WITTENSTEIN

move

The magazine of customers and friends of WITTENSTEIN AG

WITTENSTEIN AG:

The revolution in linear drive technology

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move

Das Magazin für Kunden und Freunde der WITTENSTEIN AG

Contents

Masthead

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Dear readers,

"I prefer to remember the future."
This quotation by Salvador Dalí, the famous Spanish artist, hits the nail right on the head. Following a whole year in which a crisis mood prevailed, the global economy is meanwhile looking to the future again and discovering that the financial turmoil of recent months has resulted in a transformation of the established economic order. The world has changed irreversibly. There is no going back to the pre-recession days. Raw materials will become scarcer and more expensive. Resource productivity will have a crucial bearing on a company's competitiveness. At the same time, the drives segment will also be influenced by the gigantic Asian growth market.
The WITTENSTEIN group is excellently placed again worldwide and we have more than made up for the recession year: fiscal 2010/11 will end on March 31, 2011 with record sales. Investments are the entrepreneurial gateway to the future – and we deliberately left the door wide open throughout the recession, investing a sum in the double-digit million euro range in our new production and development facility in Grüsch, Switzerland. The new Production Arena for High Performance rack-and-pinion systems was officially inaugurated in the autumn of 2010. I hope you will accept my invitation to take a personal look at WITTENSTEIN's new linear systems at Hannover Messe 2011 – where a genuine technological revolution will await you in Hall 15. By combining the rack, new gearhead and pinion in an integrated system, we have succeeded in almost trebling the feeding forces. We offer you complete drive solutions from a single supplier – as the only manufacturer of linear drive systems in the world to unite all three core competencies (transmission engineering, gearing technology and sizing) under one roof.
The chief point in our favour during the critical months has been our delivery reliability of 96% to 100% despite extreme fluctuations in the engineering industry's incoming order situation. With our help, you too have been able to maintain punctual deliveries to your customers. After all, we have a long tradition of developing and shipping individually tailored solutions quickly and flexibly, regardless of the application. This is a pledge that will remain just as valid in the future.
Energy efficiency is one aspect of drive technology that holds huge potential for innovations. The total energy consumption that could be saved in this way with technologies for machinery and industrial plant would suffice to take several power plants off the grid in Germany alone. Today, with its vast experience in the field, WITTENSTEIN plays a pioneering role as a developer of drive systems that make sparing use of resources. It is only logical that our profound engineering know-how and this rich experience should contribute to the achievement of optimal interaction between electrical and mechanical components and be applied to the development of electric and hybrid vehicles. At the "MobiliTec" flagship exhibition in Hall 25 in the framework of Hannover Messe, WITTENSTEIN will present itself as a high-end partner for the development and manufacture of high-performance electromechanical motors.

Come along and visit us at the Hanover Messe 2011.

Karl-Heinz Schwarz Spokesman of the Board of WITTENSTEIN AG

move talks to:

Axel Leidner

Controllable drive solutions from a single supplier

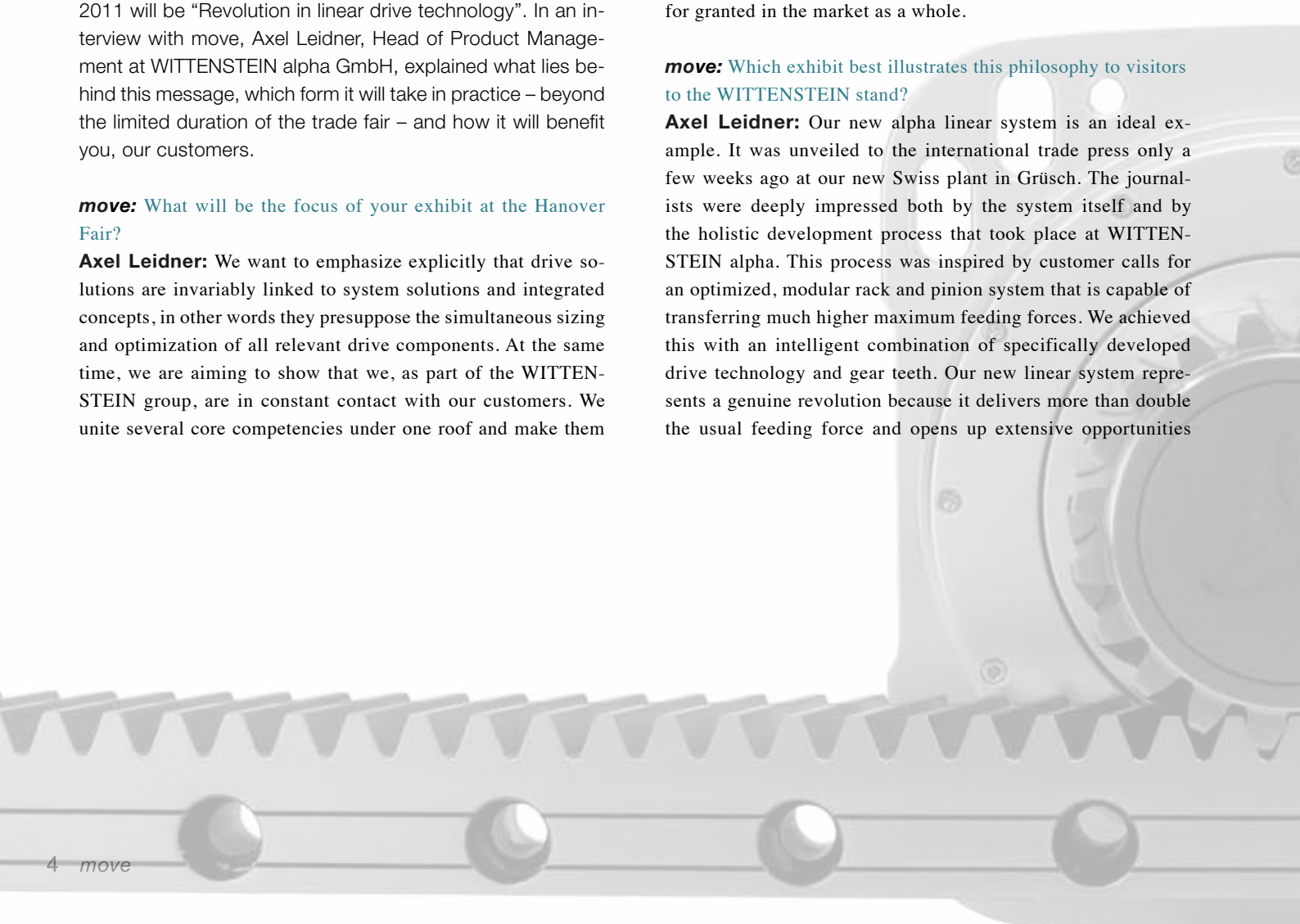
The theme of the WITTENSTEIN exhibit at Hannover Messe 2011 will be "Revolution in linear drive technology". In an interview with move, Axel Leidner, Head of Product Management at WITTENSTEIN alpha GmbH, explained what lies behind this message, which form it will take in practice – beyond the limited duration of the trade fair – and how it will benefit you, our customers.

move: What will be the focus of your exhibit at the Hanover Fair?

Axel Leidner: We want to emphasize explicitly that drive solutions are invariably linked to system solutions and integrated concepts, in other words they presuppose the simultaneous sizing and optimization of all relevant drive components. At the same time, we are aiming to show that we, as part of the WITTENSTEIN group, are in constant contact with our customers. We unite several core competencies under one roof and make them available to customers in the framework of projects through our single-source strategy. WITTENSTEIN alpha does this as a matter of course, though it's an attitude that certainly can't be taken for granted in the market as a whole.

move: Which exhibit best illustrates this philosophy to visitors to the WITTENSTEIN stand?

Axel Leidner: Our new alpha linear system is an ideal example. It was unveiled to the international trade press only a few weeks ago at our new Swiss plant in Grüsch. The journalists were deeply impressed both by the system itself and by the holistic development process that took place at WITTENSTEIN alpha. This process was inspired by customer calls for an optimized, modular rack and pinion system that is capable of transferring much higher maximum feeding forces. We achieved this with an intelligent combination of specifically developed drive technology and gear teeth. Our new linear system represents a genuine revolution because it delivers more than double the usual feeding force and opens up extensive opportunities

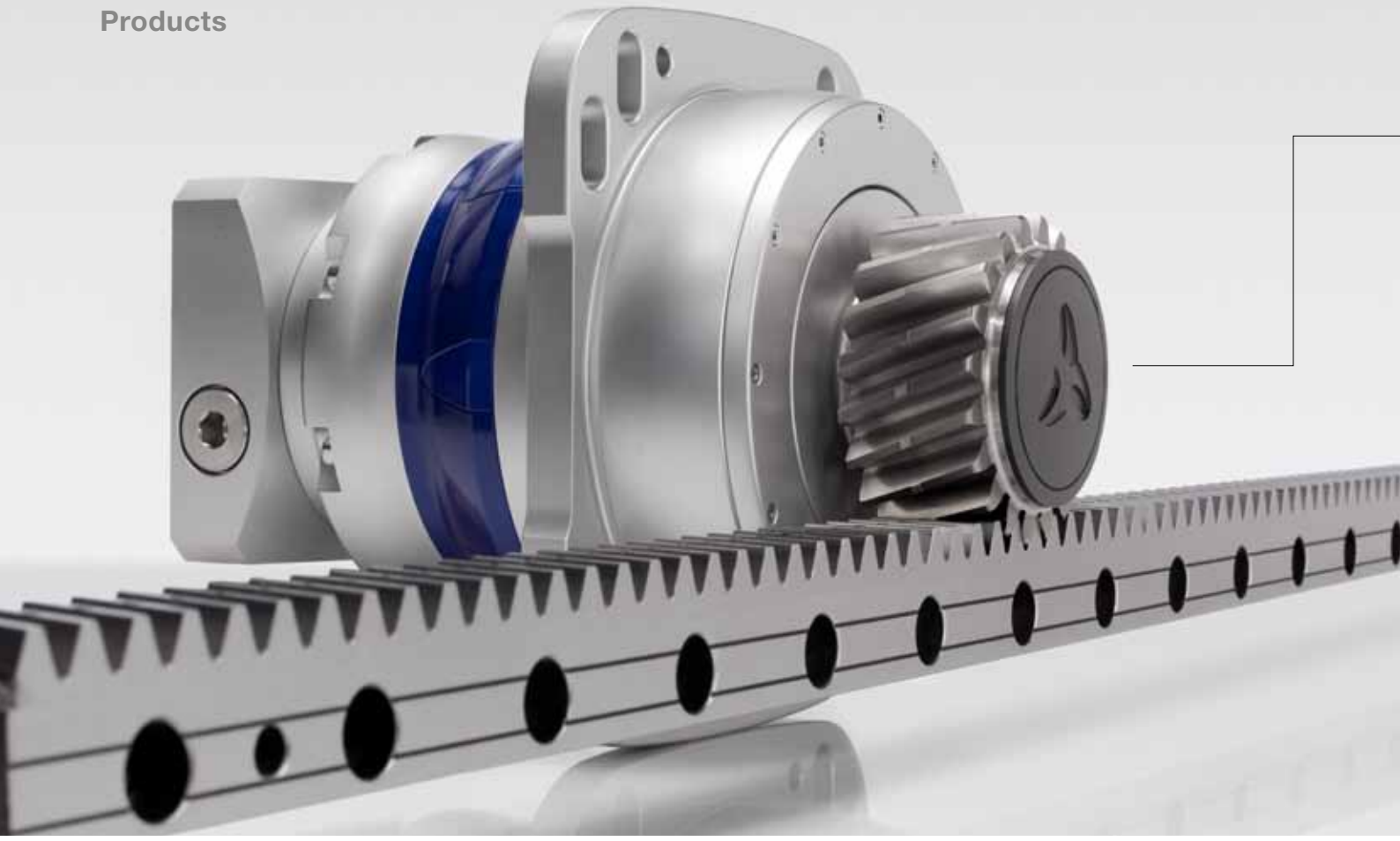


Axel Leidner
Head of Product Management
at WITTENSTEIN alpha

for downsizing drive systems. The intelligent design concept is a further convincing feature. The modified alpheno® interface provided on the new gearhead is currently the only one of its kind in the world. With only eight fixing holes instead of the traditional 32, it makes the system easier to assemble and reduces assembly times enormously. All in all, the new linear system offers a renewed demonstration of our expertise in transmission technology and drive sizing; it underlines our ability to control them reliably, harmonise them perfectly and team up the gearhead, pinion and rack in an integrated system solution.

move: WITTENSTEIN alpha as a system partner for its customers – what is the advantage for them?

Axel Leidner: By focusing on holistic drive solutions, we present ourselves as a partner for all customers seeking a single supplier for complex mechatronic tasks. From a technical point of view, this firstly means optimised drive solutions. Secondly, it is equally important that we relieve our customers of some of the burden of coordination work and thus save them valuable time. They only have to deal with one contact, so that there is no risk of confusion over responsibilities in case of discrepancies. Finally, they derive added security from our comprehensive system expertise: we warrant the optimal functionality of the solution as well as the reliable achievement of, and compliance with, defined performance characteristics. Many existing customers have confirmed to us that the all-inclusive package they get from WITTENSTEIN alpha is exactly what they are looking for. And at the Hannover Messe, we will communicate to potential new accounts how they too can profit from integrated drive solutions from a single source – starting with, but definitely not restricted to, the advanced technology.



The new High Performance Linear System from WITTENSTEIN alpha

“Every revolution was first a thought in one man’s mind” – these words of wisdom by Ralph Waldo Emerson, the American poet and philosopher, can also serve as a metaphor for a technological revolution from which WITTENSTEIN alpha customers can profit immediately: the new High Performance Linear Systems. These systems unite the company’s expertise in transmission engineering, gearing technology and sizing of complete drive trains in a mechatronic system solution, which is the only one of its kind in the world.

Holistic development provides the highest technology standards

An optimally sized mechatronic drive solution can be defined as one where the underlying basic technologies are controlled in such a way that they are utilised as efficiently as possible, bringing out the maximum performance in all components. This may seem an obvious fact, but it is still far from being an automatism. WITTENSTEIN alpha is the only manufacturer of linear drive systems in the world to unite the essential core competencies under one roof, control them reliably, harmonise them perfectly and optimise them systematically. Not only do customers benefit from solutions to the highest technology standards – WITTENSTEIN also assumes full system responsibility[1]. The new alpha linear systems are an excellent example.

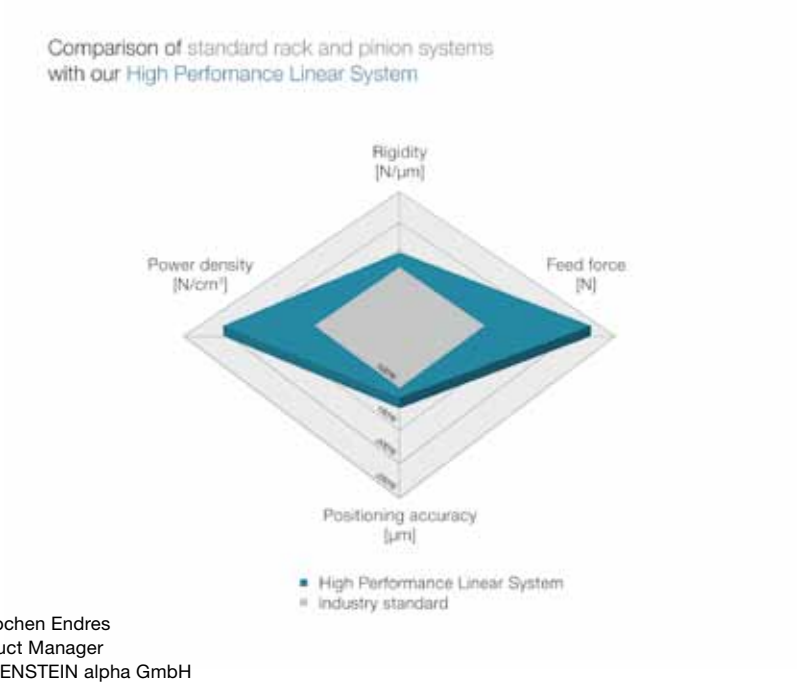
Challenging specifications

The development process was inspired by customer specifications that were challenging to say the least: what was needed was a rack and pinion system that was capable of transferring much higher maximum feeding forces than any other solution so far offered in the market. “What’s more, the new system needed to be comprised of optimized packages that can be put together to obtain solutions for different performance classes”, says Jochen Endres, WITTENSTEIN alpha Product Manager.

It was this and a series of other desired characteristics, such as a compact design with a higher power density or a simplified assembly concept – despite the higher feeding forces – that spawned the new linear system.

[1] For the design, based on the information submitted

A revolution in linear drive technology



By Jochen Endres
Product Manager
WITTENSTEIN alpha GmbH

Linear technology in a new performance class

Out developers and designers have pushed back the boundaries of what is technically possible in several areas:

- The permissible torques of the new gearhead are significantly higher. As a result, the high forces that are produced when the teeth of the rack and pinion are meshed can be controlled more effectively.
- The complete system consequently delivers much better rigidity – which in turn has a positive influence on positioning accuracy. The core components – gearhead, pinion and rack – are designed to achieve the maximum possible power density in a very small space.
- The design concept meets the specified modularity requirements; the unusual ease of assembly is a further convincing feature, because the modified alpheno® interface provided on the gearhead only has eight fixing holes instead of the traditional 32.
- The adjustment device that is fully integrated into the gearhead case is also new in this kind of system solution; it not only considerably shortens the time needed to design the connection, it also speeds up the assembly process and makes it more reliable.
- Several different sizes and versions, which are mounted at the factory prior to shipping, can be supplied as the gearhead's output pinion. A welding method that has already worked successfully for several years is used for this purpose. Even small pinions can be connected without any problems and the screwed connection of the output pinion, which is extremely critical with high feeding forces, can be dispensed with. Feeding forces up to 112 kN per drive are now possible, depending on the gearhead version.

Great opportunities for downsizing

Compared to other servo gearheads employed in conjunction with a rack and pinion, the new system is clearly superior in many applications in terms of positioning accuracy, system rigidity, power density and feeding force. These advantages often allow the complete drive system to be downsized. The same feeding forces are achieved with smaller gearheads, pinions and racks. If the customer prefers not to downsize, the new system offers far more power reserves than alternative drive systems of a similar size.

Open for any application

The sum of all these benefits opens up new potential for enhancing the performance of a wide range of equipment and machinery such as grinding, turning, portal milling, boring, laser, punching and pipe bending machines, water jet cutters or machining centres for wood-plastics compounds. "Our new, high-end linear system is suited for any type of application – from high-precision machine tools to automation technology", Endres predicts, looking ahead to Hannover Messe 2011.

Electric drive technology for vehicles
WITTENSTEIN shapes the future of eMobility

The motor for the eMobile drive (photo left, without the housing) is characterized by a high power / weight ratio, very good efficiency and a high force / torque density.

For several years now, WITTENSTEIN has presented the latest developments in eMobile drive technologies from its R&D labs at the Hanover Messe, as the leading international platform. Twelve months ago, WAG's integrated drive unit, which boasts performance data to rival that of Formula One cars, generated considerable interest. The central theme running through the 2011 exhibit will be a presentation of the newest drive platform from the WITTENSTEIN stable. This modular system for mobile electric drives further underlines WITTENSTEIN's drive expertise when it comes to highly dynamic and emission-free mobility in tomorrow's world.

In-house system expertise

The future electrification of transport calls for intelligent drive systems, in which the electronics, motor and gearhead are optimally matched. As a pioneer in the high-tech market for eMobile drive solutions, WITTENSTEIN learned to master this interaction between electrical and mechanical components several decades ago; thanks to this know-how, the company now develops trailblazing drive concepts for the upcoming generations. These concepts owe their success to two main characteristics: integration and modularity. eMobile drives made by WITTENSTEIN are integrated systems, in other words a unit comprised of a motor, gearhead and power electronics, each of which is designed to achieve maximum efficiency. At the same time, they are built from a modular building block system embedded in a non-variable parts strategy that allows different drive modules to be constructed for different vehicle types and eMobile performance classes from identical components with the help of simple interfaces. In addition, this modularity further underlines WITTENSTEIN's innovation and development expertise in the eMobility field by facilitating the creation of completely new drive architectures as well as high-end mechatronic drive solutions noted for their extremely high power densities.

Manufacturing know-how for a sharper competitive edge

As technology leader in the crucial electromobility market, WITTENSTEIN is in demand as a partner throughout all the implementation phases of eMobility projects – from consulting on alternative drive systems through the performance of

The gearhead in the electric drive system impresses with:

- High power density because the load is distributed between five case hardened planets
- High power / weight ratio thanks to the use of light-weight materials
- Customized design

feasibility studies and system engineering, the development of hardware, software and components or solutions for special applications to trials of new concepts and the construction of test models and prototypes. The production of small to medium-sized series at WITTENSTEIN represents the interface to the market, in other words to the manufacture of real electric and hybrid vehicles. This is critical for the success of electromobility. It is not adequate simply to develop drive concepts that conform to the strictest imaginable operating, safety and reliability requirements – they must also be realized economically. WITTENSTEIN contributes its profound know-how in the manufacture of high-performance electromechanical motors, for instance for the aerospace and medical technology industries, in which compact and even miniaturized solutions characterized by maximized efficiency and power / weight ratios are sought after – just like in electromobility.

Partner for industry

As a trusted partner for industry, WITTENSTEIN shows how electromobile drive technology can be developed in an integrated way – embracing both the product and the process. Only if the drives can be developed and produced efficiently and economically will electromobility succeed in becoming competitive in terms of the vehicle purchase price and also the running costs for the user. The immense importance of efficiency for tomorrow's eMobile drive solutions is demonstrated by the "StreetScooter" project, a joint initiative by automotive suppliers like WITTENSTEIN and RWTH Aachen University. They are collaborating on the development of an affordable electric car for urban transport and simultaneously evolving a concept for cost-efficient series production.

The modular eMobile system

The three innovative drive systems for emission-free mobility on show at the WITTENSTEIN stand at the Hanover Messe 2011 prove the vitality of the modular eMobile system. More systems for a variety of vehicle and performance classes will gradually become available. Thanks to WITTENSTEIN's modular product and production concept, they can be configured in different quantities. After all, the ability to produce electric drives sufficiently cheaply is essential to prepare electromobility for a broad mass market.

The new mosTEC.racing-Team is looking forward to a sucessful season.

Litmus test in Hockenheim:
electric drive made by WITTENSTEIN

By Leonhard Rödl, Assistant Manager mosTEC.racing
BWCSU Student of Business Engineering,
International Technical Sales Management at WITTENSTEIN AG

The goal is both challenging and exciting: a team of students are in the process of building a Formula One racing car that will subsequently have to convince a jury of experts from the motor sports, automotive and supplier industries with an overall package consisting of construction, performance and financial and sales planning. The "mosTEC. racing" team from Baden-Württemberg Cooperative State University (BWCSU) has until August this year to come up with a competitive electric with the ability to race in the Formula Student Electric contest at Hockenheimring. The electric drive for this car is being supplied by WITTENSTEIN.

The schedule is extremely tight and the students are working all out to get their car ready on time. The highly motivated team, about forty in number, will be participating in the electric version of the competition for the second time in the 2010/11 season, with the WITTENSTEIN group acting as a strong partner and platinum sponsor (the highest category). This year, WITTENSTEIN will be responsible for the heart of the drive: the traction motor from WITTENSTEIN cyber motor installed at its centre achieves a fantastic power output of 80 kW, considering that the total weight of the racing car is no more than 300 kg. This theoretically suffices to accelerate the vehicle to 60 mph in around three seconds flat. These awe-inspiring values are the outcome of the very high starting torque and the fact that there is no switching delay. The POWER-IQ

WITTENSTEIN will be responsible for the heart of the drive this season. The electric drive shown here was made by WITTENSTEIN and will be on show at Hannover Messe 2011.

The POWER-IQ 150 from WITTENSTEIN electronics is a highly compact power electronic system that is used to control the racing car's motor.

150 from WITTENSTEIN electronics is a highly compact power electronic system that is used to control the motor. The control electronics with the "MicroAutoBox 1401/1501" and software to match will be provided by dSPACE, another of the student project's sponsors. This is where all vehicle data is integrated, for example in order to incorporate a traction control system. Several of the students concerned are also WITTENSTEIN employees, which means they are guaranteed the excellent support and close cooperation that are essential to adapt the drive optimally to these special conditions and requirements. The mosTEC.racing team is looking forward to a successful 2010/11 season.

What is Formula Student?

"Formula Student" (www.formulastudent.de) is an international design competition for students organized by the Association of German Engineers (VDI). Student teams from universities all over the world will meet at Hockenheim for four days in August to compare their design and performance results and demonstrate their creative capabilities to industry. A separate event for all-electric vehicles was introduced at this world famous racetrack in the 2009/10 season. Each team develops and builds a racing car over a twelve-month period together with selected sponsorship partners in industry. This car is then required to race on various circuits worldwide in direct competition with the other teams.

Made-to-measure solutions: **A tooth for a tooth**

High-end hypoid bevel gearset from WITTENSTEIN bastian

WITTENSTEIN bastian's HRH hypoid bevel gearset: maximum positioning accuracy and repeatability combined with extreme dynamics.

Professional, affordable engineering for prototypes and end products, a high level of manufacturing and quality expertise in gearing technology, speed and teamwork – all of these were vital ingredients in the development of a novel positioning drive. The product of our concerted efforts – the WITTENSTEIN bastian HRH hypoid bevel gearset – is meanwhile benefiting a manufacturer of sheet metal processing and pipe cutting machines.

The HRH (High Reduction Hypoid) hypoid bevel gearset is the first axially offset transmission of its kind in the world to achieve a reduction ratio of i = 24 in gear tooth quality 1 with just one bevel gear stage. "That makes it particularly interesting for applications where very high positioning accuracy and repeatability are specified in combination with extreme dynamics", says Erik Roßmeißl, General Manager of WITTENSTEIN bastian in Fellbach. The hypoid bevel gearset is the outcome of a process of intensive cooperation with the customer's R&D department. Precise and highly dynamic positioning of tool heads in processing machines was not the sole development objective, however. The new solution also had to be much quieter, lighter and cheaper than the old gearhead concept.

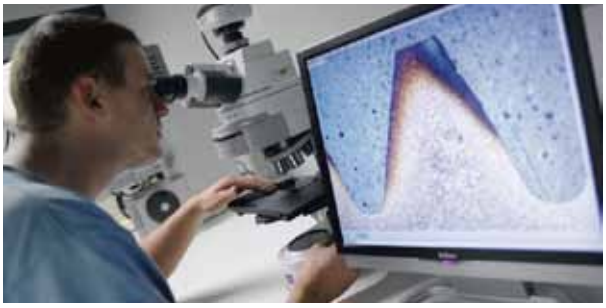
Gearing solutions from a single supplier

"WITTENSTEIN bastian offers its customers in motor racing as well as in the aerospace, robotics, engineering and car-making industries comprehensive manufacturing and engineering expertise from a single supplier", Claus Stoll, Sales Manager at WITTENSTEIN bastian, reports proudly. From bevel or spur gears through internal gearings to customized gearheads – the more complex the gearing task, the earlier the collaborative development and design process with the customer needs to begin. Contrary to common practice in the industry, the engineering services are not restricted to simply designing the gearing; they form part of an all-inclusive package consisting of development, design, detailed calculations, load testing and product optimization.

High-end gearing solutions from WITTENSTEIN bastian have to comply with the highest quality standards.

Erik Roßmeißl, General Manager of WITTENSTEIN bastian in Fellbach

Claus Stoll, Sales Manager at WITTENSTEIN bastian in Fellbach



All characteristics and any changes in them during the various production processes – such as machining or thermal treatment – were documented and optimized by WITTENSTEIN bastian in numerous measurement, testing and correction cycles.

The challenge: to position the tool head precisely

The hypoid bevel gearset supersedes the more complicated solution traditionally employed, namely a motor with two spur gear stages. The specification for the new transmission solution not only called for maximum positioning accuracy and repeatability together with very high dynamics; it also demanded a significant reduction in weight and operating noise. The prototype was developed and designed in close consultation with the customer. It underwent preliminary testing in the form of numerous measurement, testing and correction cycles and was subsequently optimized in the course of the development process. Further potential for improvement was generated by tests undertaken on the customer's testing facility. The result of the prototype phase was the high-end HRH hypoid bevel gearset, comprised of a bevel gear with 72 teeth and a pinion with three teeth in gear tooth quality 1. "It's the very high contact ratio that makes this design so unique: several teeth engage at once and each tooth engages at several points", Claus Stoll explains. This, along with the targeted design of the component macro and micro geometry, the surface design and the modification of the flanks to achieve optimal running performance and stress behaviour, assures maximum functional reliability in the presence of high dynamics, exceptionally quiet running and a very long service life.

The outcome: better, lighter, cheaper

The hypoid bevel gearset impresses in several ways in the machine for which it was developed – thanks to the higher dynamics and precision, the path control achieved by the tool head is much more accurate. The design of the bevel gear means that media and cables or hydraulic hoses can be fed through the large centre opening. The number of components to be assembled is less than it was before – with the result that the weight has been reduced by about 60%. The operating noise emitted by the hypoid bevel gearset has been approximately halved. Last but not least, the customer profits from the 30% lower costs for components.

It comes as no surprise to learn that specific plans to use the technology in other types of processing machine are already well under way.

Rotary power for exacting requirements

TPM+ family: two new sizes

TPM+ / TPM+ high torque 300 und 500

The new TPM+ high torque 300:
Rotary actuators from WITTENSTEIN motion control achieve up to 10,000 Nm in a compact space envelope.

A powerful unit

A system can only work efficiently if all its components are perfectly integrated.
A TPM+ servo actuator from WITTENSTEIN motion control is made up of a TP+ low-backlash planetary gearhead from WITTENSTEIN alpha and a servo motor from WITTENSTEIN cyber motor. The gearheads are characterized by minimal backlash as well as high torsional and tilting rigidity. The synchronous servo motors in the 220 series provide optimal power density and a maximum peak torque of 165 Nm. The integration of all these aspects in one system results in the high-precision, highly dynamic and compact TPM+ servo actuator.

• Advantages of the TPM+ high torque
The actuators have a high transferable torque and very high torsional rigidity. The integration of the gearhead pinion in the motor shaft means smaller motors can be used. As a welcome side-effect, the energy consumption of the drive train is reduced, leading to lower costs for the customer. The optimal rangeability improves the precision of the machine, thus helping to reduce lead times and make production more efficient.

By Siegfried Wallauer
Product Manager Rotary Drive Systems at WITTENSTEIN motion control

The servo actuators in the TPM+ product family impress with their high dynamics, torque and torsional rigidity. In combination with their extremely short overall length, high power density and quiet running as well as power steps geared to practical requirements, this translates into more efficient production. WITTENSTEIN motion control recently extended the TPM+ family with two new sizes: 300 and 500.

A major European manufacturer of blow moulding machines has already opted for our powerful, compact and torsionally rigid TPM+ / TPM+ high torque 300 and 500 servo actuators to meet the tough specifications of its application. The polymer melt is injected at high pressure, and this can easily cause the moulds to slip. The high-torque version of the TPM+ 500 keeps the two halves of the mould – in other words, the negative image of the product – tightly closed because even the slightest movement will result in scrap. It was the high torsional rigidity and the unbeatable performance data that tipped the scales for the customer in favour of the WITTENSTEIN motion control actuators. Their superior quality and reliability and their long service life also played a role.

Just the right application

The technical requirements of a gantry-type milling machine belonging to a big-name European manufacturer of machine tools proved to be a similarly difficult challenge: the machine is so huge that a mid-range car would fit inside it without any problems. The application calls for an actuator with a robust control response, optimal positioning accuracy and high transferable torques. The new TPM+ 300 has certainly performed impressively so far, effortlessly shifting more than 30 tons at a speed of around 50 metres a minute!

WITTENSTEIN – a system supplier you can trust

The drive train for this application also includes a few other innovations made by WITTENSTEIN: a high-precision pinion welded to the TPM+ 300 is responsible for the linear motion together with a high-performance rack. The fact that all of these matched components were provided by a single supplier is greatly appreciated by the customer.

• Suitable for exacting requirements

The TPM+ 300 and TPM+ 500 are suited for any reduction ratio up to i = 100. The TPM+ 500 is capable of transferring a maximum acceleration torque of 6000 Nm. The new TPM+ high torque 300 and TPM+ high torque 500 with reduction ratios up to i = 220 can be used for higher loads and higher torques. In this case, the maximum transferable acceleration torque is increased to 10,000 Nm. Although the actuators are only 418 mm long, their power density is very high. The TPM+ 500 achieves a maximum torsional backlash of 1.5 arcminutes. The high torsional rigidity of up to 2000 Nm per arcminute enhances the performance of the customer's machine.

• Optional extras

Various feedback devices such as rugged resolvers, optional single or multiturn encoders for detecting the absolute position (complete with a holding brake on request) are also available.

• For further information, please contact Siegfried Wallauer, Product Manager Rotary Drive Systems at WITTENSTEIN motion control GmbH,
e-mail: **siegfried.wallauer@wittenstein.de**.

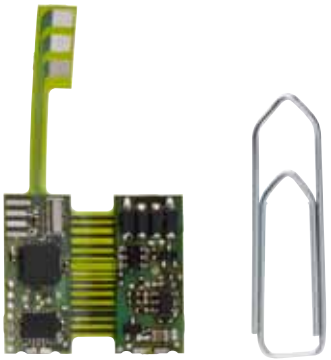
Active implants with wireless power and data transmission

How can movements and processes inside the human body be measured and actively influenced? The answer to this question is as simple as it is exciting – with power! Yet how can this power be introduced into our bodies, for example in order to drive a so-called intramedullary distraction nail for lengthening short limbs? WITTENSTEIN intens has developed a system that supplies wireless power direct to the implant – enabling the patient to be treated much more comfortably. Other human anatomy applications are now also within reach.

This innovative technology for wireless power transmission has already been used successfully in FITBONE®, the fully implantable intramedullary distraction nail for lengthening extremities, for a number of years. The electronic device required for this purpose can be accommodated in a space no bigger than 2 cm^3 – only slightly larger than a dice. The FITBONE® nail is implanted into the marrow cavity of a tubular bone, enabling the limb to be lengthened up to several inches – at a rate of about 0.04 inches a day – over a period of a few months. The miniaturised drive electronics that are essential to achieve this have been condensed by WITTENSTEIN electronics into a mere 8 x 20 mm^2 (top right). These components control a motor, evaluate various sensors and transmit power and data wirelessly to the implant. The implant's functions are controlled directly by the patient using a hand-held external sensor. The principle of wireless power and data transmission is similar to that of an electric toothbrush: power is transmitted from one coil to another via an electromagnetic connection.

The technology employed for wireless power and data transmission is not only useful in FITBONE®; it is also being continuously evolved by WITTENSTEIN intens and adapted for other applications. The first development project has already kicked off, in which a synthetic muscle substitute has to be supplied with power. The technology can additionally be transferred to applications such as an adjustable gastric band for patients suffering from adiposity (obesity) as well as for measuring stress values in implants, drug pumps, heart support systems or artificial hearts. In the near future, it could even be possible to supply power to the autonomous axes of a robot in this way.

Fully implantable FITBONE® intramedullary distraction nail with control



Miniaturised drive electronics act as the control centre for the intramedullary nail

For the good of the patient: intelligent drive technology

External limb lengthening method

FITBONE® technology

For the time being, however, let's get back to – or rather back inside – the human body: power transmission systems for implants traditionally have to be operated manually owing to their complex technology and can only rarely be controlled by the patient themselves. They also have to be replaced after a certain period – as soon as the energy store has been used up – or supplied with power via "transcutaneous" cables that protrude through the skin. A battery operated pacemaker, for example, needs to be renewed after about eight years. Wireless power and data transmission renders surgery of this kind unnecessary. And whereas the systems so far available in the market for treating urinary incontinence are can never be guaranteed to be one hundred percent reliable, and in extreme cases may even result in the loss of the urethra, wireless alternatives enhance patient comfort and security.

• Techniques for lengthening limbs (callus distraction) have been around for a long time; up to now, they have mainly been performed using external fixators such as the ring type (photo left). The bone concerned is first of all cut in two artificially and the two segments then stabilized by means of an external fixator. The principal drawback of this method is that so-called Kirschner wires are required to provide an anchor for the bone segments and the rings attached to the limbs. These wires have to be driven through the skin, soft tissue and muscles.

• In contrast to external fixators, fully implantable systems are inserted directly into the bone marrow cavity. The FITBONE® system (photo right) is stabilized by a telescopic, intramedullary distraction nail, which extends the limb similar to the aerial on a car roof.

Double honours:
Competence and Axia Awards

In mid-2010, WITTENSTEIN alpha was honoured with the coveted "Baden-Württemberg Competence Award". Three months ago, in January 2011, the "Axia Award 2010 Baden-Württemberg" was conferred on WITTENSTEIN AG. The awards were made in recognition of the company's innovative tradition, superior products and strong innovation culture.

KOMPETENZPREIS
BADEN-WÜRTTEMBERG

The "Baden-Württemberg Competence Award" was presented to WITTENSTEIN alpha as an authentic and exemplary company that has set new benchmarks in drive engineering. The cymex® and cymex® statistics sizing software additionally testifies to WITTENSTEIN alpha's role as a holistically operating system, provider of inspiration and driving force in the market. The award was personally received by Dieter Derr, General Manager of WITTENSTEIN alpha (photo right), Thomas Krämer, WITTENSTEIN alpha Quality Officer (left) and Volker Metzger, Manager Customer Service at WITTENSTEIN AG.

The "Axia Award 2010 Baden-Württemberg" was won by WITTENSTEIN in the "Culture of Innovation – a Success Factor for SMEs" category for its strong innovation culture, which is particularly exemplified by the President and principal shareholder, Dr. Manfred Wittenstein. Ulrich Boelcke, General Manager WITTENSTEIN intens GmbH and Head of Marketing & Communications at WITTENSTEIN AG (photo left, together with Thomas Traub of Deloitte & Touche, the leading auditing and consulting specialist) travelled to Stuttgart to receive the award in January 2011.

European trade press
visits WITTENSTEIN AG (Switzerland)

The new production facility at the WITTENSTEIN group's Swiss site in Grüsch in the canton of Grisons was in the limelight at a special trade press day organized in February 2011. The event also focused on topics like linear systems, sensor technology and energy efficiency. The unveiling of WITTENSTEIN alpha's new linear systems was a particular highlight. Twenty-one lead journalists from Germany, Italy, France and Switzerland had a chance to get hold of exclusive and up-to-the minute information direct from source, notably regarding the company's exhibits at Hannover Messe 2011. Not only the respective product managers but also Karl-Heinz Schwarz, Spokesman of the Board of WITTENSTEIN AG, and Dr. Anna-Katharina Wittenstein, General Manager of WITTENSTEIN AG (Switzerland) and the event's host, were in attendance and available for interviews.

TRADE FAIR CALENDAR 2011 (selection)

Hanover Fair, Hanover (Germany)
Industrial Automation (Hall 15, Stand F08),
MobiliTEC (Hall 25, Stand L13/09),
Job & Career Market (Hall 7, Stand A30/12)
WITTENSTEIN group
April 4 to 8, 20111

ITEC, Cologne (Germany)
Trade Fair for Simulation
(Hall 11, Stand D160)
WITTENSTEIN aerospace & simulation GmbH
May 10 to 12, 2011

Metalloobrabotka 2011, Moscow (Russia)
11th International Exhibition for Materials Processing, Technologies, Machines and Tools
WITTENSTEIN alpha GmbH
May 23 to 27, 2011

Paris Air Show, Le Bourget (France)
Salon International de l'Aéronautique
et de l'Espace
(Joint stand of the German Aerospace Industries Association (BDLI),
Hall 2C, Stand B338)
WITTENSTEIN aerospace & simulation GmbH
June 20 to 26, 2011

EMO 2011, Hanover (Germany)
The World's Premier Trade Fair for Metalworking Technology
WITTENSTEIN alpha GmbH,
WITTENSTEIN motion control GmbH
September 19 to 24, 2011

Motek 2011, Stuttgart (Germany)
International Trade Fair for
Assembly and Handling Technology
WITTENSTEIN alpha GmbH,
WITTENSTEIN motion control GmbH,
WITTENSTEIN cyber motor GmbH
October 10 to 13, 2011

Forum Maschinenbau, Bad Salzuflen (Germany)
Trade Fair for Suppliers in the
Machinery Manufacturing Industry
WITTENSTEIN alpha GmbH
November 9 to 11, 2011

SPS/IPC/DRIVES 2011, Nuremberg (Germany)
Exhibition for Electric Automation – Systems & Components
WITTENSTEIN alpha GmbH,
WITTENSTEIN motion control GmbH,
WITTENSTEIN cyber motor GmbH,
WITTENSTEIN electronics GmbH
November 22 to 24, 2011