
Pioneering together | WITTENSTEIN and baramundi together towards Industry 4.0

Perfect fit, not one size fits all | Customized drive technology from design to implementation

Galaxie® | Welding gun reinvented



New smart gearboxes
for the IIoT

move

The magazine for customers and partners of WITTENSTEIN SE

Masthead

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Dear readers,

Get started: play IIoT smart & simple! This year's motto for the Hannover Messe is one that concerns us all. It's time to stop simply talking about Industry 4.0 and digitalization. It's time to get on with it. Together. Wherever we are. Particularly in production shops. That's where the digital transformation is most tangible. Because that's where the virtual world of design is being fused with the real world of manufacturing. Step by step. Today's engineering and other specialist departments think and act in networks that are more closely interconnected than ever before. The new, smart products which are created in this way are capable of exchanging information both about themselves and about their environment. This is giving rise to new business models based on continuous streams of data, which are supplied and evaluated by networked products and machines in real time. No matter where we look – development, production, logistics or in sales and marketing – these radical changes are causing us to reinvent how we work.

In this latest issue of *move*, our customer magazine, you can find several examples of how WITTENSTEIN, as a family-run enterprise, is responding holistically to these challenges. By seeking

outside expertise – with the acquisition of baramundi software AG, a leading manufacturer of unified endpoint management solutions. By simultaneously setting up our own Digitalization Center, where our vision of Industry 4.0 is meanwhile being driven forward Group-wide by more than 30 sensor, electronics, software, data and cloud specialists. And of course, first and foremost, by developing network enabled drive technology. Smart gearboxes from WITTENSTEIN alpha, our biggest subsidiary, will be on show for the first time at our booth in Hall 15 in Hannover.

Finally, we also have something important news to report to you about ourselves, namely a change of leadership at WITTENSTEIN. Dr. Bernd Schimpf has stepped down from the Group's Management Board and will be succeeded by Dr. Bertram Hoffmann as our new Chairman of the Board and CEO on April 1, 2019. Dr. Hoffmann holds a doctorate in engineering and will be joining us from the Executive Board of Bosch Rexroth AG. We are delighted that he has agreed to take over the helm: with his extensive experience as a manager and an industry expert, he is the ideal person to spearhead our positive global development.

Dr. Anna-Katharina Wittenstein

The WITTENSTEIN SE Management Board

Shaping the future of the manufacturing world

The digital transformation is a catalyst for profound changes in all branches of industry. Products, production, sales and work culture are all going digital in the Industrial Internet of Things (IIoT), creating huge opportunities in the process. WITTENSTEIN SE recognized this trend early on and has already been pursuing a digitalization strategy for several years now – with considerable success.



The digital transformation represents a major technological and social challenge. At the same time, it opens up new prospects for the future. Patrick Hantschel therefore sees the digital transformation as an “opportunity to which there is no alternative”. He is in charge of the Digitalization Center at WITTENSTEIN, where 30 or so sensor, electronics, software, data and cloud specialists are actively shaping the digital transformation and driving it forward Group-wide. “There’s no doubt that digitalization’s biggest potential lies in the increased efficiency and added value of our own products as well as in the development of smart products, additional services and derived business models”, says Hantschel.

Broad digitalization expertise

His words are also the outcome of WITTENSTEIN’s experience since 2012 with “Future Urban Production”, the shop window

factory at the Group’s Fellbach facility. “That’s where Industry 4.0 concepts have been implemented, tested, optimized and successively integrated into production and logistics”, Hantschel explains. “It’s accelerated the build-up broad digitalization expertise in manufacturing, assembly, logistics and materials management processes for the entire WITTENSTEIN Group.” The lessons learned from the Smart Factory are now also paving the way for a new generation of the WITTENSTEIN product world.

Gearboxes are learning to talk

Mechatronic drive systems that can collect and communicate information independently are fundamental to the IIoT’s implementation. Their decentralized intelligence enables data that was previously hidden from sight to be mined, so that new knowledge can be created and information flows made more efficient. Patrick Hantschel:

“Our drive solutions are increasingly smart as a result, and we’re expanding them with suitable digital services for the Internet of Things and the cloud. This gives WITTENSTEIN the ability to analyze and interpret data. The knowledge gained from data analyses can then be incorporated into data based services and shared with customers.

The development of a smart gearbox, which is due to be unveiled at the Hannover Messe 2019, is one example that illustrates what form this could take in practice. “Gearboxes have always been unable to talk in the past, but now they literally have something to say”, comments Michael Herkert of Product Management at WITTENSTEIN alpha. You can discover on the next few pages what WITTENSTEIN gearboxes will be talking about tomorrow and how.



The Industrial Internet of Things – what lies behind it?

The Internet of Things (IoT) refers to a global IT infrastructure linking physical and virtual objects together in networks and enabling them to communicate interactively. Information from the real world is captured, connected and made available in a network within the IoT’s Internet-like structure. On the one hand, IoT technologies allow status information on real objects to be collected, shared, communicated and evaluated. At the same time, they form the basis for digital services that assist human beings by performing a diverse range of activities, for instance, or that optimize a variety of processes.

The Industrial Internet of Things (IIoT) is a subset of the IoT. It differs from consumer oriented applications such as wearables, smart home technologies and autonomous cars in that it concentrates on industrial processes and workflows. The idea is that the IIoT will help businesses manufacture at lower cost, establish faster and more efficient processes, optimize the availability and productivity of machinery, equipment and systems and develop new business models.



The sensorized Galaxie® drive system, the cyber® iTAS® servo drive system with a web server for automated guided vehicles and the smart drive system for heavy-duty torque multipliers: the WITTENSTEIN product world has been gradually going digital for some time now. The new smart gearboxes with cynapse from WITTENSTEIN alpha are a significant milestone on our path into the digital future – thanks to an integrated sensor module that enables Industry 4.0 connectivity.



New smart gearboxes for the IIoT

Once again, WITTENSTEIN is living up to its reputation as a pioneer. “We’re taking advantage of the upcoming Hannover Messe 2019 by becoming the first component manufacturer in our field to bring smart gearboxes to market as standard products”, says Michael Herkert, Product Manager at WITTENSTEIN alpha. “They come in an industrial grade design, in other words there are no externally mounted parts – with its IO-Link interface and form-closed connection, the sensor module is elegantly integrated into the gearbox.” It’s a fact that there are no major, external constructional differences between the Premium Line gearboxes with cynapse – they are identical in terms of design, size and contour, so that existing drive solutions need no further modification.

Gearboxes with “something to say”

“The most important differentiator is the sensor module, which lets us output data using IO-Link as a standardized interface.” In practice, this means that smart gearboxes are able to identify and measure influencing quantities in the process and the environment which impact on gearbox operation, and exchange them with the machine control as well as with applications on IIoT platforms. Herkert sums up the situation as follows: “Until now, gearboxes have been no good at communicating – thanks to cynapse, they’ve now got something to say for the first time”.

cynapse comes hand in hand with integrated logic functions that are capable of “thinking” and allow gearboxes to execute intelligent monitoring activities independently. Smart gearboxes measure temperatures and report overheating, they detect vibration, they count operating hours, and they store and document all events linked to gearbox use. Michael Herkert: “All of this supports condition monitoring and preventative maintenance, minimizes the risk of gearbox damage or machine downtime and optimizes the availability and productivity of machines”.

Double ROI

For the first time in this form, gearboxes with cynapse deliver process data that originates directly from the gearbox itself. According to reports from the first lead customers, this direct and transparent visibility enables even more performance, reliability and availability, especially with critical axes. Critical operating states are avoided, laying the ground for efficient process improvements – an invaluable return on intelligence for machine operators. “Invaluable but not priceless”, Herkert comments. “At the very latest, the costs which result from damage far outweigh the comparatively modest markup for the integrated sensor module. When you look at it that way, the return on investment is right as well.”

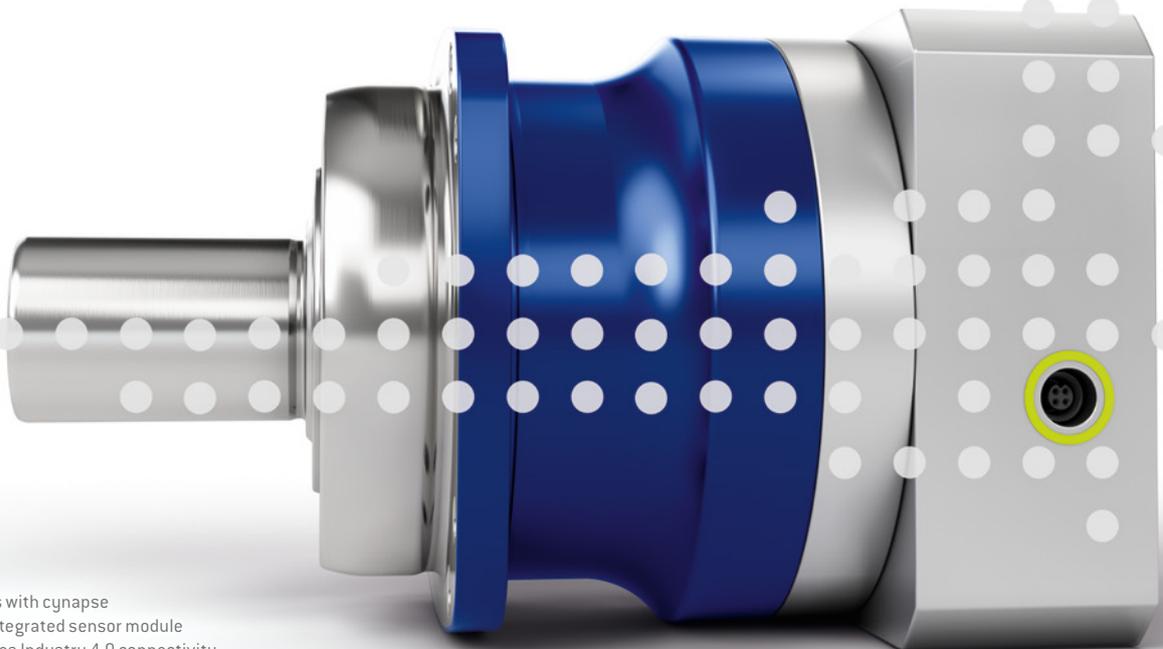
It comes as no surprise to learn that WITTENSTEIN alpha intends to follow up the launch of its Premium Line gearboxes with cynapse by gradually extending this feature to all other gearbox series.

IO-Link: the “USB port” for digital products

Plug in, identify and play – what would computers, peripherals and many mobile devices be without the simplicity, reliability and standardization of the Universal Serial Bus (USB)? It's a question that is equally applicable to IO-Link.

The term “IO-Link” – specified in IEC 61131-9 – refers to a standardized communication system that connects intelligent sensors, sensor hubs, actuators and mechatronic components such as gearboxes or grippers in a fieldbus structure, which in turn exchanges data with an automation system or with an IIoT platform or a cloud application.

IO-Link devices are integrated via a fieldbus-specific IO-Link master, which serves as the interface to higher automation levels. The necessary IO device descriptions (IODD) – including those for WITTENSTEIN's new, smart gearboxes with cynapse – can be downloaded from a central, online IODDfinder portal.



Gearboxes with cynapse have an integrated sensor module that enables Industry 4.0 connectivity.



Pioneering together

Together towards Industry 4.0

Dr. Dirk Haft (centre) is responsible for information management and digitalization on the WITTENSTEIN SE Management Board. In this role he bridges the gap between the WITTENSTEIN engineering world and baramundi software AG.

Uwe Beikirch (right) has responsibility on the baramundi software AG Management Board for sales, marketing, HR and services.

Dr. Lars Lippert (left) oversees research and development, product management as well as support & management software on the baramundi software AG Management Board.

In March 2017, WITTENSTEIN SE acquired the entire share capital of the Augsburg firm of baramundi software AG. The purchase strengthened WITTENSTEIN with competencies of strategic value as the Group treads the digital transformation path. Two years on, the Management Boards of both companies have absolutely no regrets.

WITTENSTEIN is an innovation driver for mechatronic drive technology while baramundi is a leading software manufacturer of unified endpoint management (UEM) solutions. How does this unusual combination work?

Haft: German businesses are still relative novices compared to other countries when it comes to digitalization. Industry, in particular, shows a markedly delayed response to the digital disruption – in spite of the dramatic increase in product variance and market dynamics in the drive technology sector. Smart products and flexible factories will be in high demand in the future. By purchasing baramundi, we came a big step closer to our vision of Industry 4.0. The acquisition will have a thoroughly positive impact on our efforts to strengthen our technology base even in the future, especially where our products' networking capabilities are concerned.

Beikirch: We also held a firm belief from the outset that valuable synergies would be created for both sides. Together with WITTENSTEIN, we now have a chance to realize our UEM technology in new industrial applications. That will open the door for us to the exciting new markets arising from Industry 4.0.

"Pioneering together" is a shared vision with which you are aiming to set new benchmarks for Industry 4.0. Are the first fruits of your collaboration already visible?

Lippert: We're cooperating closely and we regularly exchange ideas and experiences, especially with the WITTENSTEIN Digitalization Center. Our strategy for endpoint management in production environments will also be featured in the exhibit at the Hannover Messe 2019. Our demonstration there will center on the IT map which is integrated in the baramundi Management Suite (bMS): the bMS automatically creates an inventory of servers, PCs and mobile devices as well as network devices that can be managed using Simple Network Management Protocol. The software scans these devices and then presents them graphically in an IT map.

Haft: The IT map is our first joint step in the field of operational technology (OT). This same principle will also be used to integrate Industry 4.0 devices – such as digitalized mechatronic components from WITTENSTEIN – into the IT map in the future. Production managers will thus have a powerful tool with which to keep track of a large number of devices which are networked together.

Lippert: Our cooperation is designed to enable manufacturing employees to maintain production availability in tomorrow's world. At the same time, it will allow us to analyze the actual security status of the OT infrastructure and protect it as effectively as possible.

Last year, WITTENSTEIN SE purchased a 9677 square meter building lot for the new baramundi headquarters in the Augsburg Innovationspark – one of the biggest business parks of its kind anywhere in Europe. Is that the clear signal it appears to be?

Beikirch: The reason for moving to new premises was to create extra space for us to expand further and to optimize leverage of networks with research and teaching. The new headquarters were also an opportunity to establish a futuristic working environment that adapts very flexibly to our employees' needs.

Haft: The new location will unquestionably have multiple benefits for WITTENSTEIN and baramundi's shared vision for Industry 4.0.



baramundi software AG was founded in Augsburg in the year 2000. Around 200 employees currently develop and market the "baramundi Management Suite", a unified endpoint management software. The solution optimizes IT management processes by automating routine tasks and providing an extensive overview of the status of all endpoints. baramundi has more than 3000 customers including KUKA, RENK and Bosch.



"Le Chandelier" – the first ScreenFLITE® ad system at Rome-Fiumicino International Airport Leonardo da Vinci – was officially inaugurated on 27 July 2018.

cymex® 5 sizing tool: reading and evaluation of the motion simulations

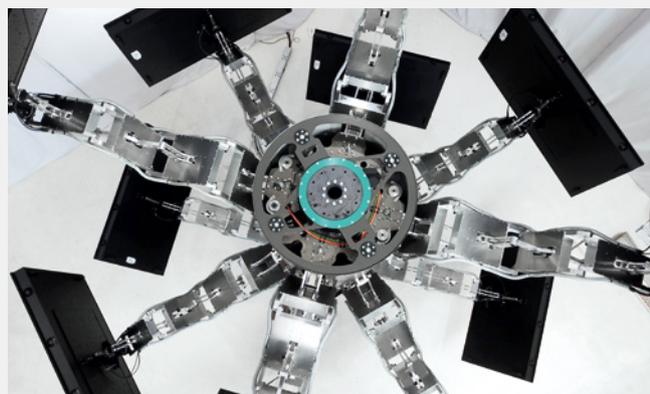
The freely programmable ScreenFLITE® ad system can be easily adapted to individual requirements with regard to shapes and patterns. All motions of the rings which form the rotational planes as well as of the scissor arms for the displays are possible with up to 20 degrees of freedom. As the basis for sizing the individual gearboxes, Simtec produced nine different characteristic motion cycles with movement profiles and forces. "These were imported into cymex 5®, WITTENSTEIN alpha's sizing tool, as ASCII files", Ms. Kaufmann explains. WITTENSTEIN then selected the gearboxes and servo drives according to the program's recommendations.



WITTENSTEIN alpha

puts advertising in motion

In mid-2018, Rome acquired yet another stunning attraction. To be precise, Terminal 3 at Rome-Fiumicino International Airport “Leonardo da Vinci” now boasts a spectacular media information system in the market today. With high dynamics and precision, low-backlash planetary gearboxes and servo actuators from WITTENSTEIN alpha position twelve giant LED panels to create shape-shifting billboards in ever-changing formations.



A total of 20 WITTENSTEIN gearboxes of different sizes are used in the interactive structure of ScreenFLITE®.

“Le Chandelier” – this is the name given by the Italian operator to the ScreenFLITE® ad system developed by Simtec Systems GmbH of Braunschweig in northern Germany. As if by magic, twelve displays on three rotational planes with a total area of 24 square meters shuffle in an elaborate dance, arranging advertising messages in umpteen different patterns. Polymath Leonardo da Vinci, who the airport is named after, would surely have delighted in the precision, dynamics and synchronicity of the ScreenFLITE®’s vibration-free motions. And he would have loved the low-backlash planetary gearboxes and servo actuators from WITTENSTEIN alpha, which are fundamental to this supreme kinematic feat.

Eye-catching ads

Anne Kaufmann, Head of Project Management Digital Signage at Simtec Systems, is convinced: “ScreenFLITE® marks the dawn of a new era in the use of digital media content in advertising and information systems for high-traffic indoor areas and high-capacity public venues. Whereas static LED or billboard advertising is characterized by low levels of perception, moving ads with electronic effects in 3D are an eye-catcher that promise significantly higher earnings for all stakeholders.” The ScreenFLITE® ad system consists of three rings that can be rotated jointly or against each other. Four LED displays mounted on each ring are moved in and out by scissor arms which can be extended or retracted by about 1100 millimeters. The arms of the upper level can be tilted upwards, the arms of the lower level downwards. In addition, each display can be rotated independently around its vertical axis. The actual movement of the displays in practice depends on the motion programming by the operator’s content designer, who can adapt the rotations and horizontal movements individually according to the media content and effects.

Precise, dynamic performance in all motions

The ScreenFLITE®’s kinematic perfection plays a decisive role in presenting the advertisers’ customized media content. This is largely due to seventeen TP+ gearboxes of different sizes in the alpha Advanced Line as well as three TPMP+ servo actuators, which are integral elements of the interactive advertising system. “Their high torsional rigidity ensures only minimal vibration no matter how high the motion dynamics; together with the low torsional backlash it enables optimal synchronism and positioning accuracy of the individual giant LED panels”, Ms. Kaufmann confirms. The high power density of the low-backlash gearboxes was another crucial aspect: the space-saving design was ideal for integration into the narrow installation spaces of the rotating structure. At the same time, they provide less than four arcminutes of torsional backlash in combination with high torsional rigidity. Anne Kaufmann: “No other gearbox offered those features with such compact dimensions”.



Experience the
ScreenFLITE® in a movie.

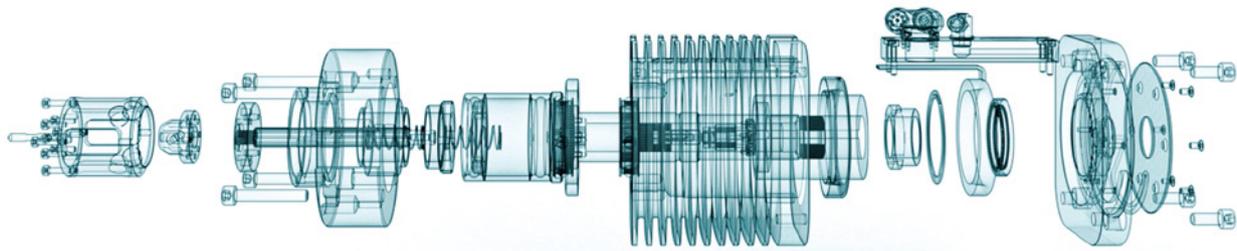
Customized drive technology

Perfect fit, not one size fits all



Adapting drives to fit an application almost always involves functional restrictions – especially when the manufacturer’s product portfolio imposes tight constraints on the sizing process.

Not so with WITTENSTEIN cyber motor, where customized drive solutions are created as a perfect fit, not one size fits all.



WITTENSTEIN cyber motor develops drive solutions that are completely tailored to the customer's logistical, technical and commercial requirements.

When WITTENSTEIN cyber motor sets out to design a perfect-fit mechatronic system solution, the emphasis is on customer and their specific application. "We normally address three requirement areas – performance, installation space and environmental conditions – because the chances are that one of them will be dominant in the design process", explains Product Manager Christoph Weis.

Design and implementation as a complete package

There are several, very different strategies for achieving these goals, depending on the requirement. For example, performance can be improved through higher dynamics, shorter cycle times and efficiently optimized motion and load profiles. "Software tools help identify extended sizing spaces and reconcile them with a perfect-fit design", says Weis. The specifications and insights are then implemented on the motor side in WITTENSTEIN's highly specialized microfactory for small batches. "Stators, for instance, are manufactured to fit the application using advanced machining and test methods, in other words the laminations for the stators are individually designed, the electric strip materials optimized and the windings executed according to each client's respective needs."

When it comes to systematically adapting the drive solution to the given installation space, expertise beyond mere catalog data once again ensures optimal integration into the machine's mechanical environment. "The spectrum ranges from frameless motors to complete drive modules integrating a gearbox, screw, holding brakes and various other components. Furthermore, by designing the flange and shaft accordingly, we can adapt the motor optimally to the installation conditions on site", Weis continues.

A perfect-fit design is additionally realized with regard to the specific environmental conditions. For example, legal requirements in hygienic, radiation or hazardous areas are reliably implemented and the machine or drive's service life extended by selecting the most appropriate type of construction and materials. Christoph Weis: "In some cases, we can also provide more design freedom results – say, if drives can be used in places where this was previously impossible."

Economic benefits for customers

The ability to design individual, perfect-fit motors combining this kind of technological depth and application breadth is what sets WITTENSTEIN cyber motor apart from most other suppliers of mechatronic drive technology. "We also clarify the optimum delivery interface with the customer – from just the motor for inhouse integration through the assembly of customized, separately provided parts to a complete plug-and-play drive module", Weis says. For many clients, the option of a perfect-fit motor design, coupled with the multiple possibilities for customizing the scope of delivery, promises significant economic benefits. "At WITTENSTEIN, 'service and delivery interface' means customers are not obliged to invest in production and assembly capacity of their own or bear the interface and performance risks", Weis comments.

Exciting examples

A heavy-duty torque multiplier, transfer units in glass production, thread forming tools in punching machines and workstations in high speed bending machines are only a few examples of how perfect-fit drive concepts by WITTENSTEIN cyber motor can make a decisive difference.



Learn here what the difference is between customized drives and really customized drives.



Galaxie®

NIMAK – Specialist for the perfect connection

NIMAK GmbH, which has its headquarters in Wissen an der Sieg, east of Bonn, has globally unique expertise in two different fields: resistance welding technologies for steel and aluminum as well as joining know-how in the form of gluing and dosing systems for non-weldable multi-material mixes. The company enjoys a reputation among customers and users as an innovation leader in both of these areas. NIMAK additionally has the capability to build complete robot systems using technologies developed in-house, integrating the welding and gluing processes in one. Robot welding guns were invented by NIMAK, who also helped this technology gain widespread acceptance.



 **NIMAK**
Die perfekte Verbindung

The Galaxie® drive system is revolutionizing the design of welding guns. The compact design of this innovative motor-gearbox unit – in combination with high torque density, rigidity and dynamics – inspired NIMAK to come up with a completely new welding gun system: thanks to the galaxy®GUN, the productivity of welding processes is significantly improved. And that's not all: force generation is rapid and dynamic, so that it is now also possible to weld new and different materials.

Welding *gun* reinvented



”

Never before has a welding gun had such a compact design with so few components.

“

Kay Nagel
Sales Manager at NIMAK

Galaxie®: Enabler for next-generation concepts

Again and again, Galaxie® causes existing design strategies in high performance engineering to be overturned. This new gearbox class has several decisive features: dynamic teeth instead of a rigid gear ring, tangential and hydrodynamic tooth contact over the full surface when loaded rather than pitch-point linear contact and a new type of bearing with a segmented outer race ring. All of these innovations add up to a novel design principle, with the result that Galaxie® is clearly superior to established planetary, cycloidal, eccentric and standard strain wave gearboxes in all key technical disciplines compared to the market standard.

NIMAK chose the Galaxie® D in size 135 on account of its compact design and high power density. The company's engineers were thus able to mount the complete drive unit directly at the gun's pivot point and dispense with the basic gun body that is normally a must. The gun has an up to 50 percent smaller interruption contour on the robot as a result.

galaxy®GUN: compact and lightweight

Conventional welding guns are configured from a modular system comprised of various basic bodies, gun arm designs, servo drives and medium frequency transformers. A totally different concept was invented for the new galaxy®GUN. The basic body, Galaxie® Drive System and gun arms are now all combined in a much more compact and approximately 20 percent lighter module. The decisive innovation here is as follows: the torque-dense, highly dynamic and extremely torsionally stiff drive system is integrated into such a small space that it could be mounted directly at the gun's pivot point. As a result of this, the rotary motion of the drive is now converted into the gun arm movement with absolutely no slip. What's more, the electrode arms can open much wider than is possible with conventional robot welding guns and thus steer clear of interruption contours in the vicinity. →

Very short cycle times and perfect welding results

The new design approach with Galaxie® D as the central component has numerous benefits. The drive system allows more rapid opening and closing of the gun arms; the force generation time is shorter and the repeat accuracy of the electrode force extremely high. Since the guns can now be designed with less mass and the center of gravity is close to the robot's flange connection, the robot can move the guns faster. The galaxy® GUN's low weight likewise enables more dynamic robot motions. Galaxie® D's high dynamics and torsional rigidity not only permit ultra-precise process control based on active force profiles but also lie behind the even more dynamic follow-up characteristics of the electrodes. Finally, shorter welding times are possible – the spot welding process for aluminum is now completed in as little as 100 milliseconds.



Galaxie® has enabled NIMAK to break with constructive conventions and completely rethink the welding gun.

[from left to right: Kay Nagel, Sales Manager, Johannes Steudter, Design Manager, both NIMAK, and Tobias Burger, Start-up Manager Galaxiesystems, WITTENSTEIN SE]



Efficient and economical

Thanks to the galaxy®GUN, NIMAK's modular system for welding guns has been greatly simplified and the assembly time is significantly shorter. The concept also opens up new options for realizing customer projects. NIMAK is now in a position to configure and provide guns sooner, which means there is more time for on-site simulation and commissioning. The gun geometry no longer needs to be adjusted and measured. Servicing of the galaxy®GUN and stocks of spare parts are likewise far more efficient and economical.

First prototype after only a few weeks

WITTENSTEIN originally showed NIMAK the Galaxie® early in 2017. The presentation and the sample of the Galaxie® gearbox kinematics evidently inspired the company's engineers. The high torque density in relation to the volume and dead weight of the drive system were the starting point for something radically new. The first prototype of the galaxy®GUN was ready and integrated in an experimental robot only weeks after the specification was agreed. The results of the field tests spoke for themselves – NIMAK was able to unveil the new robot welding gun at "Schweißen und Schneiden", the international trade fair for welding and cutting, in September 2017.



”
Galaxie® is unquestionably
the most power-dense
and precise drive system
in today’s global market.
“

Kay Nagel
Sales Manager at NIMAK



Professor Dirk Bartel
heads the Institute of Machine Design and Tribology
at Otto von Guericke University Magdeburg

Interview with Professor Dirk Bartel:

Galaxie® – Superior on principle

The scientific proof that Galaxie® is an independent gearbox class and its successful use in high performance engineering are now also rapidly establishing WITTENSTEIN’s invention as a firm fixture in research and teaching.

*When did you first hear about Galaxie®?
What thoughts and ideas occurred to you spontaneously?*

Professor Bartel: I first heard about Galaxie® in 2014 when I was contacted by WITTENSTEIN. I found it difficult to imagine what this gearbox was all about simply from the name, so I had to be patient and wait until I was given a personal demonstration. Of course, the logarithmic spiral principle, which is also found in spiral galaxies, as a new tooth geometry and the resulting surface contact by multiple teeth posed a number of questions for me, as a tribologist.

What, in your opinion, is the single most important differentiator of the new Galaxie® generation?

Professor Bartel: Owing to the large number of load-transmitting teeth, the gearbox is characterized by very high rigidity and freedom from backlash, which are vital in high-precision drive systems.

Evolutionary or revolutionary – which category, in your view, is a more apt description of this invention as a technological innovation?

Professor Bartel: The Galaxie® is quite clearly a disruptive innovation. It’s therefore fair to describe the invention of the Galaxie® as a technological revolution.

Galaxie® is applied tribology – would you agree with that statement?

Professor Bartel: Yes, absolutely. The full-surface sliding contact between the teeth has to be mastered in terms of friction and wear. This presupposes that the latest scientific findings on tribology are adequately applied.



WITTENSTEIN World Garden: the only one of its kind

It all began with a Japanese ornamental cherry – a gift to WITTENSTEIN at the topping-out ceremony for the first production shop. Today, the 10 hectare (25 acre) site at the WITTENSTEIN headquarters in Igersheim-Harthausen is home to more than 630 different woody plants: trees and shrubs from 31 countries where the Group has a subsidiary or is represented by an authorized dealer.

A unique parkland, which is constantly expanding along with the company, has grown up around the production shops and offices since 1999. The World Garden is the only botanical garden owned by an industrial company in Germany to be admitted to the German Dendrological Society (DDG), an elite association dedicated to the science of trees. When selecting new plantings, Würzburg botanist Dr. Uwe Buschbom does not restrict himself solely to exotic species which are typical of each country; he also sets rare birch or alder varieties from the surrounding meadows and woods into the ground between the biotopes, the stream and the water catchment basins that serve as sunken gardens. He then uses them as “measuring stations” to observe climate change.

The WITTENSTEIN World Garden is freely and publicly accessible. Signs next to each cluster of trees provide information on the country of origin as well as the local, German and scientific (Latin) names. The garden is clearly well worth a visit – for employees and outsiders alike, whether making a conscious detour or simply passing by – at any time of the year.





Six bee colonies are at home in the WITTENSTEIN World Garden – each consisting in the summer months of about 50,000 bees that produce between 20 and 30 kilos of honey per year. The huge diversity of the trees and shrubs gives it a special flavor. Much to the delight of beekeeper Paul Geiger, shown here during one of his regular checks of the brood-combs.

GIMA squeezes out more performance with WITTENSTEIN

WITTENSTEIN gearboxes have helped the Belgian retrofit specialist boost machine output.

GIMA is a Belgian retrofit specialist for machine tools. Its customers' expectations are high: they want higher speeds, more precision and shorter maintenance intervals. As a result, GIMA is constantly on the lookout for innovative technologies to help meet these requirements. The company recently managed to boost the output of six existing machines at a manufacturer of aircraft parts. In doing so, GIMA put its trust in WITTENSTEIN's RP⁺ gearboxes.



The new drive unit from WITTENSTEIN offers very high accuracy, so that the exact position of the machine on the machine bed is known for every movement.



”

Thanks to the WITTENSTEIN technology, the machines now operate with up to five times higher precision and move ten times faster.

“

Stef Bruynseels
Managing Director of GIMA-Machines

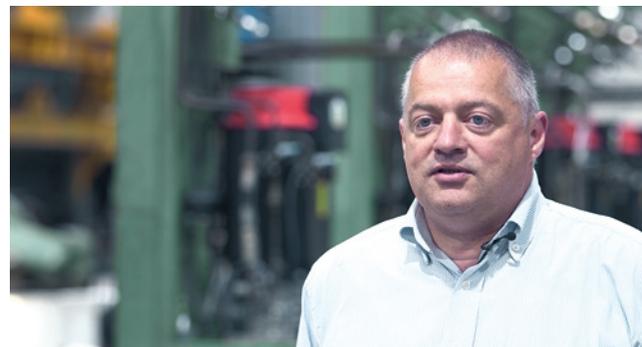
GIMA-Machines – well-known in the retrofit world

The company re-engineers machine tools for a variety of industries. Advanced technology is integrated into existing machine concepts, in order to bring them into line again with current market requirements. Precise attention to each customer’s specific wishes and needs is a top priority.

Performance boost for an existing application

GIMA regularly receives solid support from WITTENSTEIN in connection with machine retrofits. One of the Belgian company’s current projects entails modernizing six machines for a manufacturer of aircraft parts. The machines stand on a bed with straight-toothed racks. Two motors on either side are responsible for moving them. WITTENSTEIN helped optimize this setup with a combination of an RP+ gearbox and a customized pinion.

The RP+ is a high-performance gearbox that works extremely precisely and is hence ideal for controlling machines these. Moreover, with its compact design it takes up very little space. This is particularly important with retrofits because GIMA is restricted by the amount of space available. The WITTENSTEIN solution thus enables optimal design freedom as well as cost reductions through downsizing.



Five times more precise and much faster

The machines for the aircraft parts are equipped with straight-toothed racks and have a modulus of 6.5. Spare parts are very difficult to get hold of. WITTENSTEIN was able to assist here by supplying an RP+060 gearbox with a modified pinion. The new drive unit achieves very high precision, so that the exact position of the machine on the bed is known with every movement. GIMA’s designers succeeded in replacing the outdated, mechanically preloaded solution with one that is electrically preloaded.

The redundant, computer controlled master-slave configuration with four motors for the X axis has resulted in an enormous leap in precision: the machines now operate five times more precisely and are moved much faster than before.

One contact for everything

WITTENSTEIN supported the Belgian firm from the pilot study phase right through to delivery. WITTENSTEIN experts were at hand to guide the project from the outset. The calculations on which they collaborated laid the foundation for the new drive design. After close consultation, GIMA’s design engineers opted for the RP+060 gearbox – among other things because it needs no maintenance and has practically no downtime. WITTENSTEIN then set to work developing a customized pinion – the starting point for a much more reliable drive configuration.

GIMA values the way WITTENSTEIN keeps the firm regularly informed about new and improved products. That way, the retrofit specialist is perfectly placed to offer customers the latest state of the art.

”

WITTENSTEIN supplied a gearbox with a customized pinion. We were able to complete the conversion faster because of that and make the drive far more reliable.

“

Stef Bruynseels
Managing Director of GIMA-Machines

WITTENSTEIN inducted into the “Circle of Excellence”



DEUTSCHER ZUKUNFTSPREIS
Preis des Bundespräsidenten
für Technik und Innovation

Circle of Excellence 2018

The Deutscher Zukunftspreis is the Federal President's Award for Innovation in Science and Technology and has been presented annually since 1997. Once a year, the jury chooses three teams to take part in the final round. The three candidates to emerge from the rigorous selection process are subsequently inducted into the "Circle of Excellence".



It was by no means a simple task for the jury on the evening of the presentation on November 28 in Berlin: innovations from three totally different fields – medicine, energy and engineering – had been nominated for the Federal President's Award. WITTENSTEIN's Galaxie® gearbox was shortlisted for the Deutscher Zukunftspreis 2018 along with an anti-infective medication and a project on hydrogen.

As you are no doubt aware, the jury ultimately decided in favor of the medical project, yet the fact remains that WITTENSTEIN and Galaxie®, the radically new gearbox class, have now been officially inducted into the “Circle of Excellence 2018”. Put another way, Galaxie® is the German engineering industry's top innovation in 2018. The invention by Dr. Manfred Wittenstein (Chairman of the Supervisory Board) and Thomas Bayer (Manager Innovation Lab) not only won the hearts of the audience in Berlin but was also clearly a source of fascination for German President Frank-Walter Steinmeier. And even though we didn't quite win in the end, we were nevertheless proud and delighted to have reached the final, and we enjoyed every minute of the reception that followed the presentation.





1
Federal President Frank-Walter Steinmeier (centre) with Thomas Bayer (right) and Manfred Wittenstein (left) on the occasion of a preliminary talk on the Deutscher Zukunftspreis 2018 at Schloss Bellevue.



2
A short explanation video informed the audience about the special features of the disruptive Galaxie® invention.

3
Thomas Bayer (left) talking with Federal President Frank-Walter Steinmeier (centre) and presenter Dirk Steffens (right).

4
The presenter Dirk Steffens (front), known from German television, led through the event. In the background the speakers of the nominated teams (from left to right): Prof. Peter Wasserscheid, Prof. Helga RübSamen-Schaeff and Thomas Bayer as well as Federal President Frank-Walter Steinmeier.

5
Numerous guests watched the presentation of the Deutscher Zukunftspreis 2018 live at the STATION in Berlin.



You can watch the nearly 50 minute German broadcast in the ZDF media library (German only):

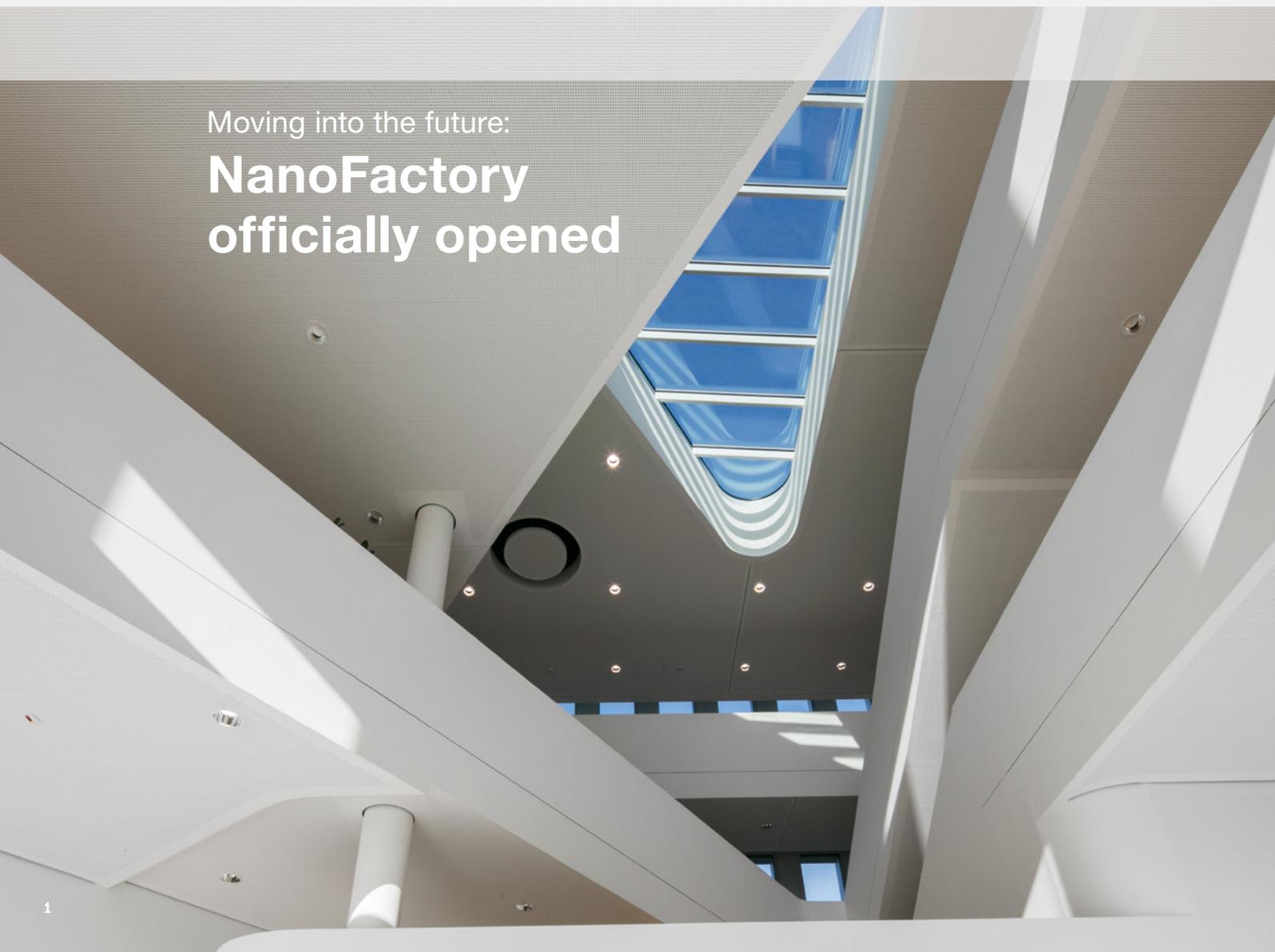
<https://www.zdf.de/wissen/deutscher-zukunftspreis/deutscher-zukunftspreis-2018-102.html>



Room for growth, transparency and openness

The ultra-modern NanoFactory in Haar near Munich was officially opened in mid-October 2018, less than two years after the ground-breaking dig. Around 150 employees of attocube systems AG and its subsidiary neaspec GmbH – both companies of the WITTENSTEIN Group – plus the sales team of WITTENSTEIN alpha GmbH, previously based on Ottobrunn, have since been working under one roof in this high-tech building.

The infrastructure and work processes at the new headquarters are optimally adapted to each firm's respective needs. The open architecture and brightly lit building will promote cooperation both among colleagues and with customers, business partners and research institutes. The official opening of the NanoFactory marks the start of a new era in the history of the company: the foundation has now been laid for further growth.



Moving into the future:
NanoFactory
officially opened



”
 The NanoFactory is more than simply a new building; it’s a vision for unlocking the potential of all employees and for fostering team spirit.
 “

Peter Kraemer
 Chief Executive Officer
 attocube systems AG



1
 The focal point of the building is the light-flooded atrium – an opportunity to meet and communicate and the central reception area for customers and visitors.

2
 A stairway provides access to the mezzanine, where a 5 x 2 meter, floor-to-ceiling glass wall offers a splendid view into the heart of the NanoFactory: the manufactory and adjacent laboratories.

3
 Innovative products go hand in hand with optimized manufacturing processes and modern infrastructure. When planning the building, particular attention was paid to short lines of communication: the development, production, delivery and warehouse areas are all 'workflow optimized'.

4
 Designed by HENN, the internationally renowned Munich architects, the NanoFactory makes a stunning first impression with its fourteen meter high glass facade and dynamic architecture.



The building

Hybrid building:	Combination of production areas, offices and catering
Production space:	1200 m ²
Facade:	Superinsulated exterior, partially with triple glazing, glass frontage totaling approx. 1800 m ²
Energy efficiency:	Low-energy building under the German KfW 55 standard



Trade fair calendar 2019

Hannover Messe 2019

Hannover, Germany
WITTENSTEIN SE
April 1 to 5, 2019

Automate 2019

Chicago, USA
WITTENSTEIN Holding Corp.
April 8 to 11, 2019

China International Machine Tool Show 2019 (CIMT)

Beijing, China
WITTENSTEIN (Hangzhou) Co., Ltd.
April 15 to 20, 2019

OTC 2019

Houston (TX), USA
WITTENSTEIN motion control GmbH
May 6 to 9, 2019

EXPOMAFE 2019

São Paulo, Brazil
WITTENSTEIN do Brasil
May 7 to 11, 2019

SMART AUTOMATION 2019

Linz, Austria
WITTENSTEIN GmbH
May 14 to 16, 2019

SPS IPC Drives Italia 2019

Parma, Italy
WITTENSTEIN S.P.A.
May 28 to 30, 2019

Paris Air Show 2019

Paris, France
WITTENSTEIN aerospace & simulation GmbH
June 17 to 23, 2019

Taipei Automation 2019

Taipei, Taiwan
WITTENSTEIN Co., Ltd.
August 21 to 24, 2019

IKMT Forum 2019

Würzburg, Germany
WITTENSTEIN cyber motor GmbH
September 10 to 11, 2019

EMO 2019

Hannover, Germany
WITTENSTEIN SE
WITTENSTEIN alpha GmbH
September 16 to 21, 2019



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

Pack Expo 2019
Las Vegas (NV), USA
WITTENSTEIN Holding Corp.
September 23 to 25, 2019

productronica 2019
Munic, Germany
WITTENSTEIN cyber motor GmbH
November 12 to 15, 2019

hi Tech & Industry
Scandinavia 2019
Herning, Denmark
WITTENSTEIN AB
October 1 to 3, 2019

Automation fair 2019
Chicago, USA
WITTENSTEIN Holding Corp.
November 20 to 21, 2019

MSV 2019
Brno, Czech Republic
WITTENSTEIN GmbH
October 7 to 11, 2019

sps 2019
Nuremberg, Germany
WITTENSTEIN SE
November 26 to 28, 2019

FMB 2019
Bad Salzuffen, Germany
WITTENSTEIN alpha GmbH
November 6 to 8, 2019



Trade fair calendar

Get started:

play IIoT
smart & simple

WITTENSTEIN at the Hannover Messe 2019: Find out more
to this year's trade fair motto as well as to the product highlights at
www.wittenstein.de



WITTENSTEIN