contact resistance coupled with only minimum heating of the contact even when subject to permanent load. And the manufacturing process is every bit as innovative as the component itself. This can take place particularly quickly and reliably on a **Bihler BIMERIC BM 3000 servo production and assembly system** and a **Bihler B 20K welding system** combined with a **Bihler RZV 2.1 radial gripper feed**. The output performance runs to an impressive 100 lamellae per minute. During the operation, the system performs all the necessary cutting, bending, stamping and welding steps, as well as the removal of the waste material, in a single, end-to-end process During the crucial contact welding step, the compact radial gripper feed system ensures the highly dynamic, precise feeding and positioning of the strip material. ●

CONTACT AT THE TOUCH OF A BUTTON

Whether for a remote control, phone or laptop keyboard: Micro-buttons in the form of so-called **short-stroke buttons or keys** are a long-established part of many manually operated device interfaces. These components, which measure only a few millimeters must ensure extremely reliable switching and provide a sealed contact system in order to establish or break the electrical contact depending on the switch position.

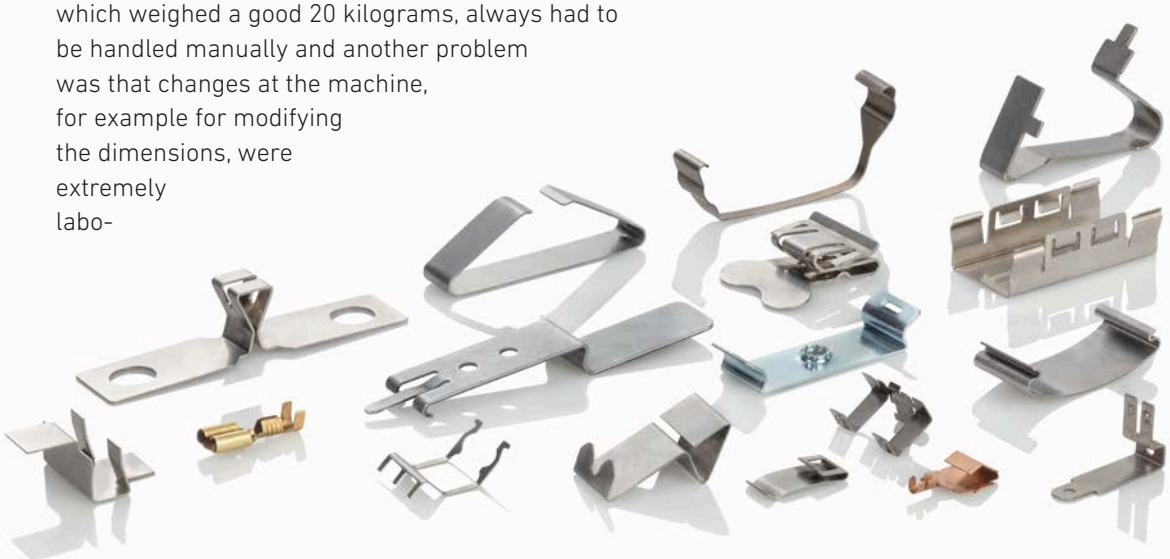
A highly efficient solution for the production of pushbuttons at a speed of 240 parts per minute was recently implemented on the **Bihler BIMERIC BM 3000 servo production and assembly system**. The system takes in the pre-punched strip from the spool, checks the injection molding on the strip by means of a camera and then performs the cutting and bending operations. The part is then fitted from behind with up to three snap washers. The cover is then mounted, again from behind, and a check is performed to ensure correct engagement. The camera inspection and the electrical and mechanical function testing of the pushbutton are then performed. Following laser marking, the OK parts are automatically picked and transported on to the packaging plant. Alongside the high performance it offers, the system excels thanks to the Bihler servo technology, which ensures top quality and the ability to adapt the setup quickly for further switch types. ●

"ENORMOUS INCREASE IN MANUFACTURING EFFICIENCY"

By introducing the Bihler LEANTOOL system and acquiring a new Bihler GRM-NC servo stamping and bending machine, Mario Schaaf GmbH & Co. KG in the German town of Möglingen has massively increased its efficiency in the fields of both tool manufacture and component production. As a result, the company is ideally placed to respond to the demand for ever shorter product cycle and life cycle times.

From the automotive and tool sectors, through aviation and on to electronic and medical technology: high-tech springs are used in practically every area of industrial manufacturing. These are produced in their millions by the Möglingen-based Mario Schaaf GmbH & Co. KG and every year, the company used to manufacture these hard-bended stainless steel components on two aging mechanical radial stamping and bending machines. "Although the systems provided the required quality, the setup times were extremely long at between 8 and 16 hours," explains Maximilian Schaaf, Assistant to the Managing Board. "In addition, the slides, which weighed a good 20 kilograms, always had to be handled manually and another problem was that changes at the machine, for example for modifying the dimensions, were extremely laborious, sometimes even involving the milling of new disk cams coupled with machine downtimes lasting days." Just as time-consuming was the task of manufacturing the 70 or so tools that have so far been used at the mechanical machines.

Convincing system-oriented approach All this explains why Mario Schaaf GmbH & Co. KG took such great interest when Otto Bihler Maschinenfabrik launched its LEANTOOL system for tool manufacture on the market. It made the decision to invest in the new technology and, at the same time, also acquired a new Bihler GRM-NC stamping and bending machine. "We were won over by the idea and concept of the LEANTOOL principle from the very beginning. It is an end-to-end, transparent system subject to clearly defined constraints which greatly simplify the entire toolmaking process and eliminate many sources of error," stresses Schaaf. "Thanks to this system, our tool construction times have been significantly reduced and tool changes and setups take only a fraction of the time they used to. The Bihler LEANTOOL concept also gives our toolmakers enormous security because with it, we can cost our projects far better than in the past."



The technical springs manufactured by Mario Schaaf GmbH are used in practically every area of industrial manufacturing.

Six of the progressive die and radial tools equipped with the Bihler LEANTOOL system are already at work, operating at up to 250 strokes per minute.

At the touch of a button The company has now already produced three progressive dies and three radial tools using the Bihler LEANTOOL system. Apart from the need for a few minor adaptations, all of these worked very well straight away – and run on the new GRM-NC at a speed of up to 250 strokes per minute. Schaaf points out the most important advantage of this: "Adaptations and optimizations can be performed in just a few minutes at the touch of a button and even the entire bending sequence can be completely reprogrammed in just as short a time. That would have been inconceivable on the old machines." What is more, ten existing tools were adapted for use on the GRM-NC where they run between two and three times faster than they did on the old systems. Since then, the new Bihler GRM-NC has completely replaced the two old mechanical machines, enabling the company to gain a considerable amount of space on site.

The right decision To implement the new technology in the company, Maximilian Schaaf successfully completed a LEANTOOL course lasting several weeks at Bihler in Halblech. "There is no doubt that this training was very useful. However, changing over to the new technology was demanding in itself and required a certain change of approach on the part of everyone involved," explains Schaaf. "Nevertheless, it was absolutely the right decision to invest in the Bihler LEANTOOL concept and the new GRM-NC. With this solution, we have enormously increased our manufacturing efficiency and can therefore supply our customers with the quality they need reliably, quickly and on time - a crucial capability at a time of shrinking cycle and delivery times." ●

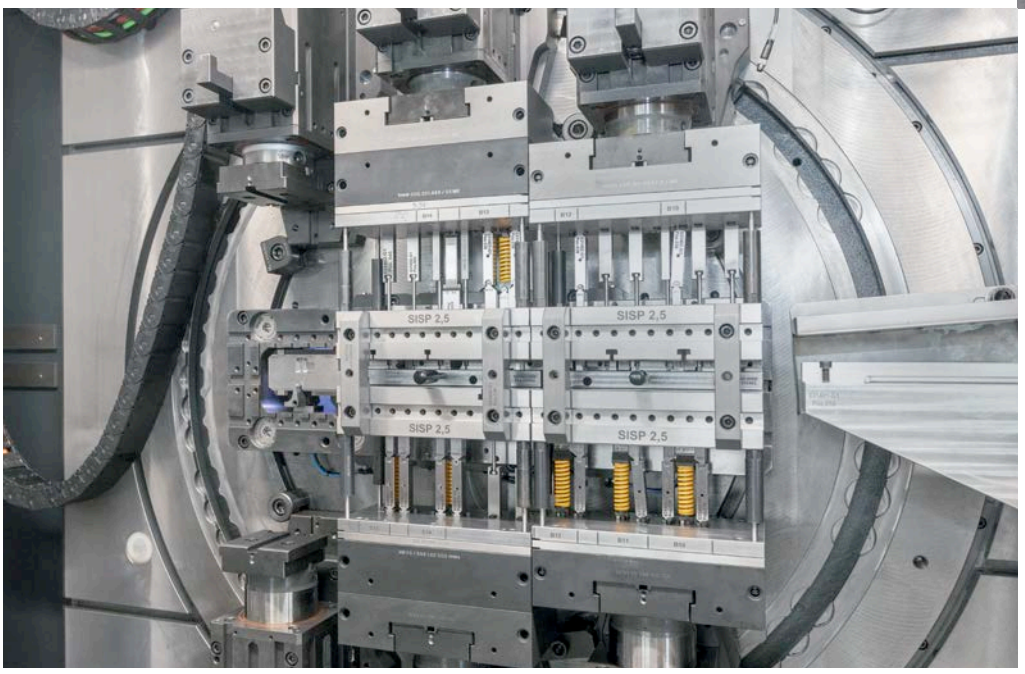
MARIO SCHAAF
technische federn

Mario Schaaf GmbH & Co. KG, which was founded in 1993, specializes in the manufacture of flat springs, shaped springs and leaf springs, spring clips, contact springs, steel springs as well as clips and holders and even complex assemblies. The family-run company covers every process step in the manufacture of hard-bended stamped and bended parts from stainless steel – from development and design through the manufacturing of the tools and on to full-scale series production.

www.schaaf-federn.de

ACHIEVING MORE TOGETHER

As global market leader in the field of Industrial Connectivity, the Weidmüller Group supplies customers from a wide range of industries with solutions in the fields of electronic connectivity and automation technology. For the production of stamped and bended parts based on the linear principle, the company now uses the Bihler LEANTOOL system as standard to cut its tool costs and reduce the time-to-market of its new developments.



The Weidmüller Group has been using a Bihler GRM-NC servo stamping and bending machine ever since 2013. In September 2019, this was joined by the Bihler LEANTOOL system.

Strong together: The continuous exchange of experience between the Weidmüller Group and Bihler – as here at a workshop at Weidmüller's headquarters in Detmold – ensures the efficient sharing of expertise and inspires optimizations on both sides.

Sharing ideas and experiences in Detmold. How can setup processes be designed better? How can tools be used even more efficiently? The participants at a shared workshop at the Weidmüller Group headquarters discuss the use of the Bihler LEANTOOL system, offer tips and absorb new ideas from practical experience. "We are linked together by a very intensive, technically-focused partnership that has grown up over the years and in which we can work together in trust and confidence as equals," explains André Pöhl, Head of Metal Toolmaking at the Weidmüller Group.

Wide product portfolio for electrical connectivity

Whether in the field of carmaking, power generation or water purification – electronics and electrical connectivity play a vital role in many sectors of industry. The market leader in this field is the Weidmüller group of companies which supplies some 60,000 different parts and components for the corresponding applications: from bus bars, through clamping yokes and on to terminal blocks and springs. The company manufactures anything up to 6.9 billion parts every year. "These parts, which are often very delicate and have complex geometries, must respect very narrowly defined tolerances even when produced in high quantities. To achieve this, we need an absolutely reliable production operation with robust processes," says Dirk Hanke, Head of Mechanical Production. That is why for its stamping and bending requirements, the Weidmüller Group uses only technology from Otto Bihler Maschinenfabrik. Starting

The high-speed clamping component of the Bihler LEANTOOL system ensures short setup times coupled with optimum tool positioning.

with a single Bihler RM 35 back in 1971, Weidmüller now operates 77 Bihler machines at its sites in Detmold and the Thuringian town of Wutha-Farnroda. "When it comes to stamping and bending technology, we need look no further than Bihler. We benefit enormously from the reliability of their machines, coupled with their robust tool and plant designs," explains Pöhl.

Faster to market The Weidmüller Group has been using a Bihler GRM-NC servo stamping and bending machine ever since 2013. In September 2019, this was joined by the Bihler LEANTOOL system for producing linear tools. This is a fully-specified modular tool system which, in 70 percent of cases, makes use of predefined, reusable standards. "The high level of standardization reduces tool costs

The Weidmüller Group manufactures parts and components for electronic and electrical connecting technology.

For André Pöhl, Head of Metal Toolmaking at the Weidmüller Group, reliable machines and strong tool and plant construction from Bihler are the Gold Standard in the field of stamping and bending technology.

To make it possible to manufacture large runs of delicate parts with complex geometries, Dirk Hanke, Head of Mechanical Production at the Weidmüller Group, has to be able to count on reliable production based on robust processes.

compared to conventional tools. And what is becoming ever more important today, it greatly reduces the development time for new tools and hence also the time-to-market," continues Hanke. With the Bihler LEANTOOL system, it is possible to work under production conditions as early as the development phase. This eliminates the extra time required for the manufacture of the production tools – while maintaining the same quality level as for conventional tools. What is more, further time savings are achieved thanks to the setup process using a high-speed clamping system and VC 1 controller.

Tangible potential for savings The Weidmüller Group has now already used the Bihler LEANTOOL system to manufacture the tools for five bus bar and spring element projects involving nine component variants. In two of these projects, the tool system was used intensively as early as the development phase. "Naturally, we had to familiarize ourselves with the system and gather experience. Despite this, the potential for savings through to achievement of product maturity was noticeable. In the future, things will undoubtedly go even faster and we will be able to make the switch from product development to series production in half the time," says Hanke with conviction. He also considers the intensive accompaniment by the Otto Bihler Maschinenfabrik support team during the start phase and the training received by Weidmüller's engineers at Bihler in Halblech to be key factors in the successful introduction of the system. And the current workshop is making a further contribution to optimizing the processes.

Setting the direction for the future The next two development projects due to be implemented on the GRM-NC using tools manufactured with the Bihler LEANTOOL system have now been identified. "We want to gradually extend this approach and plan to commission another Bihler GRM-NC in combination with the Bihler LEANTOOL system in our production department in two or three years' time," says Pöhl looking to the future. He sums up the current experience as follows: "For us, the system helps us meet the twin goals of developing products faster and more economically and launching them on the market at a high level of maturity. In this way, we are ideally equipped for the future." ●

Weidmüller

The Weidmüller group of companies supports its customers and partners worldwide with products, solutions and services in the industrial power, signals and data fields. It develops and manufactures innovative, sustainable, value-added electronic engineering and electrical connectivity solutions for customers in a range of sectors and markets. The company, which was founded in 1850, now possesses production facilities, sales companies and agencies in more than 80 countries. In the 2019 financial year, Weidmüller achieved turnover of 830 million euros with a workforce of approximately 5,000 employees.

www.weidmueller.de

A SUCCESSFUL START

The successful implementation of a Bihler 4 Slide-NC System with its increased productivity capabilities was the incentive needed for Connecticut Spring & Stamping (CSS) to enter the world of Bihler servo-controlled stamping/forming technology with the purchase of a Bihler GRM-NC machine. The Bihler GRM-NC machine provides the necessary flexibility, repeatability and performance needed to meet the stringent production requirements at CSS. In a unique collaboration between Bihler Germany, Bihler of America, vr-konstruktionen, and the traditional American manufacturer CSS, they successfully developed and commissioned, within a 6 month timeframe, a GRM-NC machine with tooling for a highly complex fixing clip with 7 variations for the Aviation Industry.

Connecticut Spring & Stamping Corporation, CSS, is a leading global manufacturer of precision springs and metal formed solutions. For nearly 80 years they have been a strategic supplier of custom springs, progressive stampings, fineblanked stampings, machined components and assemblies. The company was founded in 1939, is based in Hartford, Connecticut and has over 400 employees worldwide. They are an OEM supplier to numerous industries including: medical, aviation, aerospace, transportation, and consumer goods. The longevity of the family-run business is due to their extensive experience in developing innovative, advanced, and difficult to manufacture products. "We work very close together with our customers through every phase of the product development process which enables CSS to continuously adapt and improve our manufacturing to meet the ever increasing customer and industry requirements and standards" explains Steve Dicke, President of CSS. Outstanding examples of this can be seen by our most recently completed projects: a new servo-motion controlled Bihler 4 Slide-NC system and a Bihler GRM-NC, the latest in Bihler NC Machine Technology.

Significant Increases in Productivity "The purchase of a Bihler 4 Slide-NC system in 2019 was our first project with Bihler of America" explains Jay Pavelchak who is responsible for tooling at CSS. Our goal was three fold: to modernize our manufacturing processes, utilize our extensive and cost intensive 4 Slide tooling inventory and achieve significant improvements in product quality, productivity, and profitability. The solution was the Bihler 4 Slide-NC system which was developed exclusively for the North American 4 Slide market by Bihler of America. The horizontal stamping/forming system utilizes the VC 1 (VariControl) control platform and the servo modules designed and produced in Bihler Germany. "For CSS, the most important advantage of the Bihler 4 Slide-NC is the ease of using our existing 4 Slide tooling inventory with minimum adjustments. Often it is as simple as exchanging a tool fixture, a small modification, or the use of adapters" highlights Steve Parenti, Project Manager for new tooling at CSS. To date, CSS has converted more than 17 existing tools over to the 4 Slide-NC System, and have effectively eliminated four traditional slide machines from their production. "Our production

The project team used the Bihler GRM-NC to develop a manufacturing solution for a fixing clip for the aviation industry.

speeds have all doubled, the setup times have been cut by 80 percent and we now have a reliable, repeatable manufacturing process on the Bihler 4 Slide-NC with minimum maintenance costs," is how Mr. Pavelchak sums it up. In addition, the VC 1 control capabilities provides considerable improvements to product quality.

Building upon Success with a new Bihler GRM-NC

Wanting to build upon their current success with the Bihler 4 Slide-NC project, CSS made the decision to modernize the manufacturing process of one of their most complex stamping for the Aviation Industry. This time, however, with the purchase of a latest Bihler servo technology machines a GRM-NC.

In this project the system involved developing a new radial manufacturing solution for a fixing clip with 7 variations and some of the most critical tolerance specifications stamped and formed at CSS. Previously, the product was produced on an older machine and required costly and time intensive secondary valued added operations. Therefore, it was necessary to develop a tooling concept to efficiently handle seven interchangeable tool fixtures, improve product quality and eliminating all secondary operations, should not only run at high speeds but also permit quick changeovers. All this within a timeframe of less than six months, since manufacturing needed to be up and running as early as March 2020. A serious challenge for everyone involved.

In September, 2019 a virtual kick-off meeting took place. Due to the short delivery schedule it was decided to involve vr-konstruktionen, a decade long established strategic engineering partner from Bihler, Germany, who specializes in the design of demanding tooling solutions. vr-konstruktionen is located in Pfronton, Germany with an office in Florida, which made the choice of a tool design partner easy for CSS and Bihler. In a joint effort with Bihler Germany, vr-konstruktionen developed a tooling concept. "The tooling solution comprised of four floating modules mounted in the press, a flexible, interchangeable fixture, and a bending tool which in this solution has a forward bending action in three levels and is combined with a floating die fixture" details vr-konstruktionen Managing Director Stephan Vollmair. "This tooling concept in combination with the advantages of the Bihler NC-Technology allows quick, easy adjustments and trouble-free set-up in less than an hour."

Outstanding teamwork Upon completion of initial bending analysis at Bihler Germany in Halblech, vr-konstruk-

The success of the Bihler 4 Slide NC project inspired CSS to enter the world of servo-controlled stamping and bending technology in the form of a new Bihler GRM-NC.

As an established Bihler partner, vr-konstruktionen developed the tool concept with a total of seven variants.

tionen began the detailed design of the first tool. The tool itself was then manufactured in-house by CSS. In November, 2019 Bihler Germany delivered the machine to CSS. Shortly afterwards, Bihler of America assisted in the installation, final tool adjustments and machine commissioning. After some final and minimal fine tuning, the machine was up and running with production speeds of 120 ppm and meeting all machine specifications – an impressive achievement within a 6 month timeframe! So far, all seven tools have been successfully implemented, and another one is already under construction. "The success of this project is due to the excellent, highly efficient coordinated efforts of all parties" praises Steve Dickie, President of CSS. "Together we can exploit the full range of our joint expertise and technologies and continue to expand our success into the future" adds Chris Alexander, National Sales Manager for Bihler of America. "The importance of this project for me was to give American companies the incentive and the courage to work together, across borders, for together we are stronger. If we take advantage of the extensive resources we have, we will succeed." Andreas Strobl, Director of Operations and Sales North America for Bihler Germany. ●

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CSS

Connecticut Spring & Stamping Corporation (CSS) in Hartford in the USA was founded in 1939. The family-run company manufactures stamped and stamped/bended parts, machined components and assemblies and is a strategic supplier to many OEMs in the aviation and aerospace, medical engineering, automotive and defense and armaments sectors. The company possesses outstanding experience in the development of innovative, advanced and difficult to manufacture parts and covers all process steps from prototype development through to full production.

www.ctspring.com

"THE RIGHT PARTNER"

With a new Bihler GRM-NC stamping and bending machine and the Bihler LEANTOOL technology, ec camitec autoparts co., ltd., which is based in the Chinese city of Nantong, is reacting to the fast-growing demand for stamped and bended parts for the automotive sector.

Since 2019, the company has also been using the Bihler LEANTOOL system as a toolbox for progressive machining applications.

Top performance comes from choosing the right partner – that is the motto of ec camitec autoparts (nantong) co., ltd., which has its headquarters in the Chinese city of Nantong. The company, which was founded in 2006, specializes in the manufacture of stamped and bended parts for the automotive industry and, from a production area of approximately 16,000 m^2, outputs some 600 million stamped/bended parts each year, in particular in the form of brackets and bushings for reinforcing plastic parts. It places the focus on outstandingly high parts quality combined with high precision and attention to detail. To achieve these goals, the company now possesses four Bihler systems. It started by acquiring two GRM 80E stamping and bending machines in 2016 and 2017, later followed by a GRM 80P in 2018. Last year, these were joined by the most recent machine: a Bihler GRM-NC stamping-bending system. The very first of these systems laid the foundations for the close, trusting partnership between the two companies: "Bihler provided us with the best possible support during the introduction of the new technology,"

Frank Xu, Managing Director of ec camitec autoparts (nantong) co., ltd. (left), with Carsten Michel, Vice President of the company and founder and Managing Director of Camitec GmbH in Recklinghausen (North Rhein-Westphalia).

In the coming years, Frank Xu will extend his Bihler machine pool to a total of eight Bihler systems.

recounts Frank Xu, CEO of ec camitec autoparts (nantong) co., ltd.. "That is when we properly understood that Bihler is not just a simple system supplier but a fully-fledged solution provider. And that convinced us that the company was the right partner for us, one we could continue to work together with on the basis of trust and confidence in the future."

First steps with the LEANTOOL system One particularly important milestone in ec camitec's expansion occurred in 2019 with the commissioning of a Bihler GRM-NC. This is because with this solution, the company also introduced the Bihler LEANTOOL system as a toolbox for progressive machining applications.
"We were immediately won over by the ability to manufacture more economically using the LEANTOOL system thanks to the high proportion of standard parts we produce," reports Xu. "What is more, the fact that it is an end-to-end solution allows us to implement all the individual steps a lot more easily than in the past. And last but not least, being able to create the tools much faster than before thanks to the LEANTOOL system is also of vital importance to us."

Major extension Since then, ec camitec has already produced a complete LEANTOOL tool and gained vital new expertise in this area. "At the same time, we can also offer our customers end-to-end tool solutions and, as a local company, ensure the necessary individualized support," stresses Xu. "Here in China in particular, there is an enormous need for the Bihler LEANTOOL solution and,

ec camitec autoparts (nantong) co., ltd. manufactures stamped and bended parts such as clips and bushes for the reinforcement of plastic automotive parts.

From Nantong, ec camitec autoparts (nantong) co., ltd. supplies its customers.

at the same time, we are witnessing a surge in demand for the high-end components which we manufacture on our Bihler systems." These are two highly promising areas of future development for which ec camitec is extremely well equipped. This is because the company recently decided to extend its Bihler machine pool to a total of eight systems by 2023. ●

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EC-CAMITEC

ec camitec was founded in 2006 in the city of Nantong to the North of the Shanghai conurbation. With a production area of 16,000 m², the company manufactures approximately 600 million stamped and bended parts for the automotive industry every year. ec camitec is a joint venture owned by the parent companies EC Precision Technology (Jiangsu) Corporation and Camitec GmbH, which has its headquarters in Recklinghausen in Germany.

www.ec-camitec.com

VIRTUAL LIVE SUPPORT

The Bihler AR Remote Service is available as a mobile or AR headset version and is cost-free for new machines for all customers during the first year.

Using real-time streaming technology, Bihler's AR Remote Service ensures that small malfunctions, repairs and settings at Bihler systems can be dealt with quickly, simply and efficiently. This smart support solution is available as a mobile application or as an AR headset version.

Ever since it was introduced last year, increasing numbers of customers have taken advantage of Bihler's Augmented Reality Remote Service. This comes as no surprise as the virtual service capability allows Bihler to provide even more high-performance support for the operation of its systems. "Bihler's AR Remote Service is provided by means of a video call between the customer and the Bihler support staff via smartphone, tablet or AR headset," explains Bastian Hartmann from Bihler Sales and Customer Support. "The Bihler employee sees everything that the customer can see on-site by means of a real-time stream and is therefore able to identify the problem at the machine with absolute accuracy. Consequently, the engineer can guide the machine operator precisely step-by-step to the solution – quickly, easily and efficiently." The graphical highlighting of objects in the field of vision and the document transfer capability provide the operator with additional support. In this way, it is possible not only to analyze and eliminate errors but also to perform small repairs. Bihler's AR Remote Service also ensures optimum support during commissioning and adjustment work. This eliminates the need for time-consuming, cost-intensive interventions on-site. Instead, the customer saves time and money and is usually able to resume production immediately. And if more extensive work is needed from time to time, the visiting service engineer is ideally prepared thanks to the in-depth remote diagnosis that has already been performed.

Smartphone, tablet or data headset The Bihler AR Remote Service is available as a mobile solution or as an AR headset version. In the mobile application, the AR software supported by Bihler is available on any terminal device running under Android, Apple or Windows. In practice, this variant has the advantage of being accessible and ready for use at any time, while also being very easy to work with and providing a large-format screen. For its part, the AR data headset has the advantage that operators can have their hands free to work and can use the headset to communicate with the service staff, who always see exactly what the user sees thanks to the camera mounted in the headset. Use is not restricted to certain headset manufacturers. Whichever version is used: The Bihler AR Remote Service is free to all customers for the first year for new machines. ●

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FOR A SAFE FUTURE

Existing Bihler systems can be modernized within five working days using the BC R upgrade and retrofit package.

Thanks to the BC R Upgrade and Retrofit Package, it is possible to turn older Bihler equipment into state-of-the-art systems quickly and easily – and thus achieve greater productivity coupled with the latest safety features and guaranteed spare parts availability.

Otto Bihler Maschinenfabrik has been offering a new BC R upgrade and retrofit package since 2019 for modernizing existing Bihler systems. It consists of an up-to-date BC R controller together with numerous new machine components. "The function scope of the BC R package is perfectly adapted for conventional, long-running applications, allowing customers to modernize their existing Bihler machines quickly and economically," explains Hubert Werner, Head of Bihler's System Extension and Modernization department. "The modernization ensures not only greater machine availability due to a guaranteed spare parts supply but also implements the most recent standards for humans and the machine." This means that all the mandatory machine inspections can be passed without difficulty in the future. What is more, existing machines can also optionally be given networking capability thanks to the new BC R machine controller ("Bihler Control Retrofit"). This makes it possible to use Bihler's Remote Service as well as to integrate systems into digital production environments (e.g. OPC-UA). The modernization is available for Bihler systems of type RM-30, RM-35, RM-40, GRM-50, GRM-80, GRM-100 as well as for Mach-1, Mach-1/7 and Mach-05.

Completed in five working days At the heart of the Upgrade and Retrofit Package is the Bihler BC R controller with touch display and control cabinet. This is complemented by the new frequency-controlled, infinitely adjustable drive, freely-programmable input/output modules, sensors for machine monitoring, and electronic hand-wheel operation. Other available options include a new central lubrication system, new hydraulics and new interfaces for the connection of peripheral devices.
At a practical level, the first step in machine modernization is to complete a form requesting an individual requirements analysis. Following acceptance of the offer, Bihler's service engineers convert the machine directly at the customer's premises and equip it with the new BC R controller. At the same time, the system benefits from a full electrical refurbishment. The final step is to commission the machine ready for production. What makes this service so special is that the entire machine modernization operation is completed in under only five working days. ●

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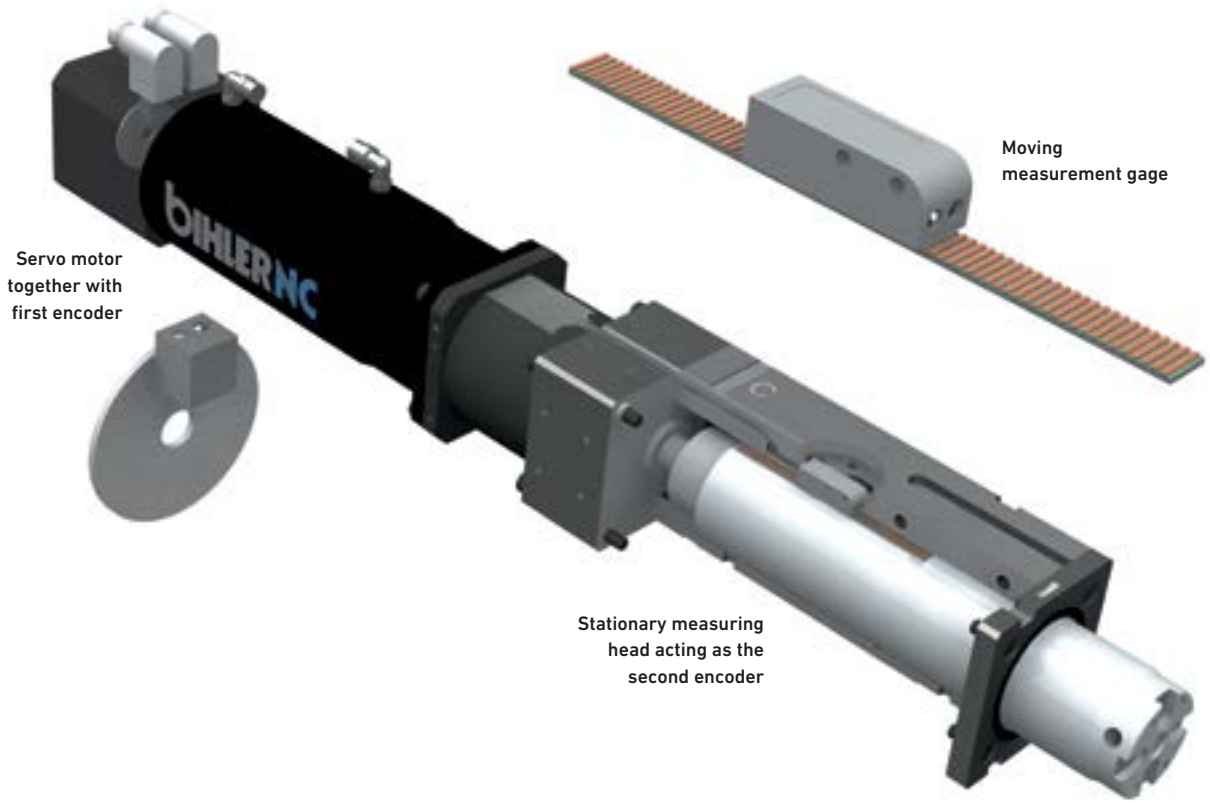
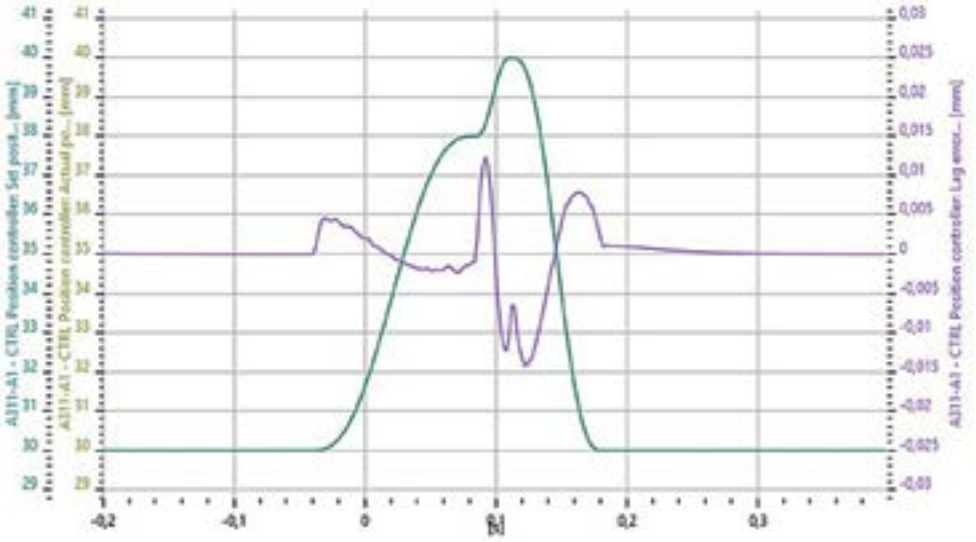
THE DUAL-ENCODER MEASUREMENT SYSTEM



Bihler's NC units (NCA) ensure that tool movements are executed with outstanding speed and precision. The integrated dual-encoder measurement system contributes greatly to this task. The system, which was developed exclusively by Bihler, compensates for the forces and external influences that occur during production and in this way ensures the greatest possible process consistency, with a positioning and repeat accuracy of ±0.01 millimeter.

Otto Bihler Maschinenfabrik introduced its NC technology and, with it, the first servo-controlled NC units some 20 years ago. A few years later, the company developed its exclusive dual-encoder measurement system which ensures outstanding precision at the servo-controlled units. Among the components that make up these solutions, there is a servo motor together with an initial encoder, as well as a stationary measuring head acting as the second encoder and a moving measurement gage. The gage is located at the mandrel, that is to say on the working part of the NC unit. The measuring head is located in the front third of the housing. Thanks to these installation positions, measurements are taken very close to the running process and all the factors at work are optimally recorded. In practice, the actual position of the mandrel is transmitted to the regulator in the control cabinet in real time. The regulator controls the motor and continuously compensates for any deviations in position.



The NC unit continuously compares the position by means of the dual-encoder measurement system. In the diagram, the nominal and actual curves are perfectly superimposed and are displayed here as a turquoise line. The contour variation shown in violet as a difference between the curves shows that the actual position differs from the nominal position by only a few thousandths of a millimeter and does so only on accelerating/braking.

Automatic compensation The positioning of NC units is therefore always absolutely accurate, both in the presence of changing forming forces acting externally and in the case of gradual changes, such as changes in temperature due to the heating of the machine during operation or fluctuations in the material. The dual-encoder measurement system reacts automatically and can therefore compensate ideally for such influences. This results in exceptional process consistency and manufacturing precision, with excellent positioning and repeat accuracy of ±0.01 millimeters. Another advantage: Thanks to the exact positioning of the NC units, no travel limit stops are needed because the overshoot that occurs with mechanical slide units is completely eliminated.

No more reference runs Another highlight of the dual-encoder measurement system lies in the fact that it is an absolute measurement system. This means that the exact position of the mandrel is known at all times and all the axes always know exactly where they are currently located. As a result, for example, there is no need to perform a reference run if there is an occasional power outage, the machine is shut down unexpectedly or even after the NC units have been manually adjusted. In practice, this reduces potential stoppage times and ensures that production is resumed extremely quickly after a shutdown. The NC units are programmed via the Bihler VC 1 controller. Easy-to-use input screens permit the simple, fast parameterization of the units, which Otto Bihler Maschinenfabrik has always developed, manufactured and assembled inhouse.

Practical value added The dual-encoder measurement system is present in many NCA units and is used, for example, in the Bihler GRM-NC and RM-NC servo-controlled stamping and bending machines just as it is in the Bihler BIMERIC servo production and assembly system. In these systems, the individually programmable NC units permit outstanding precision, speed and flexibility. In this way, they permit the fast, precise execution of tool movements, with process speeds of up to 1,000 rpm coupled with freely programmable stroke movements and movement profiles. Maximum force is also available across the entire operating range and, last but not least, there is no need to change any mechanical components at setup time. ●

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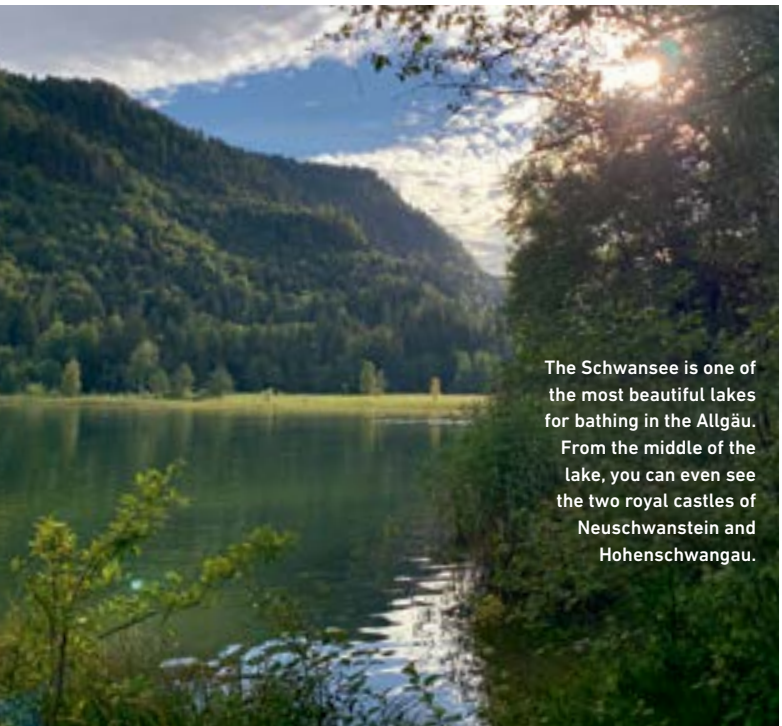
A ROMANTIC TOUR AROUND THE VALLEYS

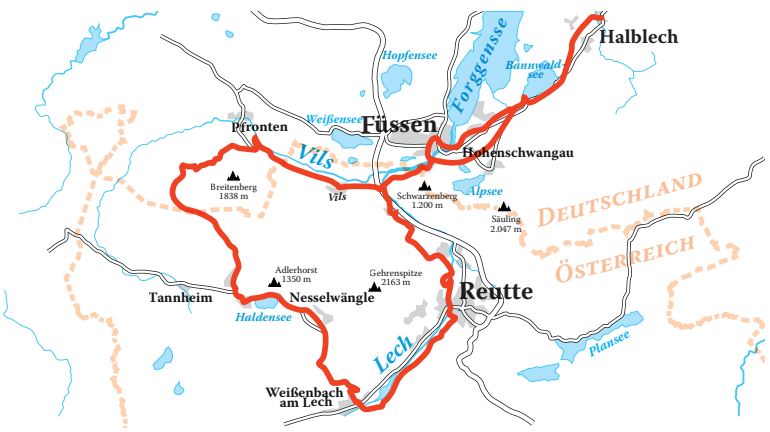
The eastern Allgäu area around Halblech is a paradise for cyclists. Whether on a racing bike, mountain bike or, as is becoming ever more frequent, a gravel bike, the routes around Halblech are both varied and exciting.

The tour described in this article takes us via Füssen and Reutte to "the most beautiful high valley in Europe", as the Bavarian writer Ludwig Steub described the Tannheimer valley in 1846. This small Tyrolean valley is indeed well hidden at an altitude of approximately 1,100 meters between the wild faces of the Allgäu and Tannheim mountains.
The route leads from Halblech via the Schwansee at Schwangau to the Lechfall at Füssen. Traveling along idyllic cycle paths and through romantic meadows, we soon reach Reutte in Tyrol. One's gaze is constantly drawn from the washed gravel banks up to the peaks of the Lechtal mountains. At Weißenbach, the Gaicht pass up into the high Tann-

heimer valley demands some hard work. The figures dressed in traditional costume seem to be calling out a welcome at the entrance to the valley before we arrive in Nesselwängle. Via Grän, leaving the characteristic Aggenstein on the right, we now descend to Pfronten in the eastern Allgäu. Now comes a short detour into the Tyrol: We set out on the return trip via the small town of Vils. The result is 89 kilometers and a total climb of some 750 meters – time for some hearty refreshment. ●



The Schwansee is one of the most beautiful lakes for bathing in the Allgäu. From the middle of the lake, you can even see the two royal castles of Neuschwanstein and Hohenschwangau.



The river Lech gives the landscape its character. Lush green in the riverside meadows and the giant mountains in the background.

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