



WITTENSTEIN

move

The magazine for customers and friends of the WITTENSTEIN AG

WITTENSTEIN AG:

PIONEER = (KNOW HOW + VISION + COURAGE)²

8

April · 2012

Masthead

Publisher:

WITTENSTEIN AG
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Circulation:

3500 copies

Production:

WAJS

Otto-Hahn-Str. 13
97204 Höchberg / Germany

Cover: Andreas Mei, Sales Manager Germany,
WITTENSTEIN alpha GmbH

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Dear readers,

Leonardo da Vinci – the artist who gave us the Mona Lisa's mysterious smile. Yet not only that: he also sketched ideas for flying machines that were not actually built until several centuries later. Today, they soar through the skies as "helicopters". It is not without reason that this gifted Renaissance painter and sculptor is still held to be one of the most outstanding polymaths of all times. Like the more modern-day Montgolfier brothers, Otto Lilienthal or Ferdinand Graf von Zeppelin, he was an undisputed pioneer of aviation with his revolutionary studies of flight.

Pioneers inspire awe and admiration. They are standard-bearers who break new ground in their chosen field. With their creative ideas they venture into new dimensions. Their pioneering achievements make possible what was previously impossible – and hence unimaginable. Pioneering technological achievements help people, change societies and give rise to new, global needs. Research and industry respond to mega trends like mobility or resource efficiency by developing innovative products, intelligent production technologies and sustainable processes. Lasting success on an international scale presupposes a good balance between ecology, economy, technology and social responsibility. Ideally, this fragile equilibrium should be decoupled from the volatility of world markets.

The WITTENSTEIN Group confronts this challenge every single day – as a development partner and solution provider for highly complex applications. Our new record sales in the 2011/12 fiscal year represent renewed confirmation that mechatronic drive technology made by WITTENSTEIN helps control motion in almost every industry and every future technology. Pay us a visit at the Hanover Fair 2012 and see for yourself!

We are determined to carry on investing our experience and know-how in this way in the years to come. In doing so, we hope not only to excite your enthusiasm for WITTENSTEIN's pioneering achievements but also to spur you to similar achievements of your own. We want to provide our customers all over the world with the same, optimal support no matter where they happen to be located – in Europe, the US, Asia or South America. That's why we launched our "Pioneers hit the road" initiative last autumn: as a complement to the traditional foreign placements for current trainees and students, all young entrants now have a chance to spend several months on a "life-changing journey" before settling down into their professional lives. Society as a whole – and each of us as individuals – needs to adopt a new, uncomplicated attitude to globalization.

To succeed in the global arena, however, investments in the future must be driven by firm resolve and a long-term perspective at the grass roots. Earlier this year, we moved into a new, pioneering "future urban production" facility in Fellbach, near Stuttgart (see pages 10/11). During the next few months, we will start preparing for the extra expense we need to continue growing at our Igersheim-Harthausen site. A new Mechatronics Centre designed to make sparing use of resources will go up directly adjacent to our existing headquarters.

As Antoine de Saint-Exupéry once said, "Our task is not to foresee the future, but to enable it". Our goal is to enable the future – for you and in partnership with you.



Dr. Manfred Wittenstein President of WITTENSTEIN AG



move talks to:

Dr. Bernd Schimpf

High-performance motors for tomorrow's world

Electromobility is currently arousing great expectations worldwide. Wherever the challenges waiting to be mastered are particularly daunting, WITTENSTEIN demonstrates its unique expertise and leverages drive engineering experience spanning multiple industries. The aim is not to serve the mainstream but to capture and retain niche segments. Several successful cooperative ventures have already been launched with automotive manufacturers. A WITTENSTEIN motor and power electronics are installed in every hybrid vehicle taking part in VW's "twinDRIVE" fleet test, for example. WITTENSTEIN is also contributing valuable input to the Electric Motorsport Grand Prix – Dr. Bernd Schimpf explains why.

move: Electromobility is a hot topic on everyone's lips. The world of motor sports is no exception – eMotorcycles are rapidly becoming an established category in major race series. Where do the main challenges lie for emission-free drives in motor racing?

Dr. Bernd Schimpf: WITTENSTEIN's activities in the electromobility sector cast a spotlight on two fundamental questions.

What form could the future take? Which aspects of drive technology are in need of further development? Motor racing is an ideal terrain for us – after all, where else does being the best and the fastest dominate to such an extent? The WITTENSTEIN claim to develop high-performance motors for tomorrow's world interacts here with an environment in which maximum power density, the highest possible torque and a compact space envelope are a must.

move: If the present trend continues, electromobility could become commonplace on race circuits all over the world in the long term. Where do we stand today?

Dr. Bernd Schimpf: Electric drives are still in their infancy, of course. It's a novel sensation to hear such a totally different engine noise at the start of a Grand Prix. Certainly as far as motorcycle racing is concerned, today's electric bikes are already nudging the performance of conventionally powered models. When the first race for electric cars will be staged is something we can't predict at the moment. Right now, WITTENSTEIN is lending its support to an extremely successful pioneering achievement by the Würzburg based Münch Racing Team (www.muench-racing.com). Last year, a machine driven by Matthias



Dr. Bernd Schimpf
Head of Generating Process Management
at WITTENSTEIN AG

Himmelmann finished first, way ahead of the rest, at the eGrand-Prix in Spa Francorchamps, Belgium. His TTE2 eBike reached a maximum speed of 214.9 km/h – not least thanks to a motor manufactured by WITTENSTEIN cyber motor and electronics from WITTENSTEIN electronics.

move: The 2012 racing season has only just begun. How would you rate the chances of the team sponsored by WITTENSTEIN? Would you care to give us your forecast?

Dr. Bernd Schimpf: Last year's successes speak for themselves: the Münch Racing Team is setting the pace in electric motorcycle racing.

They dominated the 2011 season and at the end of the year they were only a few seconds behind the supersport motorcycles with a combustion chamber that race on the same tracks. They won the double as world champion in the FIM and TTXGP electric racing series for the second year running. The prospects for 2012 are excellent, in other words. Whatever happens, we'll be keeping our fingers crossed tight for them.

move: How does WITTENSTEIN propose to support the defence of the world championship with innovative

WITTENSTEIN technologies in future?

Dr. Bernd Schimpf: WITTENSTEIN has sponsored the Münch Racing Team for the last two seasons and we intend to consolidate this partnership further in the future. We have plans to set up a WITTENSTEIN motor racing team made up of company staff with a particular interest in motorbikes, engines, electronics and the sweet smell of tarmac. We'd like them to provide additional technical support on the spot in the pit lane as pioneers and motor racing enthusiasts.

move: Let me wind up with a sneak look into the future.

WITTENSTEIN will exhibit at MobiliTec, the Hanover Fair's flagship exhibition for electromobility, for the third time in succession in 2012. What are the main trends?

Dr. Bernd Schimpf: WITTENSTEIN will exhibit in Hall 25, Stand M11/02 as a competent development partner for electromobility. Our aim is to show visitors what we can do today – and what we might be able to do in the near future...

A visionary among machine builders

Dr. Manfred Wittenstein to represent Germany in the search for the world's top „Entrepreneur of the Year“



The “World Entrepreneur Of The Year” will be announced by an international jury in Monte Carlo in June 2012. Fifty award-winning entrepreneurs from fifty different countries will compete. Dr. Manfred Wittenstein, President of WITTENSTEIN AG, will be among them. He will participate as Germany's representative, having already won the national competition last autumn as “Entrepreneur of the Year” in the “Industry” category.

Dr. Manfred Wittenstein

The “Alte Oper” opera house in Frankfurt rolled out its red carpet in honour of the numerous distinguished guests from the world of politics and industry who attended the official presentation of the prestigious “Entrepreneur of the Year 2011” awards. The jury cited clear and unequivocal reasons for its decision to confer the award on Dr. Wittenstein: “He inherited a small, ailing, family-owned sewing machine business and turned it into the world's premier manufacturer of drive technology. Wittenstein is a visionary among machine builders.”

Every year, this coveted business award seeks to identify and honour exceptional entrepreneurial achievements worldwide. Out of three hundred companies nominated in Germany in 2011, sixty-five qualified for the final round. In addition to outstanding entrepreneurial commitment, the criteria assessed also included a clear employee focus, proven innovative vitality and a policy of responsible growth.

Dr. Wittenstein primarily regards the competition as a golden opportunity to measure his company against the international business elite. “After all, WITTENSTEIN has pledged itself to excellence in many different areas.” The high demands he makes on his own company are consistent with the definition of a model entrepreneur by Ernst & Young, the leading auditing and advisory services firm and competition organizer: “Entrepreneurs are pioneers in their respective industries who realise visions in a focused way without neglecting their responsibility to the community in which they operate. High growth rates go hand in hand with a deep involvement in social and environmental projects.”

Looking ahead to the election of the “World Entrepreneur” on the French Riviera only a few weeks from now, Dr. Wittenstein intends to relax and enjoy: “I, or rather we – the entire company – are proud just to be there.”



LP⁺ Generation 3

Innovation sets standards

LP planetary gearheads made by WITTENSTEIN alpha have been up among the cream of the world's drive technology ever since 1996 – and even more so since the LP⁺ upgrade in 2004. Yet the specifications demanded by the market are constantly changing. Less noise, smaller sizes and reduced energy consumption currently top of the list of priorities.



Quieter, more powerful and more energy efficient – these were WITTENSTEIN alpha's three most important development objectives for the LP⁺ Generation 3 series of planetary gearheads. This new series extends the product portfolio, providing designers of feed axes, handling systems, packaging machines and industrial machinery in general with multiple technical and economic benefits.

Improved performance as the key to downsizing

New design and machining processes at WITTENSTEIN alpha have enabled an impressive performance leap to be realized with LP⁺ Generation 3. The transmittable torques are now up to 75% higher than the industry standard. At the same time, the enhanced performance of the LP⁺ Generation 3 gearheads may open up important downsizing options for users. Downsizing will in future be a viable option in many applications that were not originally conceived to leverage the

maximum transmissible torque. If the application features on-board drives mounted on a robot, for example, downsizing additionally improves energy efficiency. By choosing a smaller size, the mass to be accelerated can be halved without compromising the drive's output – and energy consumption is accordingly lower. Downsizing is also a good way to bring down the noise level. If it is possible to manage with the T_{2N} torque of 28.5 Nm that is achieved with the new LP⁺ Generation 3 gearhead in the 070 size, for instance, rather than the 40 Nm required by the equivalent "old" size 090, the noise produced by the application can be reduced from 72 dB (A) to 64 dB (A) – less than half the audible volume.

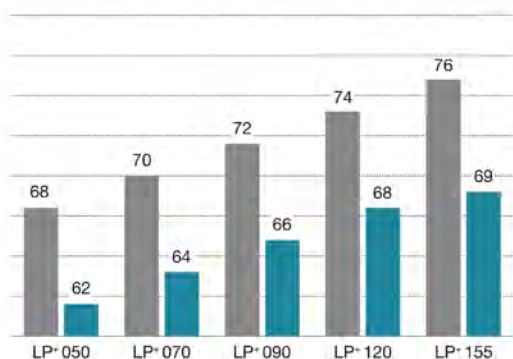
"Whisper-quiet" drives – less than half the normal noise emission

"Less noise" was also a separate development objective of the LP⁺ Generation 3 series in its own right. The operating



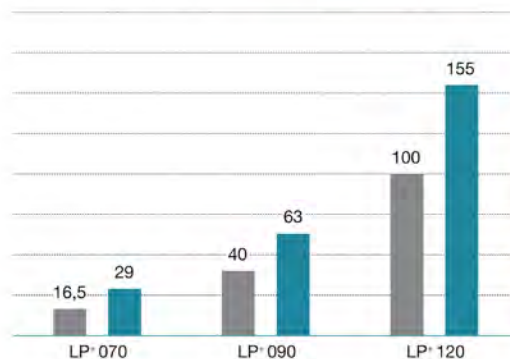
Thomas Krämer
Product Manager, WITTENSTEIN alpha GmbH

Comparison of operating noise dB (A)
Industry standard vs. LP+ Generation 3



All gearheads produce significantly less operating noise regardless of their size.

Comparison of torques in Nm
Industry standard vs. LP+ Generation 3



More torque is now transmitted with all sizes and all reduction ratios.

noise has been reduced by 6 dB (A) on average thanks to the optimized manufacturing and finishing processes for the gearing parts and the improvements to the tooth flank geometry, in other words the noise level has been more than halved. The noise reduction by the LP+ Generation 3 series is greatly appreciated by users of packaging machines and handling systems because it is achieved without any additional acoustic enclosure on the gearhead side or noise abatement measures in the periphery.

Less torsional backlash, even higher precision

However, LP+ Generation 3 is not only more powerful and quieter but also more precise. The torsional backlash, for instance, is far less than with the predecessor series. Whereas the "old" LP+ was already very precise for its class with a maximum of 15 arcmin (size 090, 2-stage), LP+ Generation 3 goes a step further. The 090 size has a maximum torsional

backlash of just 10 arcmin with a 2-stage reduction ratio. LP+ Generation 3 is consequently ideal for servo applications where highly precise positioning is a must.

Express speedline® delivery guaranteed

The development of the new LP+ Generation 3 was a holistic process: the goal was not simply to come up with technical improvements but also to examine ways to optimize the production and assembly workflows in order to reduce shipping times to a minimum and maximize delivery reliability. Short standard delivery times and the WITTENSTEIN alpha express speedline® delivery service are also guaranteed for the new series.

From noise reduction through energy efficiency to downsizing – with the LP+ Generation 3 series, WITTENSTEIN alpha has set new performance benchmarks for planetary gearheads.

Urban production and Industry 4.0

WITTENSTEIN's production concept for the future



Even the location is altogether unusual: WITTENSTEIN has invested twelve million euros in an ultra-modern production facility right next to a passive house estate in Fellbach on the fringe of the Stuttgart conurbation. The outcome is an innovative overall concept comprised of optimized processes, the building itself and the energy supply systems for the group's WITTENSTEIN bastian subsidiary christened "Future urban production" – a low-noise, low-emission plant that successfully reconciles economic with ecological requirements. It is closely aligned to tomorrow's challenges as identified within the Industry 4.0 project – the "fourth stage of industrial development".

Economic, ecological and socio-cultural sustainability

The new building, covering 5400 m², is only 300 yards from the present head office as the crow flies, yet the former "gear factory" and the new, urban production facility are worlds apart. This facility is unquestionably something special: both the building services and the machinery have been fine-tuned to minimize resource usage and maximize precision.

Thorough consideration has been given to all technical details such as noise, waste gas, refuse, CO₂ emissions, water and waste water as well as to the harmonious integration of the plant's architecture in the neighbouring residential area. The power required to run the facility is generated by biogas-operated micro turbines, for instance, while the waste heat from the company's production processes is recovered and utilized to heat the offices.

A photovoltaic system produces enough electricity to supply a hundred households. Amongst other things, this power is

utilized to continuously dehumidify the fully conditioned air in the production shop – and thus create an optimal working climate that is conducive to the good health of the WITTENSTEIN bastian workforce. The constant room climate also benefits customers by ensuring precise engineering and stable processes, which are vital for high product quality and first-rate supply performance. Rainwater serves a similarly important function, by the way – it is collected in a cistern and used for sanitary facilities.

These diverse innovative solutions have had a remarkable impact: despite the fact that the new production shop is fully air conditioned, the energy costs per square metre are around 35% lower than for the old building. So far, the standard requirements laid down by the German regulations on energy saving (EnEV) have been exceeded by more than fifty percent and the latest versions of the directives on energy and buildings are easily fulfilled.

Innovative new building at the group's Fellbach site



View of WITTENSTEIN bastian's new "Future urban production" facility.

Industry 4.0 – the "fourth stage of industrial development"

WITTENSTEIN bastian has made all the necessary preparations in its new building for a very exciting vision, which has already attracted considerable attention under the name "Industry 4.0". The aim is that machinery, means of production and semi-finished products will one day be permanently hooked up to one another online, so that last-minute changes to a gear wheel's specification, for example, are no longer a problem. In other words, the foundation has been laid for all elements of a future "intelligent" production concept – so-called cyber-physical systems – to be successively integrated into WITTENSTEIN bastian's processes.

Above all, new and innovative processes lead to higher product quality – and more satisfied customers. In the long term, however, the evolution to Industry 4.0 will also strengthen the company's German location.

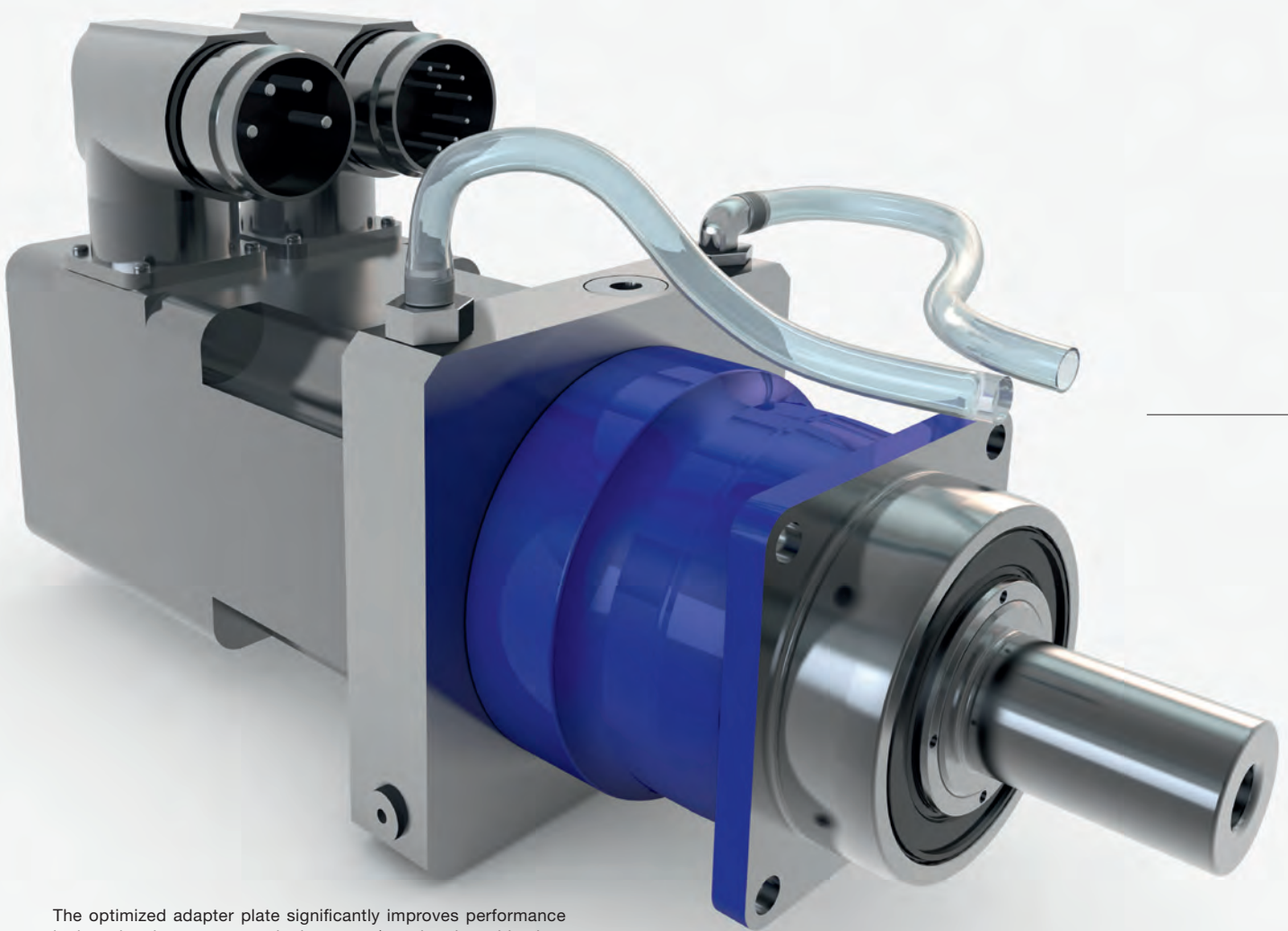
President Dr. Manfred Wittenstein is well aware of his entrepreneurial responsibility towards society and nature: "WITTENSTEIN is seeking wise and sensible answers to tomorrow's production requirements. Our claim is to reconcile optimal product quality with effective environmental protection and social responsibility."

Integration in the urban environment

"Urban production" improves the quality of life and working conditions without any detriment to living space. The new production facility blends harmoniously into the urban environment while the outside area has been successfully integrated with the adjoining plots of land. Noise emissions, which were in any case very low, have been further reduced by a special noise barrier. And in addition to a biotope and a children's playground, WITTENSTEIN bastian will in future also share two publicly accessible charging stations for electric cars with its new neighbours.

Certified pilot project

WITTENSTEIN bastian gear wheels have driven technological advances throughout the last hundred years. From the world's very first motor driven vehicle through robotic systems to modern space travel and motor racing, demand for gearing solutions made in Fellbach has remained consistently high. In future, these solutions will carry a written guarantee of "greenness": the entire facility, including all office space, will shortly be certified by the DGNB (German Sustainable Building Council) as the first building of this kind. A pre-certificate in gold has already been awarded.



The optimized adapter plate significantly improves performance by lowering the temperature in the motor / gearhead combination.

Motor / gearhead combinations are often limited by temperature. The higher the torque load and / or rpm, the higher the system-generated temperature.

WITTENSTEIN is constantly working with customers to understand their needs, identify current limitations and design solutions which allow optimal system performance. The result is an optimized adapter plate that significantly improves performance by lowering the temperature in the motor / gearhead combination.

To understand the design constraints as a precondition of successful development, WITTENSTEIN discussed all relevant details with customers. The main requirement was to reduce the operating temperature of the combined gearhead and motor and to accomplish this in the minimum amount of space. Not wanting to add additional elements to the overall

drive system, a decision was made to optimize the existing elements. The final design focused on optimizing the adapter plate, which is typically a solid piece of aluminium used to connect the motor to the gearhead. WITTENSTEIN's specially developed adapter plate has an internal channel allowing circulation of fluid (liquid or air) to remove the heat more efficiently.

Testing was performed on a servo motor mated to a WITTENSTEIN alpha SP 140 MC 1-3 planetary gearhead. The output bearing of the gearhead reached a steady state temperature of 87°C (189°F) with natural convection. When 23°C (73°F) air was run through the internal adapter channel, a steady state temperature of 63°C (145°F) was achieved, representing a reduction of 24°C (44°F) over natural convective air cooling. On the other hand, when 7°C (45°F) water was run through the channel, the steady state temperature was 53°C (127°F) – a

Designed for efficiency: Fluid cooled adapter

Heat reduction improves overall motor / gearhead performance

WITTENSTEIN's fluid cooled adapter
in the customer environment.



reduction of 34°C (62°F) over the natural convection method. The new solution was put into practice in the US customer environment. The result confirmed the significant heat removal using the fluid cooled adapter. Lower motor winding temperatures were also observed. This was possible because the cooling takes place directly between the motor and the gearhead, extracting heat from both pieces of equipment.

As the temperature is lower throughout the motor / gearhead, the drive combination can now be run at a higher torque load and / or rpm. Customer results showed that a motor / gearhead combination which with a traditional adapter plate ran at 500 rpm and 50% torque load could now run with a fluid cooled adapter plate at up to 2000 rpm and 50% torque load without any increase in temperature. This represents a substantial improvement in performance.

Downsizing options

Optimizing the overall system components by employing a fluid cooled adapter plate increased performance and reduced heat. This new design resulted in a general system improvement. Instead of operating the same size servo motor at a higher torque load and / or rpm, a smaller motor is now allowed to be selected. Downsizing in this way was previously not possible due to temperature limitations.

The fluid cooled adapter plate was the outcome of very good cooperation between WITTENSTEIN and its customers. It's a part of the WITTENSTEIN philosophy to design solutions based on exceeding customer expectations.

Noses to the wind

Wind power “made” by WITTENSTEIN



Gregor Stühler
Sales Engineer, WITTENSTEIN cyber motor GmbH



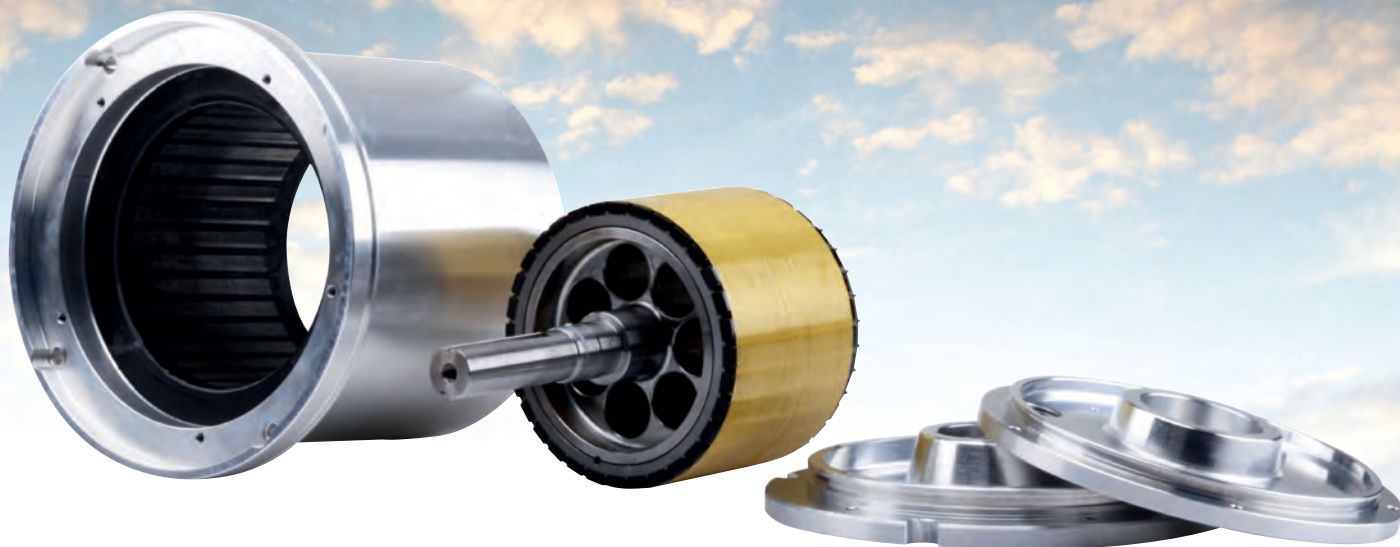
The permanent magnet synchronous servo motor with about 2 kW maximum output that is used as the generator for this small wind turbine has been gradually perfected, with the result that the generator and the turbine are now optimally harmonized with an efficiency of about 95%.

Can wind power really be produced on the rooftop of private homes or factory buildings? WindTec Systems, the Swiss manufacturer of wind turbine technology, is not afraid to tread completely new paths with this cutting-edge idea. The permanent magnet synchronous motors that drive the compact ENFLO 0110 wind turbine, which can be installed without a permit, are supplied by WITTENSTEIN cyber motor. The MRSx series to which they belong was perfected for this highly specific application.

Wind of change in the energy production market

“There’s no reason why house roofs should remain the exclusive domain of photovoltaic systems for ever more”, says Dirk Süss, Managing Director of WindTec Systems. The company is currently the only vendor in the market that is capable of erecting small yet efficient wind turbines on urban sites or at off-grid locations. Uwe Steffens-Paal, Managing Director of ENFLO Service, explains why: “The ENFLO 0110 wind turbine has a rotor diameter of 1.10 m, making it very compact and also relatively light at around 50 kg. Planning permission is not required. Last but not least, the specially designed ge-

ometry assures quiet operation.” The ability to produce wind energy and convert it to electricity without any loss of power is crucial, of course. “That’s why, when WindTec Systems was on the lookout for a suitable generator solution, they decided to get in touch with us”, Dieter Bauch-Panetzky, a development engineer at WITTENSTEIN cyber motor, recollects. “We recommended a permanent magnet synchronous servo motor with about 2 kW maximum output as the starting point for the generator. The generator then ‘grew’ with the wind turbine as the project progressed. It was gradually perfected for this highly specific application, with the result that the



Permanent magnet synchronous motors like the MRSx series from WITTENSTEIN cyber motor are very much in demand in the wind power sector.

generator and the wind turbine are now optimally harmonized in the ENFLO 0110 with an efficiency of up to 98%.”

Versatile generators produce wind energy without any loss of power

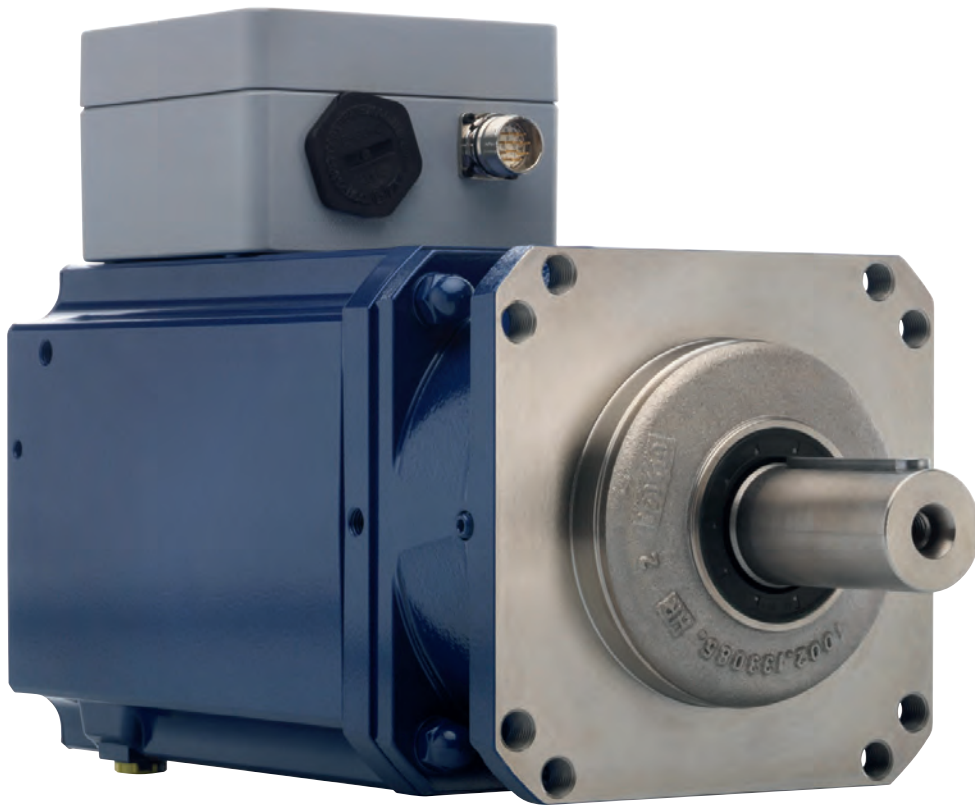
MRSx generators from WITTENSTEIN cyber motor are very much in demand not just with WindTec but in the wind power sector in general. They feature very quiet running, a space-saving design, a greatly reduced weight / power ratio (kg / kW) and far higher efficiency than can be achieved with asynchronous technology. “Added to that, WITTENSTEIN has the experience and expertise to design drive solutions for specific applications”, Süß continues. Another argument in favour of generators from WITTENSTEIN cyber motor that is crucial for the success of his small turbines is their exceptional ruggedness. “Operators of conventional small wind turbines don’t just complain about the noise and poor output; they’re also dissatisfied with the short lifespan and the high costs for maintenance and repair”, Süß adds, speaking from experience. These are issues that neither he nor his customers have to worry about any more: “The rotor and stator are well protected inside the generator and the bearing technology has already demonstrated its suitability in harsh industrial environments. They’re virtually maintenance-free and at present there are hardly any restrictions on the service life”, Bauch-Panetzky reports. WindTec Systems evidently concurs with

this view – and guarantees a minimum life of twenty-five years for its wind turbines owing to the general robustness of the WITTENSTEIN generators. President Dr. Manfred Wittenstein has already underlined his faith in this claim by ordering a wind turbine from Dirk Süß and Uwe Steffens-Paal for his Igersheim-Harthausen premises.

WITTENSTEIN technology also suited for large wind turbines

The ENFLO 0110, which is sold with increasing success via industrial wholesalers, specialist installers and the electrical industry, will drive WindTec Systems’ future growth. “The 1.5 kW wind turbine for rooftop installation on private homes is only the beginning”, Süß predicts. “Turbines with a rotor measuring anything from 2 to 22 m will follow for a broad range of applications such as mobile towers or charging stations for electric cars – electromobility is the big buzz.” The new applications and sizes will simultaneously create new requirements that have to be taken into account by the generators. “Once again, the chief problem will be to convert the low speeds as efficiently as possible without a gearhead”, concludes Dr. Michael Geier, General Manager of WITTENSTEIN cyber motor. “Our aim will be to maximize the overall efficiency of the system.”

Knowing which way the wind is blowing is a central part of the WITTENSTEIN creed...



The SPM endurance rotary actuator made by WITTENSTEIN motion control.

Cool and energy efficient – SPM servo actuator for high-performance injection moulding machines

Precise dosing, low energy consumption and very short cycle times are vital for high-performance injection moulding processes, for instance in the manufacture of plastic caps. Electromechanical dosage drives are ideal for achieving these objectives. ARBURG, the leading manufacturer of injection moulding machines, has fared very well with SPM endurance, the rotary servo actuator from WITTENSTEIN motion control.

The German firm of ARBURG is one of the leading global manufacturers of injection moulding machines for plastics processing applications with closing forces from 125 kN to 5000 kN. Amongst other things, its products are used to make plastic parts for the automotive and communications markets, consumer electronics, medical technology, household appliances and packaging equipment. Robotic systems, complex projects and various peripherals round off the portfolio. All manufacturing takes place at the German parent plant in Lossburg.

Injection moulding demands exceptionally high precision
The high-performance machines in ARBURG's Allrounder H

series are characterized by high production capacities, short cycle times and low energy consumption. They are tailor-made for manufacturing thin-walled packaging products in large quantities. The drive technology not only has to satisfy strict requirements with regard to precision and energy efficiency, however; reliable cooling is also imperative.

SPM endurance servo actuators consistently provide the specified precision. They consist of a highly precise planetary gearhead and a servo motor with very high power density; the sun wheel of the gearhead is pressed into the motor shaft directly. The decision to dispense with the usual shaft coupling reduces the moment of inertia and improves mechanical



A one-piece motor housing made of cast aluminium was developed specifically for WITTENSTEIN's SPM servo actuator; at its heart is a stainless steel cooling coil.

The electromechanical dosage drive works absolutely precisely thanks to the WITTENSTEIN SPM endurance servo actuator (circled).

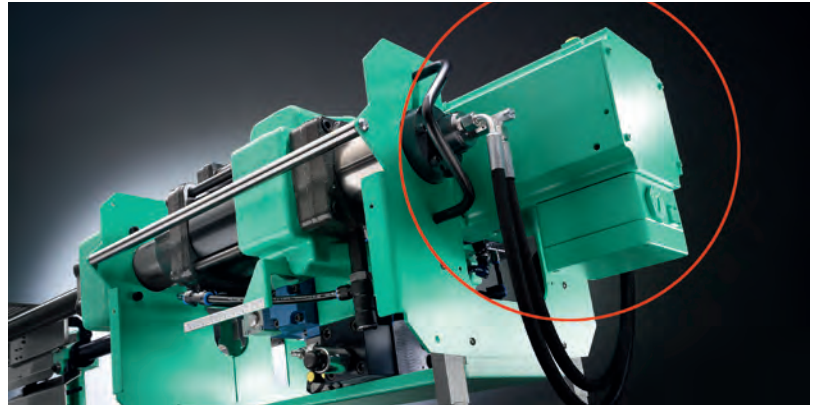


Image: ARBURG GmbH + Co KG

rigidity. As a key component of the electromechanical dosage drive, these servo actuators increase the accuracy and reproducibility of the injection moulding process by switching off the machine precisely at the end of the dosage step, thus ensuring absolutely repeatable dosage volumes.

Compact, energy efficient design

The WITTENSTEIN motion control actuator also convinces in terms of energy efficiency – an aspect that has been high on ARBURG's list of priorities for many years. The interaction of several different factors allows smaller motor sizes to be chosen. The pinion integrated in the motor shaft and the rigid output bearing increase the overall rigidity and stabilize the control response while the low torsional backlash in the gearhead helps eliminate dead times in the control loop. All of this improves the ratio of the external to the intrinsic moment of inertia, frequently adding up to a smaller motor, reduced energy consumption and lower costs for investments in the powertrain as a whole. SPM endurance boasts a very high level of integration and extraordinary power density. Its very high torque and exceptionally short length are the two most outstanding benefits, however. The total length saving is around fifty percent compared to conventional gearhead motors.

Ingenious cooling solution

The development engineers attached particular importance to efficient in-process cooling. The fluid cooling system in-

tegrated in SPM endurance actuators is crucial for the sustained operation that is often expected of injection moulding machines in the Allrounder H series with their high production capacities. The machines are connected to the moulding company's cooling circuit.

The fact that open circuits and river water are sometimes also used for cooling represented a major challenge for WITTENSTEIN motion control. If this is the case, the corrosion protection agent must not contain any additives. A one-piece motor housing made of cast aluminium was developed to overcome this problem. At its heart is a stainless steel cooling coil with a higher corrosion resistance to coolants from open cooling circuits. Another advantage of cooling the housing with an integrated stainless steel cooling coil is that the cooling circuit can be designed as a single system and there is no longer any need to seal the individual sections. As a result, the servo actuators are more robust, and this reliability is a prime success factor.

Customized engineering

The SPM endurance servo actuator is a customized drive solution developed jointly by ARBURG and WITTENSTEIN motion control. The actuator design unites WITTENSTEIN's drive know-how with ARBURG's process requirements for high-performance injection moulding machines.

The result is an optimized product based on customized engineering.



www.kreativekoepfe.info

Ideas learn to fly “Creative Young Minds” competition now ten years old



Iris Lange-Schmalz
Competition Director



The erector spinae, designed by Markus Michelbach

A mobile phone that is only switched on if someone calls? An erector spinae that reminds the wearer to straighten up? A skylight that dampens the sound of raindrops beating on the window pane? These clever little helpers were thought up not by great minds but by youngsters in their teens.

It is now ten years since Dr. Manfred Wittenstein initiated the (highly successful) “Creative Young Minds” foundation. “Creative Young Minds” is a regional competition for young inventors that is sponsored by business enterprises, public authorities and organizations in three local areas.

Back in 2002, the signs were unmistakable: the steady decline in the number of engineering science students was a cause of great concern for Dr. Manfred Wittenstein. Technology was perceived as a very complex subject in which theoretical knowledge was too detached from day-to-day practice. One alarming repercussion of this trend was that companies in the local region were finding it increasingly difficult to attract trainees. Dr. Wittenstein resolved to tackle the implications of Germany’s demographic development there and then before it became too late – with a competition for inventors.

Every year ever since, the competition has encouraged teenagers of both sexes to apply what they have learned about engineering and natural sciences to the problems of the real

world. It provides schoolchildren with a platform on which to put their creative ideas into practice and gives them an insight into business processes. What sets it apart from other, similar initiatives is the fact that the young people taking part are mentored by experts in the various firms who help them formulate and realize their projects.

The result is a win-win situation for all stakeholders. In the meantime, a well-established network has been built up between pupils, schools, local authorities and business enterprises, and the ties between schoolchildren and their home region have become closer. Whereas the competition was originally confined to Bad Mergentheim and its near neighbours – in other words, the immediate geographical surroundings of WITTENSTEIN AG – children from other, more remote schools in the Main-Tauber district are now equally keen to demonstrate their inventive abilities.

Incidentally, the idea for the above-mentioned erector spinae was submitted by a 16 year-old boy in last year’s competition. Two sensors attached to a rubber band detect incorrect back posture and activate vibrating motors, which subtly remind the wearer to straighten up. The invention has already been registered as a utility model. The motto for this summer’s official award ceremony in the WITTENSTEIN talent arena relates to another form of motion: Creative Young Minds – ideas learn to fly.

TRADE FAIR CALENDAR 2012 (selection)



Hanover Fair 2012, Hanover (Germany)
Industrial Automation, Hall 15, Stand F08
MobilTec, Hall 25, Stand M11/02
WITTENSTEIN group
April 23 to 27, 2012



ILA 2012, Berlin (Germany)
Salon International de l'Aéronautique et de l'Espace
WITTENSTEIN aerospace & simulation GmbH
September 11 to 16, 2012



XYLEXPO 2012, Milan (Italy)
Biennial World Exhibition for Woodworking Technology and Furniture Supplies
WITTENSTEIN S.P.A.
May 8 to 12, 2012



BI-MU 2012, Milan (Italy)
Showcase for Metal Forming and Metal Cutting Machine Tools, Robots, Automation Systems and Auxiliary Technologies
WITTENSTEIN S.P.A.
October 2 to 6, 2012



HISPACK 2012, Barcelona (Spain)
International Packaging Exhibition
WITTENSTEIN S.L.U.
May 15 to 18, 2012



Motek 2012, Stuttgart (Germany)
International Trade Fair for Assembly and Handling Technology
WITTENSTEIN group
October 8 to 11, 2012



BIEMH 2012, Bilbao (Spain)
International Machine Tool Biennial
WITTENSTEIN S.L.U.
May 28 to June 2, 2012



Forum Maschinenbau 2012, Bad Salzungen (Germany)
Trade Fair for Suppliers in the Machinery Manufacturing Industry
WITTENSTEIN alpha GmbH
November 7 to 9, 2012



Metalloobrabotka 2012, Moscow (Russia)
13th International Exhibition for Materials Processing Technologies, Machines and Tools
WITTENSTEIN alpha GmbH
May 28 to June 1, 2012



SPS/IPC/DRIVES 2012, Nuremberg (Germany)
Exhibition for Electric Automation – Systems & Components
WITTENSTEIN group
November 27 to 29, 2012



Eurosatory 2012, Paris (France)
International Exhibition for Land and Land-Air Defence
WITTENSTEIN motion control GmbH,
Special Applications Business Division
June 11 to 15, 2012



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