WITTENSTEIN

move

The magazine for customers and partners of WITTENSTEIN SE

Media Literacy 4.0

"Smart" employees for the smart factory

move talks to
Dr. Anna-Katharina Wittenstein

October 2016

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Masthead

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Cover photo: Trainees Christian Betz (left) and Alexander Zangl at the video shoot for a digital learning system at WITTENSTEIN SE

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From left: Dr. Dirk Haft, Erik Roßmeißl, Dr. Anna-Katharina Wittenstein, Dr. Bernd Schimpf

Dear readers,

A headline in the relevant specialized media recently caught the eye of many observers: “Industry 4.0 needs a new type of employee”. But have we really got enough qualified people for the digital world? Production in the future will by no means simply be a question of how to implement technologies; it will pose a serious challenge for schools, universities and not least vocational and further training concepts in business enterprises. It therefore seems an obvious strategy to introduce our own next generation to the subject in a fun way. Our trainees and students have now taken the first step along this exciting path in a hands-on project. And because the future will belong to “smart” employees for the smart factory, we have decided to show two of them on the cover of this latest issue of move.

Networking – that much-cited buzzword in the Industry 4.0 context also demands a response from us, the WITTENSTEIN Group’s Management Board. Our new team has shared the responsibility for the company since October 1. All four of us have already been attached to WITTENSTEIN for a very long time in various management positions, and we’re now looking forward to this great opportunity to get our family firm ahead together with you, our customers and business partners – on a geographical, technological and organizational level. Board Spokeswoman Dr. Anna-Katharina Wittenstein introduces herself in an interview on pages 4/5.

“WITTENSTEIN on all axes” – this is our motto for the upcoming MOTEK, the International Trade Fair for Assembly and Handling Technology from October 10 to 13, 2016 in Stuttgart. The motto reflects our aim of exciting our customers with innovative mechatronic drive solutions. Or, “translated” into products: the servo worm gearheads in the WITTENSTEIN alpha V-Drive product family will be on show for the first time at the exhibition, with both a new series and a technological upgrade of proven gearhead variants. Secondly – and no less exciting – is our new chipless principle for rack pinning. You can discover how that works upfront on pages 20/21 – but we recommend that you also put it to the test live at our booth in Hall 8, Stand 8121.

Last but not least: the former WITTENSTEIN AG will in future operate as WITTENSTEIN SE and is listed as a European Company. Our legal form now also reflects our globalization strategy.

The WITTENSTEIN SE Management Board

Dr. Anna-Katharina Wittenstein, Dr. Dirk Haft, Erik Roßmeißl, Dr. Bernd Schimpf

move talks to:

Dr. Anna-Katharina Wittenstein

Dr. Anna-Katharina Wittenstein, aged 40, has already been a Member of the WITTENSTEIN Group's Management Board since April 1, 2016 and has now been appointed Board Spokeswoman with effect from October 1. She has a degree in Business Administration and a PhD in Engineering. Dr. Manfred Wittenstein's eldest daughter joined the family run firm in 2007, and amongst other things has held the position of General Manager at our Swiss facility in Grüsch as well as Chairwoman of the Board of the WITTENSTEIN Holding Corp. in Bartlett / Chicago (USA).

move: You've been a Member of the Board at the company headquarters in Igersheim-Harthausen for a good six months now. Do you feel like you've finally "arrived"?
Dr. Anna-Katharina Wittenstein: No, I wouldn't say that. "Arrived" sounds far too much to me like "goal achieved" or "resting on my laurels". I don't think that's the right picture, either for me personally or for WITTENSTEIN. We're constantly changing and we want to stay on the move the whole time – helping our customers replace something good with something even better. That's our ambition. Secondly, even in the narrow sense, I've never really been gone – apart from the years when I was a student and my time as a research assistant at Fraunhofer IPA (Institute for Manufacturing Engineering and Automation). The connection has always been there. I used to love playing in the production shop as a child. The years I spent in Switzerland and the U.S. were very intensive and instructive. I was keen to gather broad international experience before taking on responsibility for the WITTENSTEIN Group overall. And that's where I am now.

You were appointed Board Spokeswoman to coincide with Professor Dieter Spath's departure. As such, you are also the face of the company's basic strategic direction. What are your plans in this area? In a nutshell, what can we expect from you?
For a start, there's absolutely no reason to question everything that's proved so successful up until now. At the same time, the new Management Board in general – and we see ourselves as a team spanning different functions, even though I might be the one to get most of the limelight – obviously has its own ideas and intends to develop them in the future. As a high-performance network, WITTENSTEIN is continuously evolving on a geographical, technological and organizational level. Our mental starting point is the clearest possible focus on customers and markets; an agile, highly innovative and extremely effective organization is our objective. It's a goal we're committed to pursuing – for the benefit of both our customers and our employees.

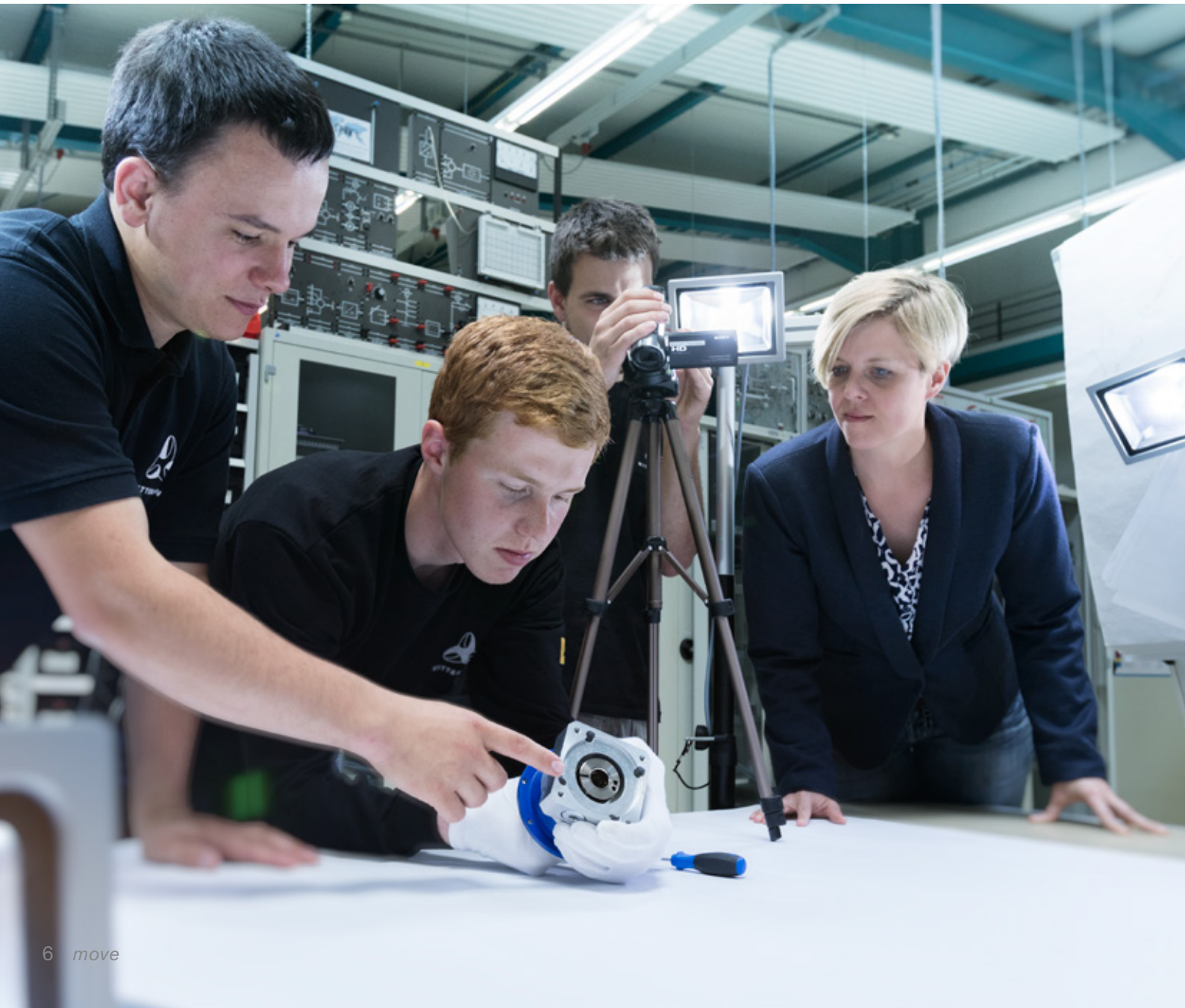
Women are still a tiny minority in management positions. Particularly in the engineering industry, they're very much the exception. Do you have a harder time than your male colleagues?
The question doesn't arise for me. The reasons why there are fewer women than men in management positions, especially in our industry, are already well-documented. Beyond that, I don't get the impression in my daily work that I'm perceived first and foremost as a woman, or that I'm judged more or less favourably than a man would be. I believe that anyone is capable of showing at least a minimum of objectivity and discernment, and what I've experienced so far confirms that. Women and men may have different abilities, strengths and weaknesses – but that's something we should understand as an opportunity and leverage as a team. At the end of the day it's the results that count.

"Results count" – that's also the internal motto for the WITTENSTEIN Group this fiscal year. It's the benchmark you'll be judged by as a Board Member. If you had to sum it up in a single word, what would you like your individual contribution to be measured by? What's the most important thing for you personally?
Attitude.

Media Literacy 4.0

“Smart” employees for the smart factory

Industry 4.0 is not simply a question of how to implement technologies; it’s also a challenge for employee training, development and qualification. In both technical and commercial professions, creating media literacy is increasingly important alongside teaching the basic “tools of the trade”, imparting management methods and developing soft skills.



»The ‘smart’ employee in the smart factory is characterized by a high level of media literacy.«

Dr. KATHRIN HECKNER,
MANAGER PERSONNEL DEVELOPMENT AND TRAINING AT WITTENSTEIN

“It’s only logical that the increasingly digitized world of work should be integrated as an additional element in vocational and further training”, says Dr. Kathrin Heckner, Manager Personnel Development and Training at WITTENSTEIN. “We wanted to introduce our own next generation to the subject of Industry 4.0 in a fun way, which is why we launched a project with trainees and Cooperative State University students to promote digital media literacy, personal initiative, team working ability and the application of new project management methods.

A project with practical relevance: development of a digital learning system

To make sure the trainees’ and students’ knowledge of this topic was not purely theoretical, they were given a mission with clear practical relevance: they were asked to refashion a physically existent training kit for assembling WITTENSTEIN gearheads into a digital learning system with videos they had to shoot themselves. What originally began as a training project turned out to be something much bigger: “Those young people filled a complete online video platform with life”, Dr. Kathrin Heckner explains. “Just like on YouTube, they can now post homegrown videos online and share them with all staff throughout the Group.”

The success of the digital learning system is patently visible: the online training tool encourages self-learning and is a meaningful support for trainees, or for new staff during the induction phase, when they are being taught how to assemble the practice gearhead.

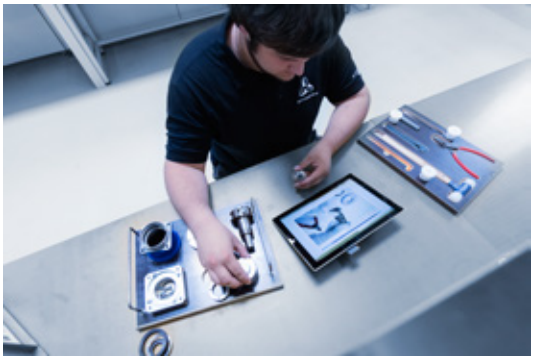
The platform is not only designed to be used in-house, however; it is also a training channel that will in future be utilized to offer and provide content to WITTENSTEIN customers and sales partners. “Our Customer Service has already shown a few of the videos to customers – and the initial feedback has been extremely positive. They can easily imagine all kinds of advantages, for example when it comes to assembling and maintaining gearheads or servo actuators”, Dr. Kathrin Heckner reports. Apart from building up media literacy, the project has also familiarized the trainees and students with modern project management methods and how to realize them.

Dr. Kathrin Heckner: “The project participants succeeded in implementing and controlling the complexity of the task at hand in such a way that the digital learning system meets the high quality standards that were stipulated for the didactic concept and the media design. Agile project processing techniques were communicated in passing, as it were, as part of the training project.”

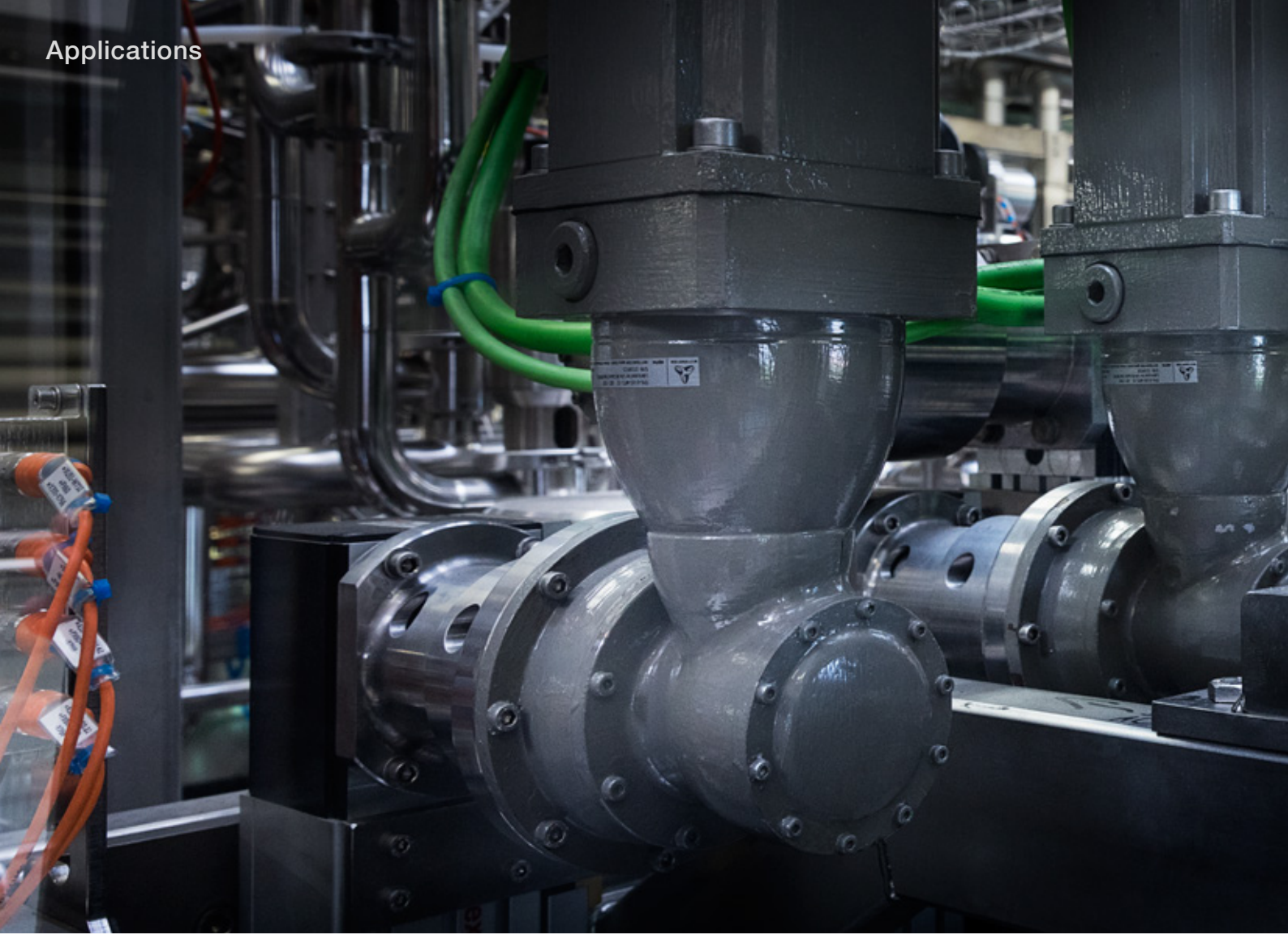
“Smart” employees convince with media literacy and management expertise

The development of the video portal and the chance to shoot more than twenty videos – motivated by their affinity with new media and social networks – provided the trainees and students with a successful introduction to Industry 4.0 and taught them valuable skills necessary for innovative management methods. “Smart employees in smart factories are characterized by a high level of media literacy and they’re optimally prepared to expand their knowledge in a self-organized fashion. That combination is a key personal qualification for both them and us on the way to Industry 4.0”, Dr. Kathrin Heckner concludes.

Creating media literacy is set to become an increasingly important element of in-company training in the next few years. There are currently around 180 trainees and placement students at WITTENSTEIN, but many more users will profit equally, both now and in the future.



The training video can be played by scanning a QR code: it encourages self-learning and supports trainees or new staff when they are being taught how to assemble the practice gearhead.



SIG Combibloc and WITTENSTEIN:
Two partners devise technologies

Trust, openness, shared success – these are the crucial pillars of the longstanding cooperation between SIG Combibloc and WITTENSTEIN. What began in a rather unusual way nearly twenty years ago is meanwhile a well-established, two-way technology and innovation partnership.

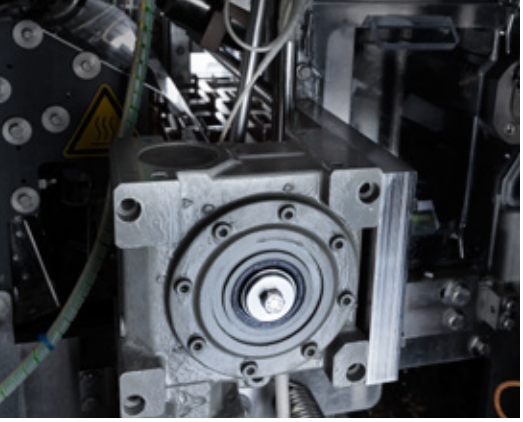
SIG Combibloc is one of the world's leading system suppliers of aseptic carton packaging and filling machines for beverages and food. With an annual turnover of 1.72 billion euros, the company is one of the key players in this market. A marked openness to new technologies is a crucial aspect here: "Non-conformist thinking, a willingness to try out novel ideas and a desire to test new limits have traditionally been the doctrine of our developers and engineers", explains Bernd von Birgelen, Head of Competence Pool Handling & Transfer at SIG Combibloc Systems GmbH. In 1997, the firm's attention was drawn to a like-minded partner: WITTENSTEIN.

A joint achievement:
servo actuators in packaging technology

The very first time a WITTENSTEIN gearhead was used in a SIG Combibloc filling machine, its job wasn't to transmit a motion but to reduce it. "It was a rather unusual task for a gearhead, but it worked and it helped cut the costs for the machine", Bernd von Birgelen recalls. Servo gearheads later made their debut in another application, and the line speed was increased from 2500 to 3000 packs per hour.

Right-angle gearheads on the valve cluster of a Combibloc 612 food packaging machine: Tappets and valves are moved by transmitting a linear motion

"The gradual technology shift to WITTENSTEIN servo gearheads and motor / gearhead units meant SIG Combibloc was regularly able to announce significant performance improvements by its machines", acknowledges Jürgen Blümel of Competence Pool Forming & Sealing at SIG Combibloc Systems GmbH (right) in conversation with Josef Tintrop, Sales Manager at WITTENSTEIN alpha's Engineering Office West in Dinslaken (left).



At the interface between the mandrel wheel and chain sections, V-Drive+ worm gearheads are used to lift the fold.

»SIG Combibloc sees WITTENSTEIN's servo technology as an 'enabling technology' that is at least partly responsible for the top performance delivered by its machines today.«

BERND VON BIRGELEN,
HEAD OF COMPETENCE POOL HANDLING & TRANSFER
AT SIG COMBIBLOC SYSTEMS GMBH

The first obstacle had been overcome. The gradual technology shift from pneumatic to servo technology meant SIG Combibloc was regularly able to announce significant performance improvements by its machines. "Our gaze has increasingly turned to servo capability with each new generation of machines", says Jürgen Blümel of Competence Pool Forming & Sealing at SIG Combibloc Systems looking back. WITTENSTEIN has continued to provide active support to the firm's engineers as a development partner to this day.

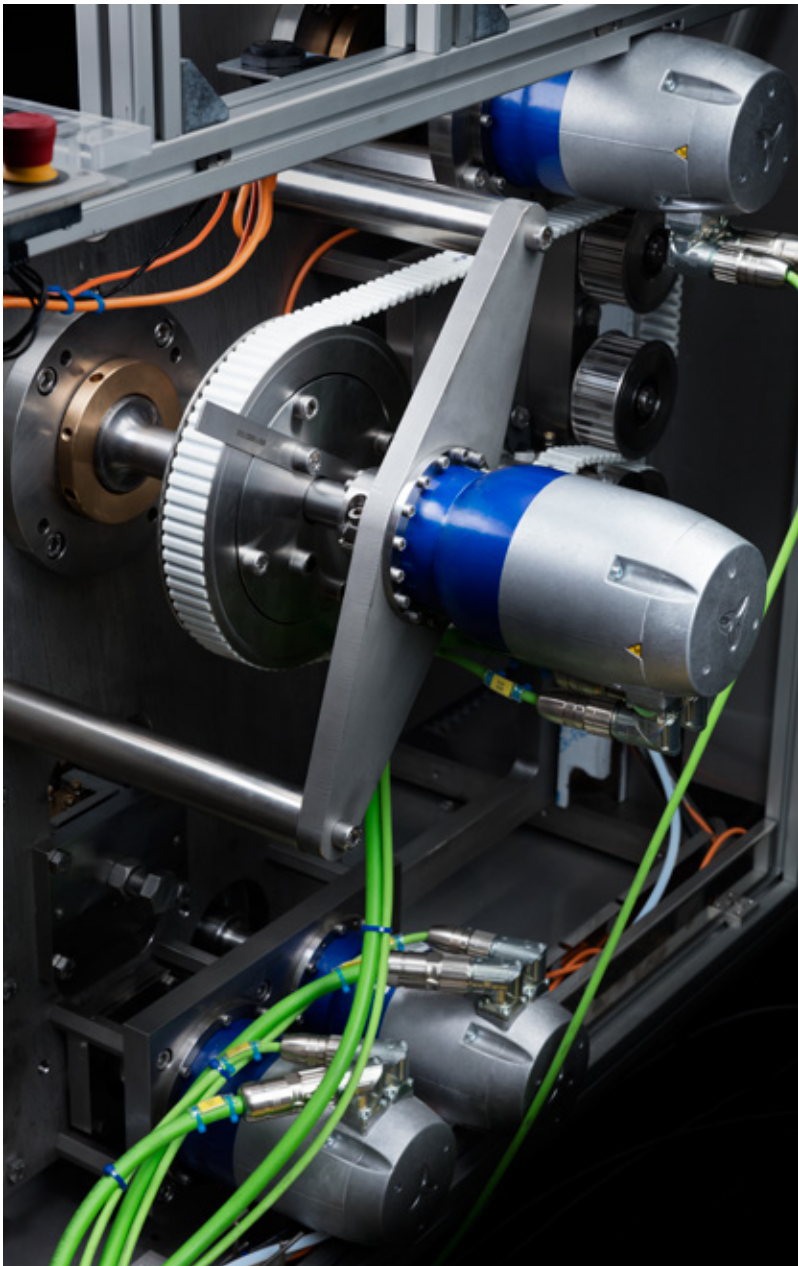
WITTENSTEIN on all axes – with good reason

SIG Combibloc currently installs various high-end right-angle gearheads such as HG+, TK+ and V-Drive+ as well as high-end TP+ and SP+ planetary gearheads depending on the specified function, the performance demanded and the space available – all built by WITTENSTEIN alpha and almost all in a corrosion resistant design. There's no sign anywhere of servo technology from other manufacturers – with good reason. "WITTENSTEIN alpha products are innovative and perform extremely well; they make our machines more flexible, increase their throughput and guarantee optimal processing quality in continuous, dynamic operation. What's more, the support we get from Sales and Customer Service leaves nothing to be desired and the developers are always very receptive to any new ideas. It's a partnership on equal terms", adds Bernd von Birgelen enthusiastically.

From component supplier to expert partner

SIG Combibloc sees WITTENSTEIN's servo technology as an "enabling technology" that is at least partly responsible for the top performance delivered by its machines today. "It was only possible because our cooperation progressed from a simple supplier-customer relationship to a two-way innovation and expert partnership", says Bernd von Birgelen. "Corrosion resistant servo gearheads and actuators, and more recently also Hygienic Design, are just two instances of projects we've undertaken together. WITTENSTEIN has been able to take advantage of our know-how here regarding the requirements in food processing plants with sterile and wet areas. In the opposite direction, we profit from WITTENSTEIN's ability to deliver appropriately designed components that conform to our rigorous standards and significantly enhance the efficiency and the value of our machines." There are many examples which underline the quality of the collaboration between SIG Combibloc and WITTENSTEIN. "On top of that, the support provided to key accounts – both technical and commercial – couldn't be better", confirms Stefan Mergel, Head of Downstream and Procurement Engineering Equipment Supply Chain Management & Procurement at SIG Combibloc. "The present cooperation takes place within a very close relationship that easily exceeds preferred supplier status." In the meantime, it isn't simply restricted to gearheads but also includes complete motor / gearhead units, such as the compact servo actuators in the TPM+ power series, which are installed in NewFood machines.

SIG Combibloc has set itself the objective of being more than just a supplier of first-class technology for its customers. The cooperation with WITTENSTEIN is evidence that the company also practises this philosophy successfully in its dealings with partners.



The compact TPM⁺ power and TPM⁺ dynamic servo actuators are currently proving their worth at SIG Combibloc on a test facility for the NewFood machine, where they drive the mandrel wheel and the fill nozzles dynamically.

Which WITTENSTEIN solution for which machine function? Josef Tintrop (right) in conversation with Christian Turobin of the Competence Pool PLC & Process Control at SIG Combibloc Systems (centre) and Christoph Bremer of the SIG Combibloc Competence Pool Handling & Transfer (left).

Servo technology has superseded pneumatics in the ultrasound station, where the anvil and ultrasonic sonotrodes are pressed together by means of coupling elements, because the packs are no longer transported and sealed sequentially but simultaneously, which is considerably faster.

Beverage cartons, large or small, are all manufactured and filled in the same way

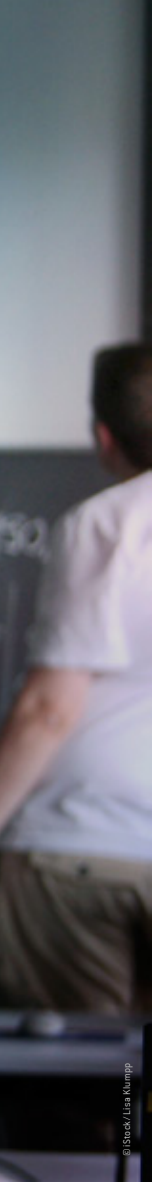
The basic design of all SIG Combibloc machines always consists of four modules regardless of the size of the beverage cartons for which they are intended: so-called sleeves are folded in the mandrel wheel section, then pushed onto mandrels and heated. As part of the same process, the base of the packaging is first folded and then sealed by the bottom press. In the downstream chain section, compressed air blows dust particles out of the packaging, which is still open at the top; the pre-punched creases and folds in the carton material are broken and pre-folded in preparation for sealing. In the aseptic zone, the packaging is sterilized with hydrogen peroxide (H_2O_2), dried, filled with product and ultrasonically sealed.
Next, a handling module transfers the filled and sealed primary packaging to a conveyor, which takes them away. The folding, filling and sealing processes are completed amazingly fast. A six-lane Combibloc CFA 124, for instance, achieves an output of 24,000 packs an hour, equivalent to sixteen million machine cycles a year for every lane. The machines have to be capable of keeping up this performance for at least ten years – an incredible 160 million cycles all told.
There are two fundamental reasons why this kind of efficiency and availability are a reality today: one is the consistent use of servo technology and the other the powerful gearheads and actuators which do a reliable job every single time.

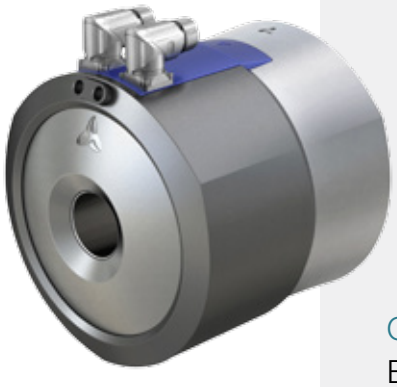
Galaxie® Drive System
excites academia and business

"New gearhead generation revolutionizes high performance engineering" – this was the tenor of the headlines last year when the press reported on the Galaxie® Drive System. It was the vision of a gearhead that dispenses with gearwheels that inspired WITTENSTEIN to develop a brand new gearhead generation, with features that would previously have been inconceivable.
Recent enquiries from textbook authors, prestigious awards and challenging applications testify to the status the Galaxie® Drive System meanwhile enjoys in research, academia and industry.

Galaxie® writes a new chapter in textbook series

The 8th edition of RWTH Aachen University's Machine Tools Compendium, published by Springer Vieweg and edited by the University's Laboratory for Machine Tools and Production Engineering, is due to appear in mid-2017. Aimed at students, engineers and users, the book covers a wide array of subjects, including the design of feed drives like those used by machine tools to execute highly dynamic drive motions. Chapter 2 "Feed axes in machine tools; feed gears" now contains an introduction to the principle, mode of operation, potential applications and benefits of the Galaxie® Drive System.
"The editors – Professors Manfred Weck and Christian Brecher of the Department of Machine Tools, Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University – asked us for information on the Galaxie®, so that they could add it to their textbook as a new, distinct type of gear", declares Tobias Röthlingshöfer, a development engineer at WITTENSTEIN. "That proved that the Galaxie® Drive System is something special – it's not simply a technical product but a new technological generation. It's a genuine





Productivity up
20%

Galaxie® provides fresh impetus: Enhanced motion precision when riveting aircraft structures

A 20% improvement in productivity – that was the outcome when the Galaxie® was installed in the MPAC (Multi-Panel Assembly Cell) riveting machines at Broetje Automation, where fuselage sections and aircraft struts are riveted fully automatically. “These machines join the fuselage parts of all passenger aircraft made by the big manufacturers together using thousands of rivets”, explains Dr. Christian Heyers, Head of Control Systems at Broetje-Automation – one of the very first lead customers to choose the WITTENSTEIN Galaxie®.

The Galaxie® is designed as a right-angle gearhead and is used in the axes of the MPAC machines that control the process. “What tipped the scales for us was the enormously improved torsional stiffness of the Galaxie® kinematics and the absolute freedom from backlash at the zero crossing, even with alternating loads”, reports Dr. Axel Peters, Executive Vice President Fastening at Broetje-Automation. “We profit from significantly more precise motion control – also at reversal points – and around **30% faster positioning** of the MPAC’s lower tool. That, in turn, has enabled us to increase the riveting rate from 18 to 21 per minute.”

»Sometimes you really do have to reinvent the wheel – or at least the gearwheel.«

THOMAS BAYER, MANAGER INNOVATION LAB AT WITTENSTEIN SE

INNOVATIONSPREIS DER DEUTSCHEN WIRTSCHAFT
ERSTER INNOVATIONSPREIS DER WELT

innovation that creates totally new opportunities for designers in high performance engineering.” In short: the Galaxie® is increasingly coming under the spotlight of research, academia and publications.

Innovation Award of the German Economy 2016

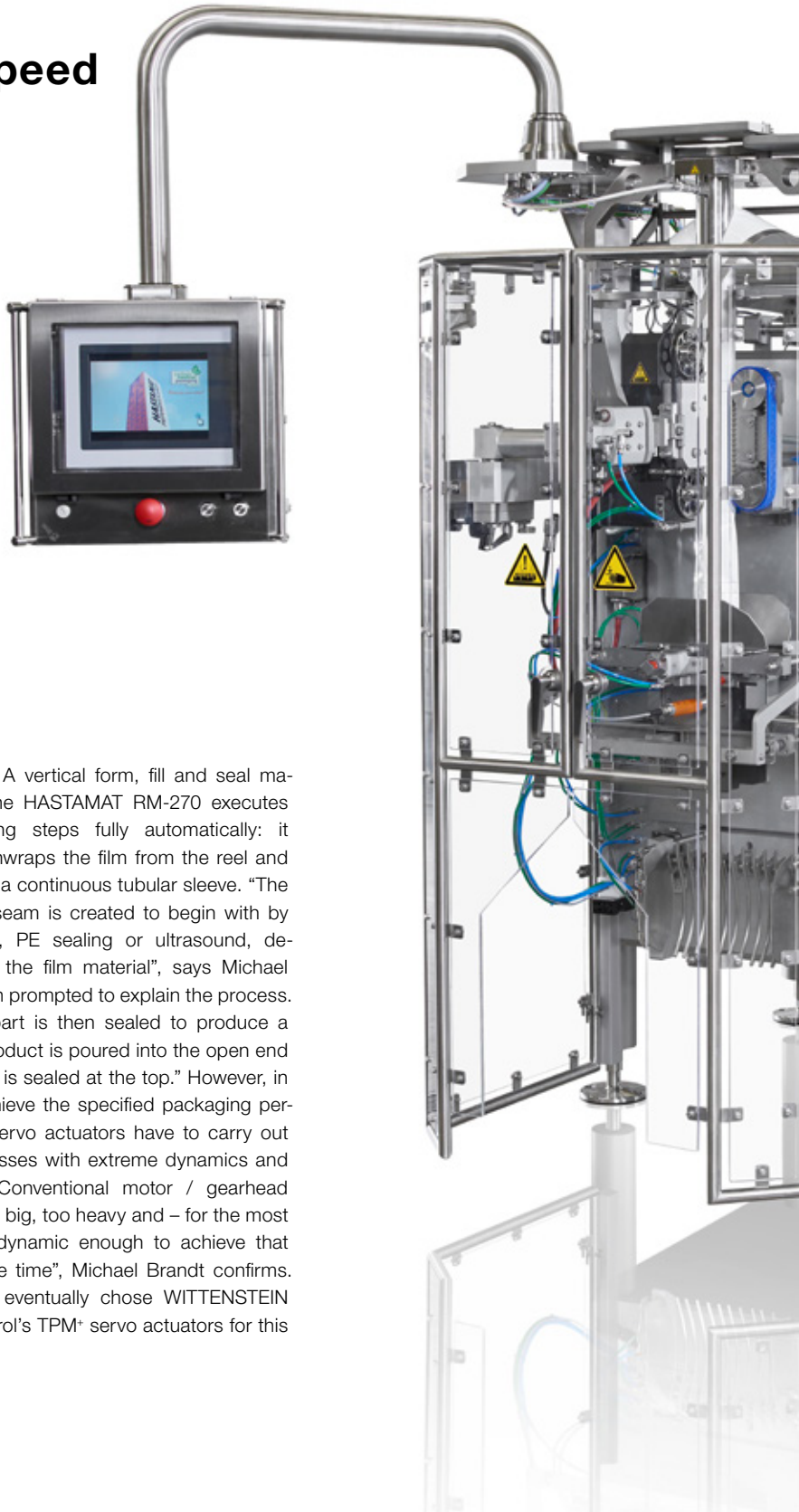
It was none other than Professor Klaus von Klitzing, Nobel Laureate in Physics, who on April 16, 2016 handed this year’s Innovation Award of the German Economy to Professor Dieter Spath, then Chairman of the Board and CEO WITTENSTEIN AG, and Galaxie® inventor Thomas Bayer. The award in the “Medium-Sized Companies” category honours the development of the Galaxie® Drive System as an outstanding scientific, technical, entrepreneurial and intellectual innovation: with its significantly improved efficiency, the Galaxie® Drive System marks a quantum leap in terms of productivity for the positioning drive solutions of tomorrow. Thomas Bayer, Manager Innovation Lab at WITTENSTEIN SE, sums up: “Sometimes you really do have to reinvent the wheel – or at least the gearwheel”.

Broetje-Automation’s MPAC machines join the fuselage parts of all passenger aircraft made by the big manufacturers together using thousands of rivets.

From food to screws – bulk goods and pourable products are often packed in bags. The vertical form, fill and seal machines built by HASTAMAT, the leading packaging specialist, particularly impress with their very high speed and precision – due not least to servo actuators from WITTENSTEIN motion control.

Packaging at lightning speed

Smart drive solutions for HASTAMAT vertical form, fill and seal machines

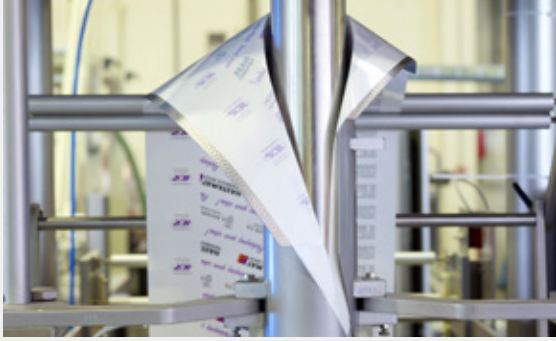


HASTAMAT Verpackungstechnik GmbH of Lahnau, about thirty miles north of Frankfurt, develops and manufactures customized packaging machines, packaging lines with integrated weighing and counting technology as well as special systems for the food and non-food industries. From food products through DIY items to tablets, "non-stop filling, non-stop closing" is what HASTAMAT's customers traditionally expect. Michael Brandt, Technical Director at HASTAMAT Verpackungstechnik GmbH, describes the challenges facing the engineers: "That generally means individually designed, intelligently realized packaging solutions with tailored details".

15,000 bags of biscuits an hour

One HASTAMAT customer, for instance, recently ordered a vertical form, fill and seal machine for packing biscuits at a rate of 15,000 bags an hour – equivalent to more than four bags per second and 250 machine cycles per minute. A vertical form, fill and seal machine like the HASTAMAT RM-270 executes all packaging steps fully automatically: it first of all unwraps the film from the reel and forms it into a continuous tubular sleeve. "The bag's side seam is created to begin with by heat-sealing, PE sealing or ultrasound, depending on the film material", says Michael Brandt when prompted to explain the process. "The lower part is then sealed to produce a bag. The product is poured into the open end and the bag is sealed at the top." However, in order to achieve the specified packaging performance, servo actuators have to carry out these processes with extreme dynamics and precision. "Conventional motor / gearhead units are too big, too heavy and – for the most part – not dynamic enough to achieve that kind of cycle time", Michael Brandt confirms. HASTAMAT eventually chose WITTENSTEIN motion control's TPM+ servo actuators for this reason.

The vertical form, fill and seal machine in the RM-270 series forms a sheet of film into flexible bags by heat-sealing, PE sealing or ultrasound, depending on the film material. These bags are then filled with bulk goods or pourable food or non-food products.



Yet another convincing packaging solution with TPM⁺ servo actuators: These actuators are currently used in more than 55,000 rotary and linear applications – including numerous different packaging machines and pick & place systems.

The TPM⁺ is installed in the jaw closer (top) and the jaw stroke (bottom)

Photos: HASTAMAT Verpackungstechnik GmbH

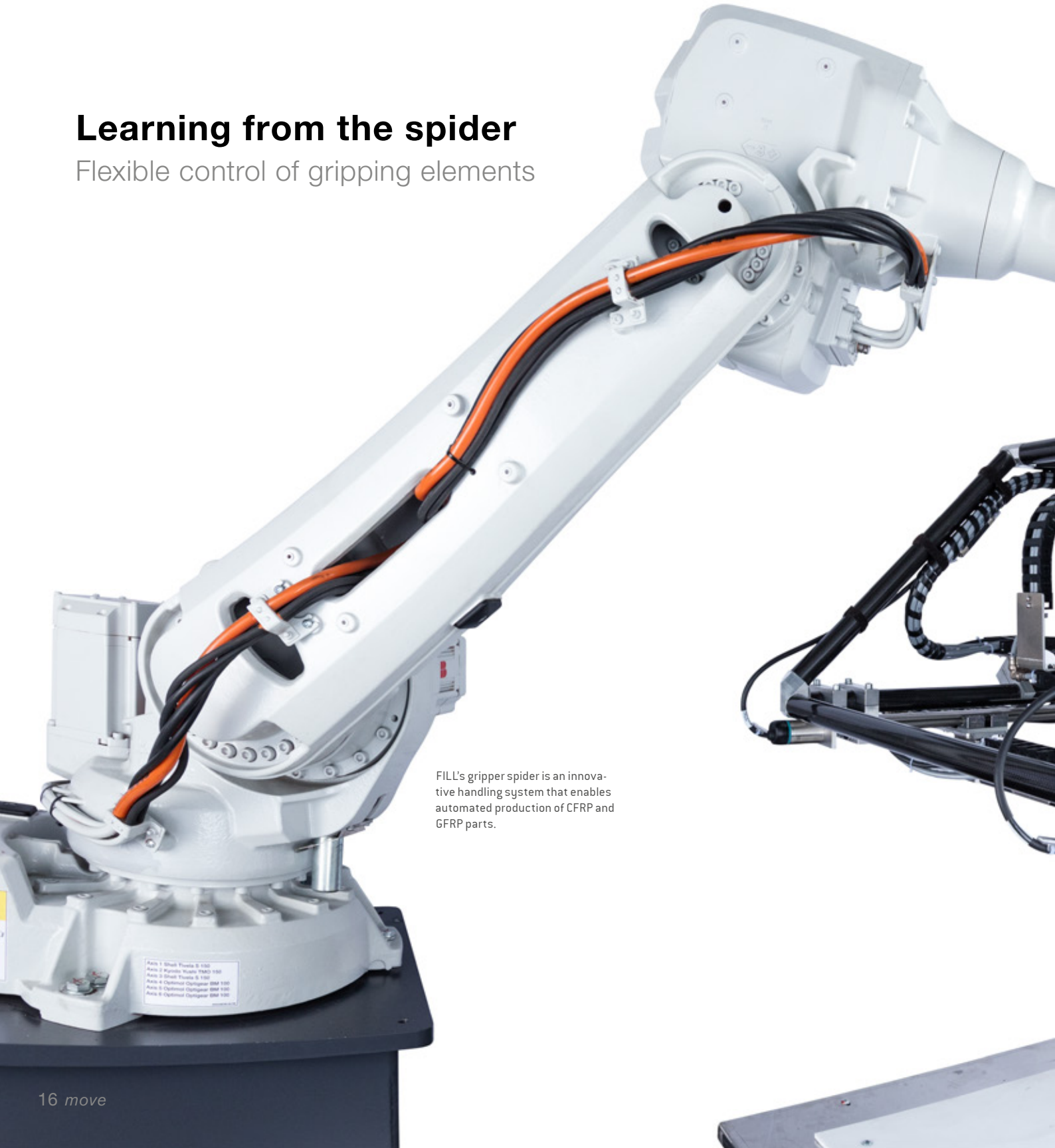
Highly dynamic pacesetters
TPM⁺ dynamic servo actuators

Reliable control of all process steps is vital. The film must be unwrapped from the reel as precisely as possible, to make sure the sealed seams are in exactly the right place later. “The second job for the actuators is to execute the vertical jaw stroke. The sealing and cutting unit is lowered during the filling process together with the bag and must then be moved up again one notch at a time at lightning speed”, states Siegfried Wallauer, Product Manager at WITTENSTEIN motion control. The third application is the horizontal movement of the jaw closer, which seals and cuts the bags. “We were able to offer HASTAMAT servo actuators with suitable power ratings in our TPM⁺ dynamic series for all these applications”, Siegfried Wallauer recollects. “The 004, 010, 025 and 050 sizes are used.”

HASTAMAT praises the crucial enabling potential offered by the servo actuators: “The combination of an integration-friendly design, high dynamics and low weight makes it possible to achieve – and control – significantly more than 200 cycles per minute for the first time with the RM series”, Michael Brandt concludes.

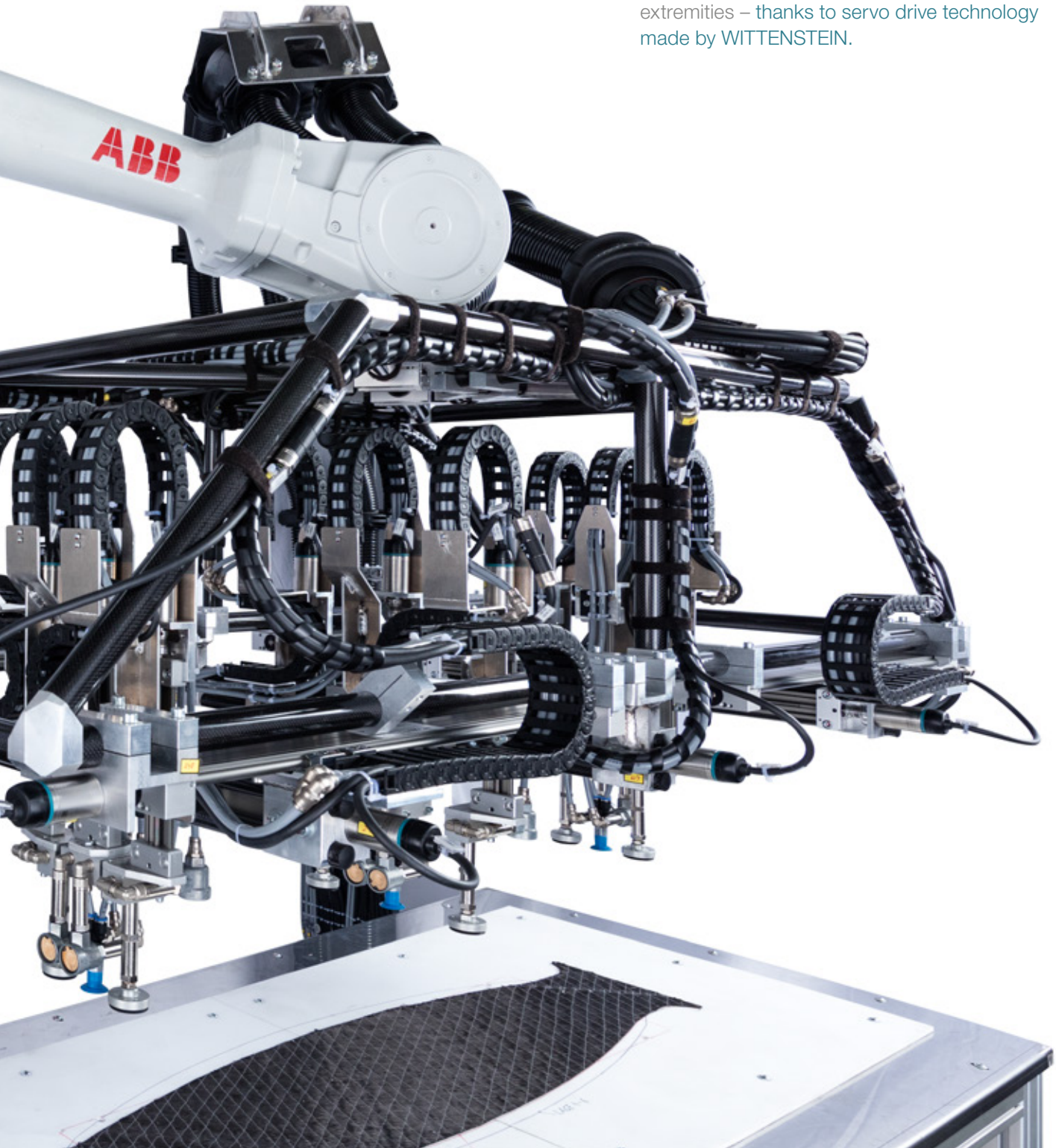
Learning from the spider

Flexible control of gripping elements



FILL's gripper spider is an innovative handling system that enables automated production of CFRP and GFRP parts.

Spiders have eight legs, each of which can be moved completely independently of the others. This gives them the ability to grip onto any surface. The new gripper spider from FILL, the Austrian mechanical engineering and plant construction company, is every bit as flexible as this arthropod's extremities – thanks to servo drive technology made by WITTENSTEIN.



More than a dozen size 32, industry-standard brushless DC motors in the cyber® dynamic line family enable precise motions to be executed steplessly and independently of one another.

The gripper spider is part of a system that enables automated production of fibre composites made from CRFP (carbon fibre reinforced plastic) and GFRP (glass fibre reinforced plastic). FILL uses a total of 19 industry-standard brushless DC motors from the cyber® dynamic line in this handling unit, each of which is teamed up with a simco® drive. The main arguments in favour of these brushless DC motor systems were the compact design and low weight of the motors and the fact that the servo drives integrate easily into the handling system's PROFINET fieldbus environment. "Unlike pneumatics, for instance, the servo technology allows different linear positions to be approached flexibly without any mechanical retooling. That was an essential advantage for the process", explains Michael Schneiderbauer of FILL's Product Development department. The gripper spider is part of a complex and highly innovative manufacturing process. "One central idea is that the same mould should be used to build up the layers and cure the CFRP or GFRP parts, which are used amongst other things as strut bars in the automotive industry", says Michael Schneiderbauer. "The gripper system must be able to pick up composite cuttings and PU cores of different sizes for this purpose, in some cases preform them and place them down again." The prototype for a gripper spider that could meet this requirement had already been designed by Tecnalia, the Spanish research association: the challenge for FILL was to optimize this prototype and bring it up to industry standard in the framework of the EU funded "LOWFLIP" project (Low Cost Flexible Integrated Composite Process).

Lightweight, flexible, cost efficient – next-generation gripping technology

Based in Gurten, Austria, the company employs around 700 staff and is a leading international manufacturer of machinery and equipment, including composites manufacturing and processing systems. Composites are used, for example, in the automotive and aerospace industries, in the sports and energy sectors and in wood & building. Apart from generally attaining industrial maturity, the further development work on the gripper spider was undertaken with three main objectives in mind. Michael Schneiderbauer sums up: "Maximum gripping flexibility, a substantial weight reduction for the end effector and optimal cost efficiency as regards the purchase and operation of the handling system. By using carbon tubes for the supporting structure together with WITTENSTEIN's brushless DC motors, we managed to more than halve the weight and slash energy consumption."

Servo technology provides maximum flexibility

The new gripper spider's movements could almost be described as graceful. The lightweight, compact servo motors in WITTENSTEIN's cyber® dynamic line not only blend in perfectly; they also permit ultra-precise motions which can be controlled flexibly and independently of one another. The selection process for the servo motors was supported by WITTENSTEIN cyber motor with on-site consulting as well as load calculations with the cymex® 5 sizing software. Motors were also made available at short notice for test purposes. Nine of these brushless DC motors now each position a suction cup vertically via a spindle drive. These cups enable the gripper spider to pick up PU cores of various sizes as well as different composite cuttings which are preformed in preparation for the processing process. The other cyber® dynamic line motors position the suction cups horizontally according to the format, also with the help of a spindle drive. Michael Schneiderbauer summarizes the most important innovation: "The complete structure is built up layer by layer in a single mould.

> »Unlike pneumatics, for instance, the servo technology allows different linear positions to be approached flexibly without any mechanical retooling. That was an essential advantage for the process.«
>
> MICHAEL SCHNEIDERBAUER, PRODUCT DEVELOPMENT AT FILL

The result is a composite part made from fibre reinforced plastics, where no complicated treatment or laying of the fabrics is necessary between the individual process steps, as is usually the case."
The combination of simco® drives and brushless DC motors from the cyber® dynamic line opens up many new horizons both for machine builders like FILL and for integrators and end users.

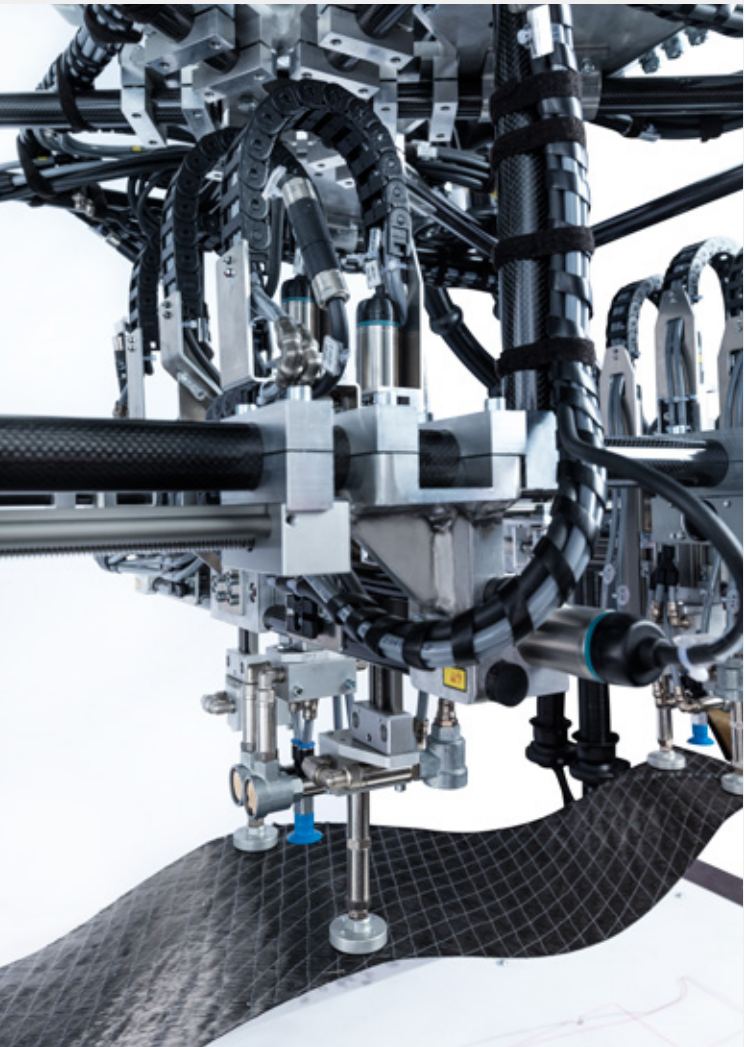
An ideal combination: WITTENSTEIN's industry-standard brushless DC motor system

One half of the comprehensive mechatronic solution for the gripper spider is comprised of a simco® drive. Several possible options for fieldbus integration are available: FILL opted for the version with a PROFINET interface because a Siemens controller was already in place.

Part two of the mechatronic "doubles team" is a brushless DC motor in the cyber® dynamic line family. "The gripper spider integrates a servo motor with an outer diameter of 32 mm and a rated output of 110 W", Michael Schneiderbauer observes. The performance data couldn't be better: "This motor weighs in at just 220 g, making it far lighter than any other, comparable type on offer in the market".

Thanks to the electronic identification plate, there is no need to parametrize the system, so that the time for commissioning is significantly shorter.

Motor and controller from a single supplier – a technically optimized solution with no interface risks.



EtherNet/IP™

ePLAN data portal

Brushless DC motor system configurable in the EPLAN Data Portal

The brushless DC motor system, comprised of simco® drive and cyber® dynamic line, can now also be configured in the EPLAN Data Portal. This web based platform from EPLAN Software & Service GmbH & Co. provides all relevant engineering data and is always absolutely up to date. Configuring the brushless DC motor system in the EPLAN Data Portal not only enables a huge time saving and more reliable project planning for electrical installations – it also ensures that customized drive solutions are optimally engineered.

cyber® dynamic line: multiturn functionality in miniature makes its debut

The size 32 and 40 industry-standard brushless DC motors in the cyber® dynamic line are the first of their kind with a miniature multiturn encoder to dispense with a battery and gearhead. Precise and reliable solutions for complex motion tasks can in future be realized in an extremely small space envelope. The diameter of the multiturn encoder is twenty percent smaller than the market standard while the axial height is less than half.

simco® drive: new performance features

The simco® drive series was recently extended with a higher-output version for up to 50 A nominal current. The door is now open for this servo drive in new applications requiring output ratings of up to 2.5 kW. WITTENSTEIN has also integrated another interface in the new controller in addition to the existing fieldbus interfaces with EtherNet/IP. This is a particular advantage for engineering firms which operate in both the European and the American markets. The servo drive is presently taking UL certification.
The integral – and likewise new –web server allows online access to the servo drive in mobile applications or out-of-reach installation positions. Customers can thus call up information on the drive system anywhere at any time, for example overall system load data or current errors and warnings. Condition monitoring, downsizing and optimizing the operational process are greatly simplified as a result.

In addition to assembly training, Customer Service also offers rack assembly directly on site.

Chipless rack pinning

Added value for assembly and servicing

Swarf is always undesirable during assembly work: it is difficult to control and has a destructive effect. WITTENSTEIN alpha's new chipless pinning principle successfully amends a proven method that was first established in the market several decades ago.

Secure pinning in just 1 minute

Incidentally: The foundation for pinning machine components was laid back in 1918 with the publication of DIN 1, the very first German standard. The new principle for chipless rack pinning proves that even something which has been tried and tested for many years, indeed almost a century, can still be improved – especially when applications are considered from the customer perspective and thought right through to the end.

1 The assembly pin is inserted into the mounted rack and driven into the pre-drilled hole in the machine bed.

2 The assembly sleeve and pin are turned in opposite directions, so that the sleeve engages in the hole. The sleeve is then pressed in half-way by hand.

3 Finally, the assembly sleeve is driven in flush with a hammer.

No drilling, no swarf, no problems with parts that are unfavourably positioned or otherwise difficult to reach – the new chipless principle for pinning machine components offers enormous time and cost benefits. No special tools are required: the two-piece mounting kit is comprised of a special pin and sleeve, which are fitted together using just an Allen key and a hammer.

Pinning: effective rack protection against overload

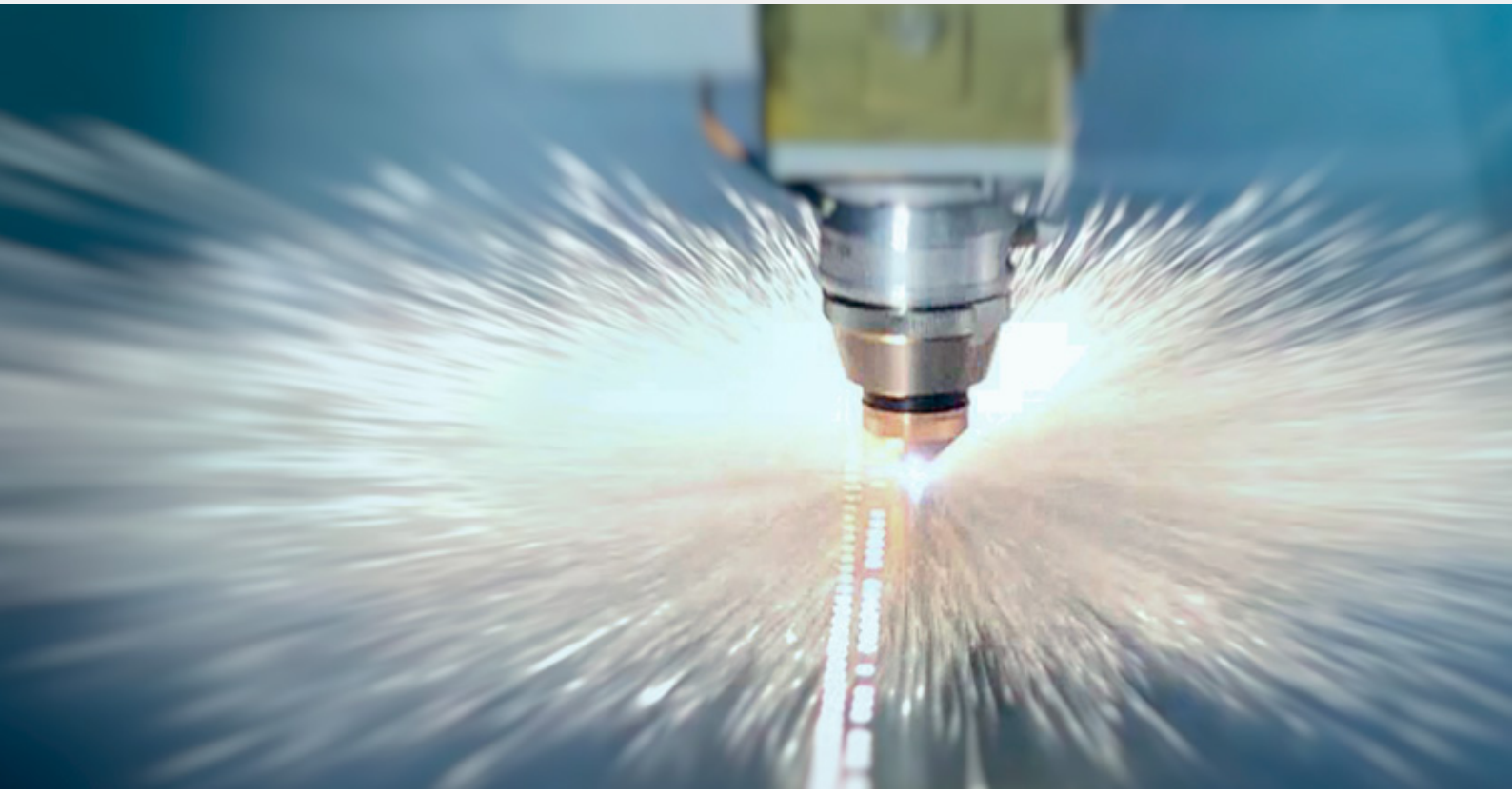
The main reason why racks are fixed with a positive connection is to protect them against overload. “Pinning stops the rack from slipping due to high loads, for instance in the event of a crash or another emergency situation”, explains Jochen Endres, Product Manager at WITTENSTEIN alpha. “That can quickly lead to the failure of the complete rack-and-pinion drive system.” In heavily loaded axes, therefore, pinning the rack is vital in order to rule out the risk of failure or threats to availability. “At the same time, conventional pinning is very time-consuming”, says Jochen Endres. “What’s more, an awful lot of swarf is produced when the racks and the machine bed are drilled and reamed together. Our new pinning method enables a huge time saving; it completely eliminates borings from the assembly process and allows machine components to be replaced quickly during servicing.” The new method highlights yet again how WITTENSTEIN alpha typically thinks outside the box – in terms of systems rather than isolated drive solutions.

Thanks to this ergonomic, efficient alternative to screw clamps for rack installation and the rack adjustment tool for aligning the interface precisely, a time economy of up to fifty percent can be achieved. The new pinning concept is a further example of “efficiency engineering” at WITTENSTEIN alpha. Instead of drilling and reaming the rack and the machine bed together in a time consuming process and then fitting the pin, this innovative assembly solution facilitates a secure and completely chipless connection! The holes which are required in the machine bed can be machined to fit exactly when the components are manufactured.

Fixed overload-proof in minimal time

The time saving as a result of this chipless assembly process is quite substantial: each rack can be securely fixed with a positive connection in less than 60 seconds – compared to 35 or 40 minutes with conventional pinning. Easy dismantling and reusability mean the rack can be exchanged rapidly in case of repairs or retrofits.

Innovative laser cutting
with drive technology made by WITTENSTEIN



Procon laser cutting machines achieve 0.05 millimetre precision on the cut workpiece.

Lightweight carbon mechanism and parallel kinematics – these innovative features are helping Italian manufacturer Procon to tread new paths in the field of laser cutting machines. Planetary gearheads with an output flange from WITTENSTEIN's TP+ series combine high dynamics and maximum torsional rigidity to enable fast, precise and reliable movements in the machine's main axis.

Laser cutting machines can be employed to work a wide range of materials and material thicknesses – from sheet metal through copper and brass to stainless steel. The FL3015LU model newly developed by Procon has an integrated loading and unloading system and is suitable for all sheet sizes up to 3 x 1.5 metres; its key hallmarks are high speed and precise movements. The machine uses a so-called fibre laser to achieve 0.05 millimetre precision on the cut workpiece. Compared to conventional solid-state or CO_2 lasering, this technology is particularly notable for its excellent beam quality, high energy efficiency, space saving, robust, maintenance-free design and long service life.

Special kinematics control the movement of the gantry and laser head

The actual innovation with this laser cutting machine is the special motion control principle of the movable gantry and the cutting head which is mounted to it. Procon's engineers developed and patented a lightweight carbon mechanism with parallel kinematics for this purpose, which keeps the movement of the gantry separate from that of the cutting head and thus reduces inertia to a minimum. The

Photos: Procon (2)

With their high dynamics and torsional rigidity, the planetary gearheads in the TP+ series ensure fast, precise and reliable movements in the machine's main axis.

TP+

carbon arms guide the cutting head extremely rigidly when a workpiece is machined while the parallel kinematics result in fast, precise movements in the x and y planes. A rapid, high quality cut is hence guaranteed, no matter how complex the machining task. To enable this high machining precision to be controlled safely and reliably, the gantry and the laser cutting head still have to be guided extremely accurately at the maximum acceleration rate of 5 g, cutting feed rates of one metre per second and high cutting speeds. "In the end, it all comes down to the right gearhead", explains engineer Emanuele Radice, WITTENSTEIN Italy's Area Manager. "High dynamics are only possible if both the drives and the machine control system have high stiffnesses, so that the axis as a whole has very short reaction times. The rigidity of the complete drive train is crucial."

The solution: TP+ planetary gearhead and comprehensive technical support

With WITTENSTEIN's technical support, Procon selected and installed TP+ servo gearheads with an output pinion. "In the Procon FL3015LU laser cutting machine they shine with their high maximum acceleration torques, minimal torsional backlash and high power density, precision and positioning accuracy", Emanuele Radice adds. "The TP+ withstands the high kinematic loads and guarantees optimal bending strength and torsional rigidity throughout the drive train." WITTENSTEIN was able to offer Procon several vital advantages – not just technology-related but also from the point of view of technical support and delivery reliability. "We value WITTENSTEIN because of the high quality of their products; the professional service and short delivery times are equally important. Standard WITTENSTEIN products arrive here configured and ready to install within a fortnight", asserts Yves Dejonckheere, proprietor and Sales Manager at the company headquarters in Schio, Northern Italy. "That's a very important aspect for Procon. After all, we don't just build laser cutting machines; we also make punching machines and industrial automation systems, which we generally ship four months after we receive the order."

For Procon, WITTENSTEIN is not simply one supplier among many but a special technology partner for innovative engineering.

The excavator can be operated from a safe distance without any risk to life and limb.

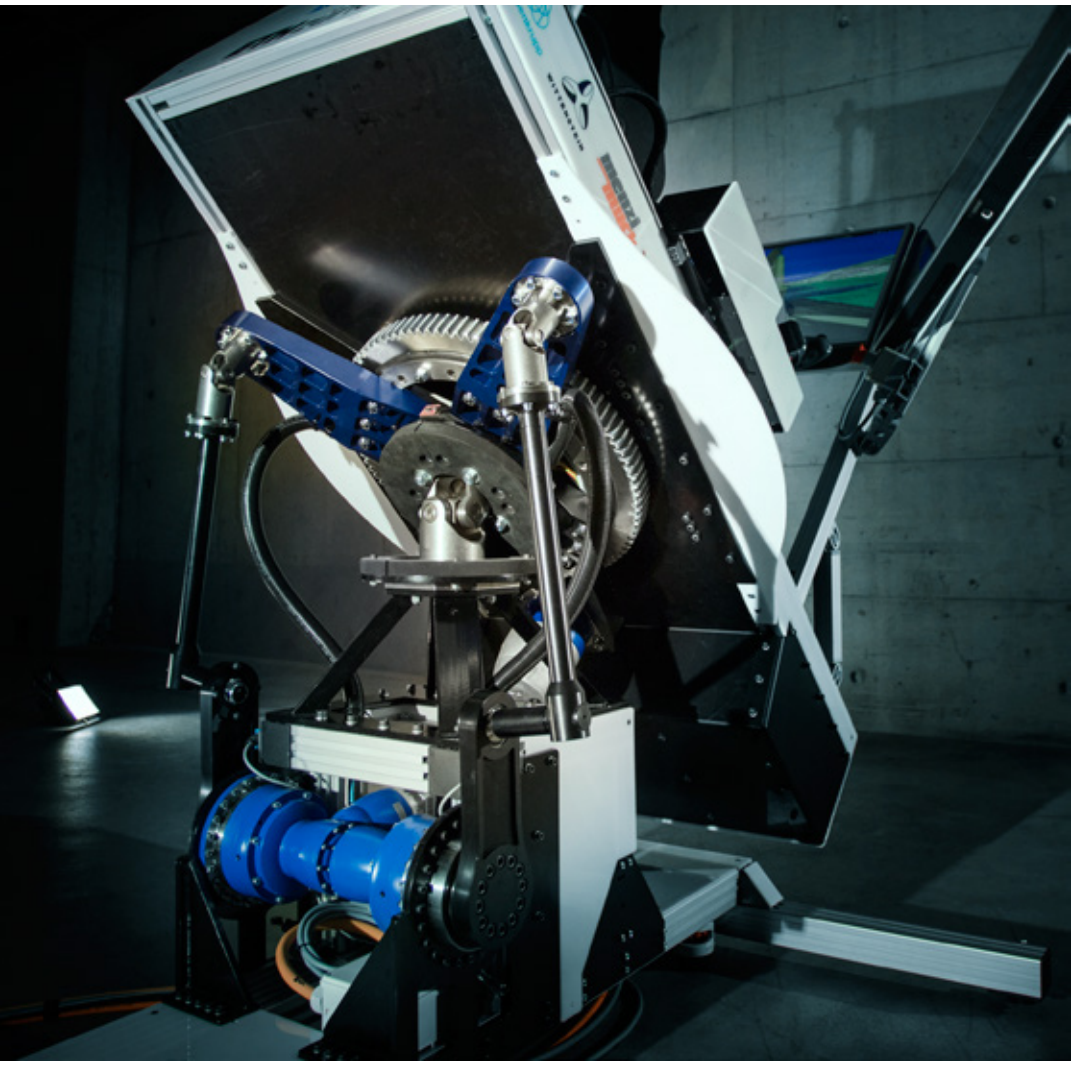
The telecontrol platform in action

WITTENSTEIN drive technology
controls civil protection excavators

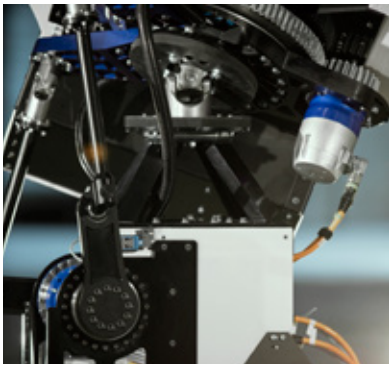
Freeing people trapped under collapsed buildings, stabilizing steep, landslide-prone slopes, rescue operations following an avalanche, clearing landmines, work in zones affected by radioactivity: these are just a few of the possible scenarios in which teleoperated excavators can be used.

Students at ETH Zurich have developed a telecontrol platform for such vehicles – with vigorous support from WITTENSTEIN AG in Grüsch, Switzerland.

The platform allows excavator operators to control their vehicles from a safe distance without any risk to life and limb. It works in a similar way to a flight or sports car simulator: the area where the excavator is action is visualized on various screens. The platform is tilted and rotated, imitating the roll and pitch angle of the excavator, so that the operator "senses" every movement or change of direction. The platform's kinematic performance is truly awesome: with its unique concept of movement, the actual excavator vehicle – a Menzi Muck M545 – is one of the most agile of its kind anywhere in the world. This university project was co-funded by WITTENSTEIN AG of Grüsch,



With their high dynamics and precision, the two TPK+ HIGH TORQUE right-angle gearheads and the TPM+ dynamic servo actuator enable the telecontrol platform to simulate the excavator's movements extremely agilely and realistically.



TPK+ HIGH TORQUE
TPM+ dynamic

Switzerland, as main sponsor. "We initially helped the students in the ibex team, who are working on the platform as a "focus project" as part of their Bachelor's degree at ETZ Zurich, to create motion simulations", reports Jürg Riederer, Sales Engineer Eastern Switzerland at WITTENSTEIN AG in Grüsch. "The motion data was then imported into cymex®, our sizing tool. Amongst other things, to enable the students to realize the computed drive design, we placed two highly precise, size 050 TPK+ HIGH TORQUE right-angle gearheads as well as one size 025 TPM+ dynamic servo actuator at their disposal and gave them a number of valuable tips."

Thanks to the high dynamics and precision of the mechatronic components, the telecontrol platform can simulate the excavator's movements extremely agilely and realistically. The cockpit has an ergonomic seat, adjustable screens and pedals; it is centrally mounted and can be turned 360° about its own axis. The platform can be simultaneously inclined up to 45° in any position. "This highly dynamic motion simulation provides the user with an experience similar to a real excavator cockpit", says Nicolas Sollich, one of the students involved in the ibex project. "Using the feedback, the operator can also control the excavator intuitively and precisely from a distance in critical situations."

Successful presentation at Sindex 2016

In the meantime, the nine students of Mechanical and Electrical Engineering at ETH Zurich who developed the platform for the ibex excavator have completed their focus project; they each graduated with a Bachelor's degree in August 2016. If you'd like to learn more about how the telecontrol platform works, there is a fascinating video on the project website: **www.ibex.ethz.ch**.

"The platform was on show at our booth at the Sindex automation fair in Berne in September", Jürg Riederer adds. "It was a real attraction that drew considerable attention." Hopefully, some of those visitors will also be interested in implementing the ibex platform on an industrial scale – so that the students' vision of a teleoperated excavator for civil protection can soon become a reality.

WITTENSTEIN opens regional office in Turkey

A whole series of innovative, and very ambitious, small-scale businesses have been established in the Turkish engineering sector over the last few decades. Dynamic growth will also be a key priority in the short-to-medium term future – the aim is for exports of machinery to rise to one hundred billion dollars by 2023.

Identify opportunities, exploit market potential

Against this background, WITTENSTEIN is investing in a new regional office in the Eastern Mediterranean. “Our Turkish customers seek close contacts with us because they want to refine their machinery and equipment with our help”, explains Björn Proschinger, Head of Sales Europe at WITTENSTEIN alpha GmbH. “A local presence there provides us with the means to consolidate our relationships with firms in Turkey’s aspiring engineering sector and support their development activities optimally with mechatronic solutions.”

Stronger customer focus and increased satisfaction with a proven team

The team at the new regional office – General Manager Süha Elbil, Sales Engineer Ercüment Kanber and Gökhan Yalcin in Commercial Sales Support – have already demonstrated their abilities in the past. There is no doubt in their minds: “We need to be present on the spot with an official regional office in Istanbul in order to get closer to our customers consistently and continuously. That will also enable us to become better acquainted with the market and to be aware of important technology or commercial trends in good time.” The number one priority, though, is customer satisfaction. “We want to offer our assistance to Turkish machine builders as early as the design phase”, comments Süha Elbil. “Our customers depend on innovative and sustainable solutions to add value to their machines. This increased proximity will allow them to leverage our know-how in mechatronic drive solutions more effectively and help us achieve a higher level of customer satisfaction.

General Manager Süha Elbil (centre) supports customers in Turkey together with Sales Engineer Ercüment Kanber (left) and Gökhan Yalcin in Commercial Sales Support.

Visit us at www.wittenstein.com.tr

Trade fair calendar 2016

WITTENSTEIN is represented at numerous trade fairs and exhibitions worldwide.
We look forward to meeting you!

Motek
Stuttgart, Germany
WITTENSTEIN Group
October 10 to 13, 2016

The 6th All in Print China
Shanghai (Pudong), China
WITTENSTEIN (Hangzhou) Co., Ltd.
October 18 to 22, 2016

Engineering Design Show
Coventry, UK
WITTENSTEIN Ltd.
October 19 to 20, 2016

CITME
Shanghai (Pudong), China
WITTENSTEIN (Hangzhou) Co., Ltd.
October 21 to 25, 2016

CeMAT Asia
Shanghai (Pudong), China
WITTENSTEIN (Hangzhou) Co., Ltd.
November 1 to 4, 2016

CIIF
Shanghai (Hongqiao), China
WITTENSTEIN (Hangzhou) Co., Ltd.
November 1 to 5, 2016

Pack Expo
Chicago (IL), USA
WITTENSTEIN holding, Corp.
November 6 to 9, 2016

Elmia Subcontractor
Jönköping, Sweden
WITTENSTEIN AB
November 8 to 11, 2016

Automation Fair
Atlanta (GA), USA
WITTENSTEIN holding, Corp.
November 9 to 10, 2016

Forum Maschinenbau
Bad Salzuflen, Germany
WITTENSTEIN Group
November 9 to 11, 2016

Professional MotorSport World Expo
Cologne, Germany
WITTENSTEIN Group
November 9 to 11, 2016

Robomatica 2016
Madrid, Spain
WITTENSTEIN S.L.U.
November 16 to 17, 2016

JIMTOF
Tokyo, Japan
WITTENSTEIN Ltd.
November 17 to 22, 2016

SPS IPC Drives
Nuremberg, Germany
WITTENSTEIN Group
November 22 to 24, 2016

TMTS
Taichung, Taiwan
WITTENSTEIN Co., Ltd.
November 23 to 27, 2016

I/ITSEC
Orlando (FL), USA
WITTENSTEIN Inc.
November 28 to December 2, 2016

ATX West
Anaheim (CA), USA
WITTENSTEIN holding, Corp.
February 7 to 9, 2017

Indumation
Kortrijk, Belgium
WITTENSTEIN bvba
February 8 to 10, 2017

FMB Süd
Augsburg, Germany
WITTENSTEIN Group
February 15 to 16, 2017

Intec
Leipzig, Germany
WITTENSTEIN alpha GmbH
March 7 to 10, 2017

LogiMAT
Stuttgart, Germany
WITTENSTEIN motion control GmbH
March 14 to 16, 2017

TIMTOS
Taipeh, Taiwan
WITTENSTEIN Co., Ltd.
March 7 to 12, 2017

WIN Automation
Istanbul, Turkey
WITTENSTEIN alpha GmbH
March 16 to 19, 2017

Praxisforum elektrische Antriebstechnik
Würzburg, Germany
WITTENSTEIN Group
April 5 to 6, 2017

Hannover Messe
Hanover, Germany
WITTENSTEIN Group
April 24 to 28, 2017