MDA Technologies

Motion, Drive and Automation

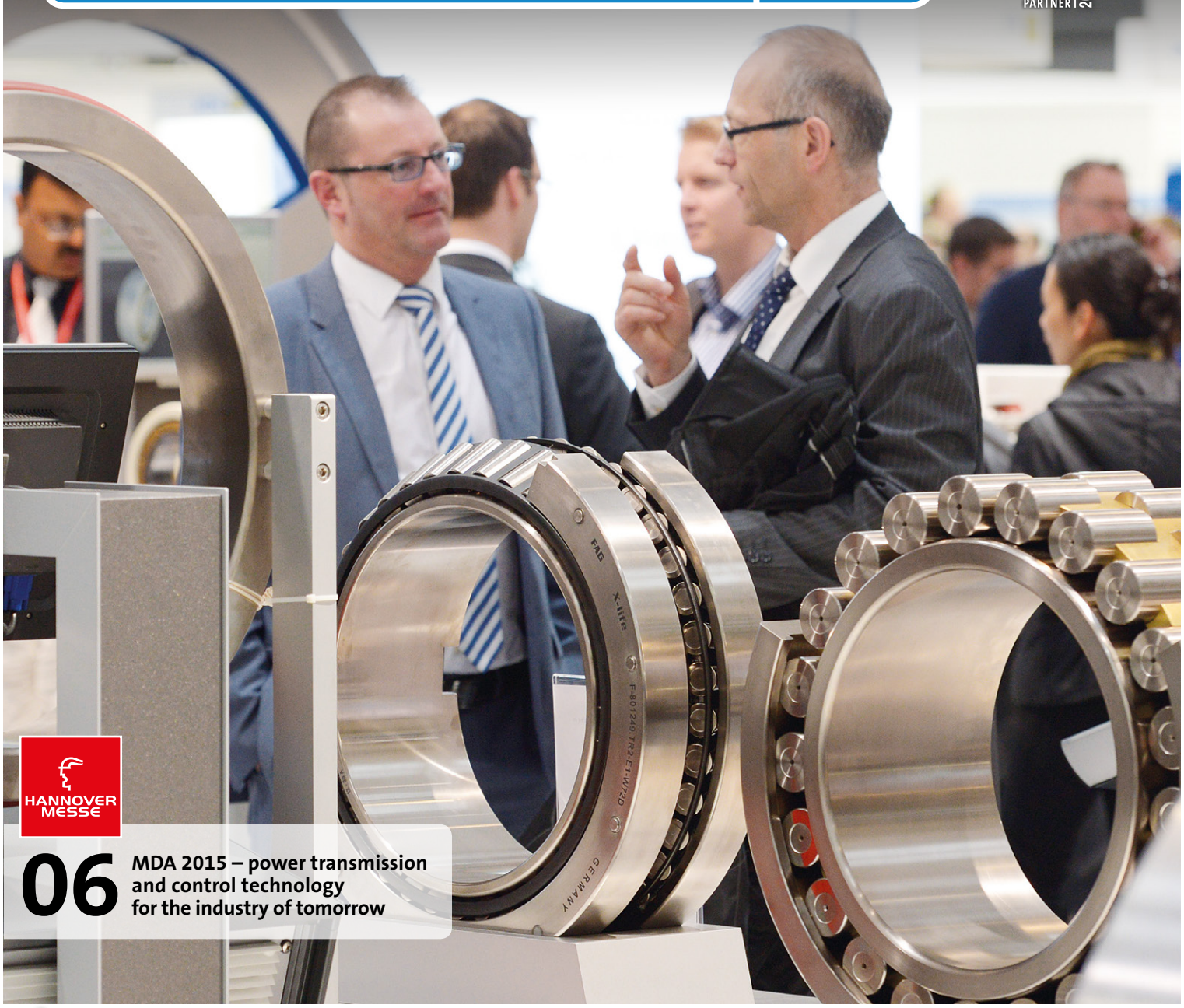
INTERNATIONAL EDITION

2

April 2015

VEREINIGTE FACHVERLAGE

MDA WORLDWIDE OFFICIAL PARTNER 2015



HANNOVER MESSE

www.mda-technologies.com

in cooperation with Deutsche Messe VDMA Fluidtechnik Antriebstechnik

Platzhalter
297.0mm x
210.0mm

At the Pole Position

Dear Reader,

World-wide, there is a great demand for German transmission and fluid technology and it ranks at the absolute top position upon international comparison. With about € 22 billion, the turnover volume of both the supplier industries is at a high level and underpins the great demand for cutting-edge technology "Made in Germany". Looking at 2015, both areas are positively poised. German transmission technology expects an increase in turnover of 2 %, German fluid technology of 5 % - Efficiency, Intelligence, Top-quality and Networking are the key concepts in the coming year.

This year's big leading trade fair MDA - Motion, Drive & Automation that takes place as the international leading trade fair at the Hannover Fair in April, will show what the future looks like and which concepts have already been realised by the development departments. The event will again be a benchmark for our sector. With the current edition of MDA Technologies, you already get a small insight into what awaits you - and that too across international boundaries. The main focus of our coverage is this year's partner country, India.

Do come to Hannover in April and take a look at automation technology. The focus here is mainly on Industry 4.0. In the past two years, enterprises have pressed ahead rapidly with research. Now it is time for concrete implementation. Here too, internationally seen, Germany is at the pole position. German enterprises will therefore be the global suppliers to factories of the future - machine tool manufacturers world-wide will benefit from this.

At the Hannover Fair you will get a deep insight into the future of networked factories – from individual Industry 4.0 capable components to total solutions for your automation requirements – so, join the Network!

Dirk Schaar
Editor-in-chief

MDA Technologies
Motion, Drive and Automation

Editors-in-chief:
Dirk Schaar, Email: d.schaar@vfmz.de
Michael Pfister, Email: m.pfister@vfmz.de

Editorial board:
Peter Becker, Nicole Steinicke, Sushen Haresh Doshi

Assistant editor:
Svenja Stenner, Email: s.stenner@vfmz.de

Design/Layout:
Conny Grothe, Doris Buchenau, Anette Fröder, Melanie Lerch, Sonja Schirmer, Mario Wüst

E-Paper Designer:
Katja Rüdell, Mathias Göbel

Managing editor:
Dipl.-Ing. (FH) Winfried Bauer

Publisher:
Vereinigte Fachverlage GmbH
Lise-Meitner-Str. 2
55129 Mainz, Germany

Managing director:
Dr. Olaf Theisen

Publishing director:
Dr. Michael Werner
Email: m.werner@vfmz.de

Advertising sales director:
Beatrice Thomas-Meyer,
Email: b.thomas-meyer@vfmz.de

Advertising sales manager:
Oliver Jennen, Email: o.jennen@vfmz.de

Sales representatives

Austria
Heinz-Joachim Greiner
Email: verlagsbuero-greiner@vfmz.de

Brazil
Carlos Frederico Graf Schaffgotsch
Email: datadress@vfmz.de

China
Oliver Jennen, Email: o.jennen@vfmz.de

France
Marc Jouanny
Email: marc-jouanny@wanadoo.fr

Great Britain
Rob Brewer
Email: rob.brewer1@btinternet.com

India
Oliver Jennen, Email: o.jennen@vfmz.de

Italy, Switzerland
Hermann Jordi
Email: info@jordipublipress.de

Poland
Dr. Miroslaw Bugajski
Email: premiummedia.mb@gmail.com

Russia, Ukraine, Kazakhstan
Natalia Hretschkova
Email: nhrethkova@ivdk.ru

Sweden, Finland, Norway
Malte Mezger
Email: verlagsbuero-mezger@vfmz.de

USA, Canada
Aryan Zandieh
Email: aryan@hfusa.com

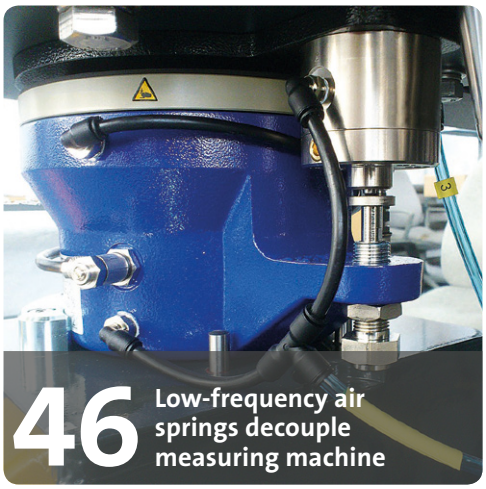
Advertising disposition:
Annemarie Benthin
Email: a.benthin@vfmz.de

In cooperation with:
Hannover Fairs International GmbH
Messegelände, 30521 Hannover, Germany

Additional Partners:
Fachverband Antriebstechnik im VDMA
Fachverband Fluidtechnik im VDMA
Fluid Power Association of India
Moskauer Deutsche Zeitung

Internet:
www.mda-technologies.com

6th year (2015)



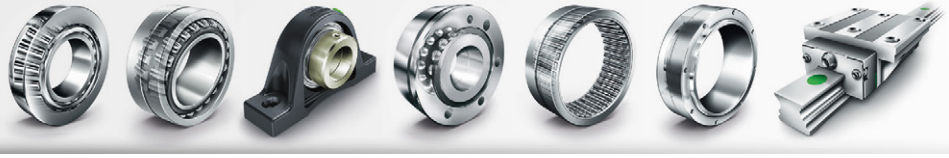
Lasts longer.

Get more value out of your machines and equipment.

Higher dynamic load ratings: the key advantage of Schaeffler rolling bearings and linear products bearing the X-life seal of quality. For product designs that deliver higher performance and machines that operate more cost-effectively, we invite you to choose from our extensive line of X-life products.

- X times longer service life
- X times greater load-carrying capacity
- X times more efficient use of space

HANNOVER MESSE
13-17 APRIL 2015
Hall 22, Booth A12



schaeffler.com/X-life

LuK INA FAG

SCHAEFFLER

MDA 2015 – power transmission and control technology for the industry of tomorrow

Is the fourth industrial revolution just around the corner? You'll find the answers to this question – and much more – at MDA 2015 in Hannover. Around 1,100 world-leading manufacturers of power transmission and control components and systems will be presenting a wide range of market ready ideas and building blocks for next-generation production systems.

The world's leading trade fair for industrial technology, Hannover Messe, is staged annually in Hannover, Germany. This year, it will run from 13 to 17 April and feature India as its official partner country. One of the leading flagship fairs that are comprised within Hannover Messe is MDA (Motion, Drive & Automation) showcasing power transmission and control technology for Industry 4.0.

Next-generation production systems

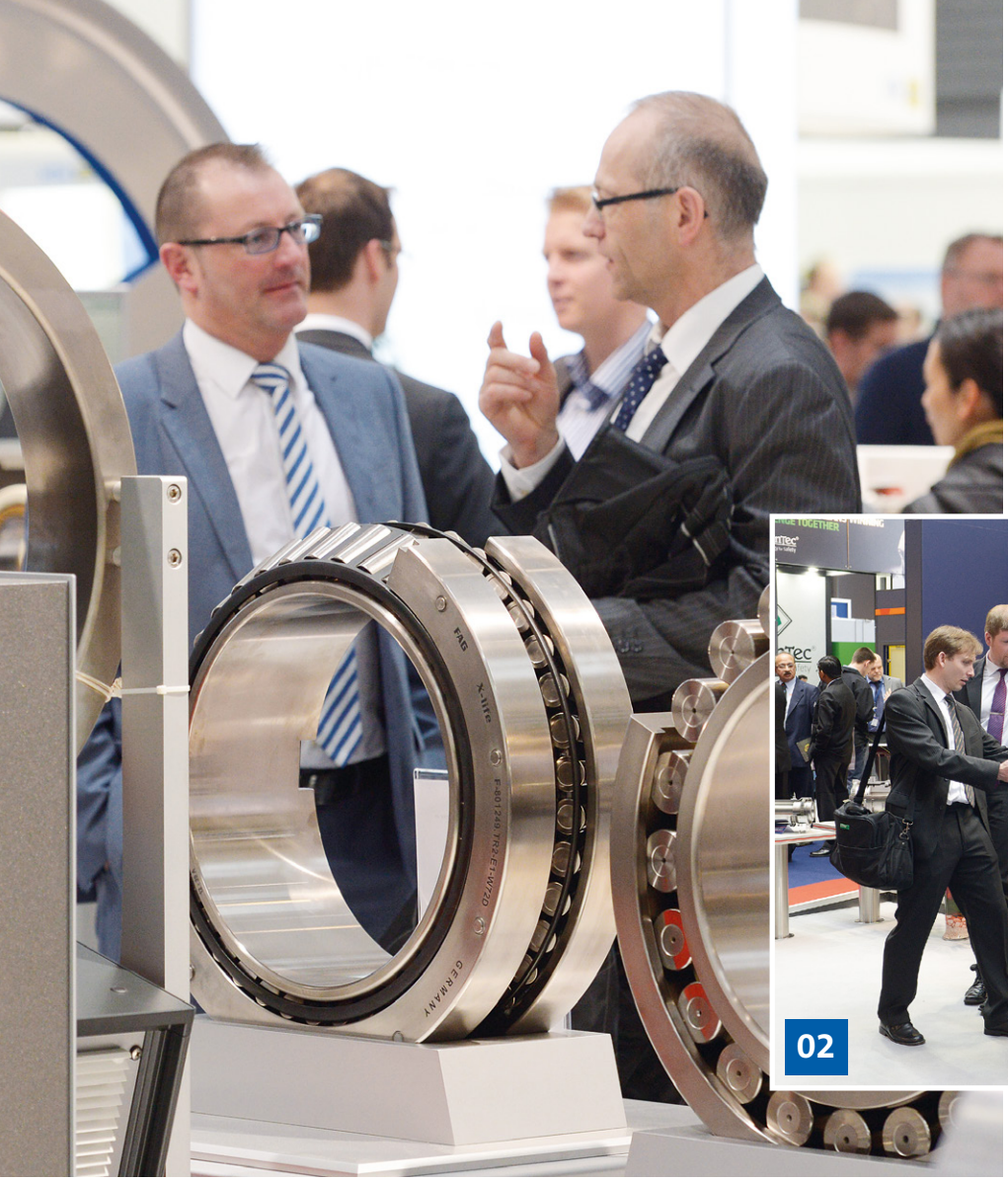
Power transmission and control technology is integral to next-generation production systems because combining drives, actuators, sensors and control units into integrated systems is the key to realizing manufacturing plants and machines that can do things like share information, monitor themselves, detect when tools are wearing out, and even self-optimize on the fly. The other part of the Industry 4.0 equation involves integrating machine components, tools and even the products they produce into overarching communication networks to create the Internet of Things.

An example of all of these things in action is Argo-Hytos, a market-leading provider of tailored, high-reliability online condition monitoring systems. Online condition monitoring involves the continuous determination and analysis of information on the status of machines, systems and system components. "The advantage of online monitoring is that it's seamless – it doesn't miss anything. The data generated by online monitoring do not represent a snapshot at some random point in time; they plot changes over time and are thus the key to condition-based predictive maintenance," says Christian H. Kienzle, Argo-Hytos' CEO and the Chairman of the Power Association within the German Engineering Federation (VDMA).

In terms of Industry 4.0, there is still uncertainty – and a great deal of debate – as to the exact form that the anticipated digital transformation might take and the effects that it might have on production, products and the overall product development process. But whatever happens, power transmission and control will have a major role in it. Hartmut Rauen, member of the VDMA Executive Directorate, explains: "As enablers of smart, efficient production processes, power transmission control technologies have an integral part to play in Industry 4.0. The power transmission and control industry is also a user of Industry 4.0. Its intelligent components are important sources of the big data that will be mined and analyzed in the connected world of Industry 4.0."

Greater ease of operation and diagnosis

Further examples of Industry 4.0 technology will be on show at the Bosch Rexroth booth at MDA. The company will be showcasing intelligent hydraulic and electromechanical drive and control systems that feature its new Open Core Interface technology. With the Open Core Interface, users and manufacturers have enhanced access to the control core and thus have the freedom to program their own individual control functions. Dr. Karl Tragl, the Executive Board Chairman of Bosch Rexroth AG: "Multiple OEMS are currently



01 Power transmission and control technology is integral to next-generation production systems

02 Combining drives, actuators, sensors and control units into integrated systems is the key to Industry 4.0

using our interface to achieve things such as integration of smartphones and tablets into their solutions for greater ease of operation and diagnosis." Bosch Rexroth also implements Industry 4.0 projects in its own production operations. It is currently running two pilot projects. "The experience and insights we gain from these projects are also flowing through into the development of new Rexroth products and integration solutions for industrial automation," Dr. Tragl said.

High-precision process control

Ideas, food for discussion, and fully developed, market-ready products and drive systems will also be on offer at the MDA display stand of Parker Hannifin GmbH. Its Managing Director, Günter Schrank, explains: "Our solutions can be used both to develop complex, self-controlling production plants from scratch and to retrofit existing plants with intelligent components to make them Industry 4.0-ready."

Parker will be showcasing a number of new developments at MDA, including a new PSD servo-controller that has an Ethernet-based interface real-time drive data transmission. Used in combination with servo drives, such as Parker's single-cable servo motors, the controller enables high-precision process control. Then there's Parker's new PAC motion control unit. Used as a central hub, it can collect all process data from a given machine and display that data on a smartphone or tablet via integrated Web publishing.

Intelligent networking

Schaeffler Technologies, manufacturer of bearing and linear drive products, will also be part of the Industry 4.0 narrative at MDA 2015. Dirk Spindler, Senior Vice President R&D Schaeffler Industrial and Member of the Management Board Schaeffler Industrial, talks about the Industry 4.0 solutions his company will be exhibiting: "One of our main focuses is on developing drive components with integrated miniaturized sensors, and we're pleased to say our first sensor bearings are ready to go into production. Another focus is on networking plant and machinery with central information systems so that large amounts of data can be shared and transferred. It's all about using intelligent networking to deliver added value to our customers".

Alongside these big names in power transmission and control technology there will be plenty of specialists and niche providers at the fair – and indeed at the closely allied Industrial Automation show. They will be presenting innovative solutions and ideas for tomorrow's flexible, intelligent production systems.

Preparing for Industry 4.0

These solutions and ideas are definitely worth a look for anyone involved in the design, construction or use of production systems and machinery. Because, although views and perspectives on Industry 4.0 vary widely, the one thing pretty much everyone agrees on is that the convergence of Internet-based data systems and smart machines will yield productivity and efficiency gains. The key is to be prepared for this in order to remain competitive – an imperative that applies both to manufacturers of industrial plant and machinery and, perhaps more importantly, to users of industrial plant and machinery, who need to act early to ensure that their production systems are Industry 4.0-ready.

www.hannovermesse.com

"German Transmission and Fluid Technology Faces Global Competition"

In April this year it will again be time: The leading international trade fair Motion Drive & Automation (MDA) presents highlights of Transmission and Fluid Technology within the framework of the Hannover Fair. German enterprises from both branches are taking part in this.
There is a great demand world-wide for premium products in German transmission and fluid technology and both branches are world leaders. Figures speak for themselves: With a total of approximately € 22 billion, the turnover volumes of both important supplier industries are at high levels; transmission and fluid technology are the largest branch segments within the German machine tool and plant construction industries. In 2014, the turnover of transmission technology amounted to about € 15.4 billion that of fluid technology was about € 6.6 billion. Both branches were up in comparison to the previous year and reinforce the high demand for cutting-edge technologies "Made in Germany".
The success is not without reason. The success criteria are efficiency, intelligence and prime quality. The service components of the transmission and fluid technology are important when it comes to performance and quality of the machines. German technology convinces with components and systems that keep consumption of resources to a minimum are intelligently tuned to specific requirements. This is crucial in international competition.
Furthermore, the high innovation level of German transmission and fluid technology is a critical success factor and this provides crucial added value for the clients. It differentiates itself from the competitors. In view of the above, investments and strong commitments by the enterprises, politics and associations in the areas of education, science and industrial cooperative research are of vital importance; it is necessary here to ensure sustained efforts.

„Criteria for success are Efficiency, Intelligence and Prime Quality

This year's leading trade fair MDA within the framework of the Hannover Fair this year offers the appropriate stage for all aspects of transmission and fluid technology, and furthermore takes up the developments of all aspects of the subject Industry 4.0 under the main theme "Integrated Industry - Join the Network". Transmission and fluid technology also plays a central role in relation to the so called fourth industrial revolution. They are suppliers and users of new technologies and, with their components, are often directly at the point where data is generated in the production process. As a result, they are in the centre of Industry 4.0.

Hartmut Rauen, member of the executive board of VDMA Verband Deutscher Maschinen- and Anlagenbau (Association of German Machine Tool and Plant Construction Industries), Frankfurt

Continental
The Future in Motion

Precision
of the highest degree

Reduced emissions, lighter, more environmentally friendly – as a specialist in all types of hose lines, we open up new prospects with our innovative prowess when it comes to vehicle construction and mechanical engineering. Together with you, we develop hoses, lines, and custom-fit connections that are pioneering in the field of material and process engineering. Clean solutions for strong machines – from the idea to production readiness. ContiTech Fluid Technology.

ContiTech. Engineering Next Level

Fluid Technology
Phone +49 6039 990-0
mail@fluid.contitech.de
www.contitech.de

HANNOVER MESSE

Hannover Messe,
April 13-17, 2015
Booth B18 in Hall 25,
Booth F18 in Hall 6

ContiTech

India rolls out the red carpet to investors and industries

Sushen Doshi

#Hannover Messe #India – Partner Country #Modi #'Make in India' #Larger Integrated Networks. Smells like one spicy recipe. Come taste it...in Hanover, Germany April 13-17.

The Ministry of Finance, Government of India forecasts the GDP growth for the year 2015-16 to be between 8-8.5 %. This provides a great opportunity for the companies from Germany and other countries as well to enter and expand into the Indian markets. This year, having India as the partner country for the Hannover Messe provides the perfect chance for the exhibitors and the visitors to interact and tap the tremendous growth potential that India has to offer. Every year at the Hannover Messe there has been a decent representation of the Indian business community mainly from the SME's. But this year after the arrival of the new progressive government led by Prime Minister Modi, the sentiment in the business community is very positive and growth hungry. The purpose of Modi's visit to Germany is mainly to boost trade, technology and research co-operation with German government and the Industry. With India as the partner country and arrival of PM Modi at the Hannover Messe inauguration will hugely expand the number of Indian visitors.

Author: *Sushen Doshi, editor, MDA Technologies*

Make in India

Apart from the high growth forecasts and enormous market potential, there are more factors why India is an attractive destination for German Businesses. One of the factors being the 'Make in India' campaign launched by Prime Minister Modi himself. From agriculture to automobiles, from satellites to submarines, from paper clips to power plants, whatever you want to make: Make in India. This is definitely a great initiative that is attracting the foreign companies to Invest in India. This increase in the size and volume of manufacturing sector is stimulating the need to modernize the machinery and the plant equipment. To meet up with the increased production demands, the larger and medium scale companies are focusing more and more on high end equipment and automation

Along with manufacturing, the infrastructure and the housing sector are expected to grow rapidly as well. The government is undertaking and sanctioning a large number of infrastructure projects to cater to the infrastructure needs of the industry.Therefore the demand for machinery and construction equipment is also huge.

Ease of doing business

Another important factor which makes India a special place for businesses is the drastic improvements being made on 'ease

of doing business'. Again under the flagship of PM Modi, the government and its bureaucracy are reducing the documentations and out dated processes that were a hindrance and a major cause of project delay and cost escalations.

The Indo-German business summit at the Hannover Messe 2015, has significant focus on the Indo-German bilateral trade and transfer of the high end technology, which will be a major component of the future bilateral trade as well. Keeping in mind this aspect the 'Embassy of India' has commissioned a report that showcases the prospects of Indo-German collaborations in high technology manufacturing. This report to be launched by PM Modi and Chancellor Angela Merkel, recognizes the need to create awareness on both the sides that will allow for easier trade in dual use and sensitive technologies, and also the in-depth understanding of the each other's requirements.

Expectations from the Hannover Fair

The expectations of the Indian Industry has changed a lot in the last few years. The businesses in India realize their role of being an active partner in meeting the global industrial supply of goods and services. Majority of the Indian delegation at the Hannover Messe are aiming to grow their businesses by partnering with new customers on product improvements and developments. At the same time, with the existing customers they want to grow the business by broadening the product base and supplying the superior value addition to their existing products. A significantly large number of Industries are looking keen to invest on research and innovation as well. This will enhance the value perception of its products on a global scale. Along with the European markets, they are targeting newer geographies to increase the global market share of their products. They want to further strengthen their exports and prove their abilities in all areas from high tech research to international marketing of their products. Like Germany, Indian industry has a very large number of family run businesses that are now determined and well prepared to adapt and adjust to the increased expectations and the needs of the international markets. A lot of Indian visitors arriving at the Hannover Messe, will also be interested in hunting out the products for the huge domestic market.

India also expects to make significant developments in the field of manufacturing 'high value added electronic components'. At Hannover Messe by collaborating with their German and global partners, India would definitely want to shift gears in order to bridge the significantly large demand-supply gap.

The Indian industry is not only seeing the Hannover Messe as the opportunity to increase its global presence, developing and creating international networks. But more importantly, a lot of companies will be aggressively seeking technology collaborations, business tie-ups and research joint ventures over the medium term.

Outlook

With more than 250,000 visitors expected to arrive, Hannover Messe is the largest Industrial fair in the world. In 2006, India was the partner country at Hannover Messe. This generated the business to the tune of $1.3 billion and a number of major MOU's and Joint Ventures were signed with large private and public sector companies. But with all the changes and reforms occurring in the Indian side, there is no doubt that the businesses generated are going to be larger and the collaborations formed are going to be stronger than ever before. In Hanover we will for surely see that the India is – ready to integrate the industry – ready to join the network.

Photographs: *ornaments fotolia*

www.makeinindia.com

At the launch event of Make in India campaign in September 2014 pledging his support to the initiative, Mukesh Ambani, Chariman of Reliance Industries said: "This is a historic day for the Indian manufacturing industry. We commit ourselves to the Make In India. In order to succeed in this campaign, it was important to be open to capital and expertise from all over the globe." Ambani, also announced that Reliance Industries would create 125,000 jobs in the next 12-15 months.

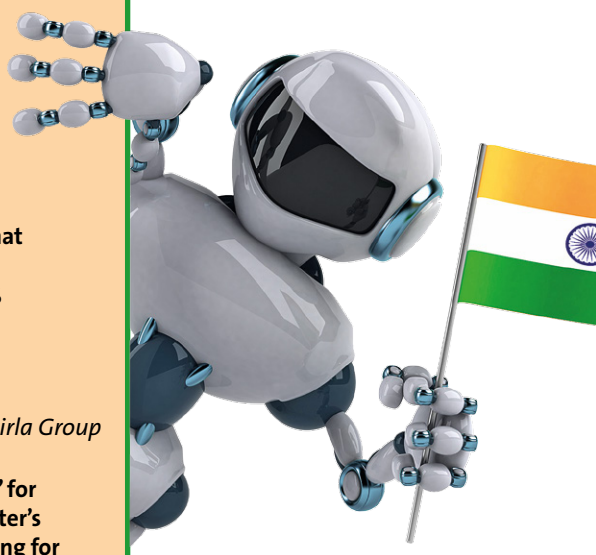
Mukesh Ambani, Chairman and Managing Director, Reliance Industries

Exuding confidence on India's competitiveness, Kumar Manglam Birla said: "India has come to be known as global IT hub and reservoir of intellectual capital. It's high time that India becomes a preferred center of choice for manufacturing for global companies." Currently the share of manufacturing in India's GDP is low at 16 % as compared to 36 % in China, and 22 % in Germany."Quite clearly in manufacturing we have lot of catching up to do. We need manufacturing to put the economy into a higher growth trajectory and to create millions of jobs."

Kumar Mangalam Birla, Chairman of the $ 40 Billion Corporation, Aditya Birla Group

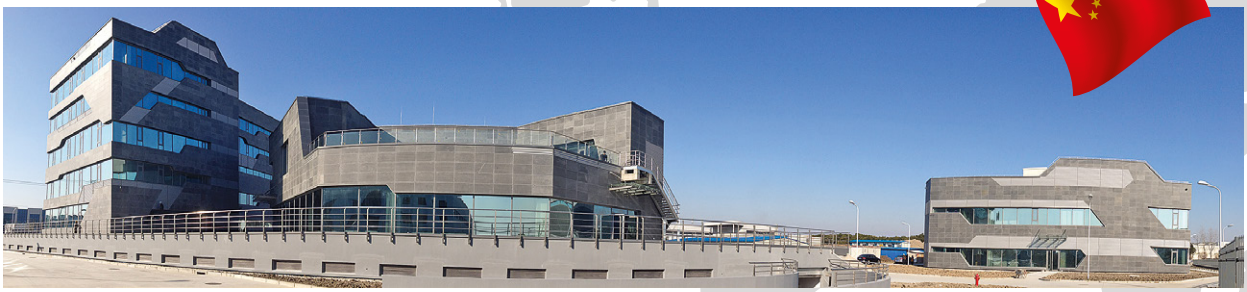
"Ikea is well positioned, not just to 'Make in India' for India, but to 'Make More in India' for Ikea worldwide," .The company's sourcing plans "resonate with the Indian Prime Minister's Make in India agenda. "We believe there is tremendous potential in India. We are looking for new suppliers who share our vision and values, are willing to grow with us and become world class suppliers." Ikea, which has proposed to invest € 1.5 billion in India over a few years, has 45,000 direct employees and 400,000 in its extended supply chain.

Sandeep Sanan, Head of Sourcing at Ikea South Asia



Worldwide News

Klüber Lubrication opens new R&D center in China



In Qingpu, close to Shanghai a new state-of-the-art research and development center, as well as administration and training facilities, have been commissioned by Klüber Lubrication and Chem-Trend. Both companies are Business Units of Freudenberg Chemical Specialities. Over the course of three years it is planned to invest more than 18 million euro into the entire expansion project for the 2008 inaugurated site. As a next step, Freudenberg plans to expand the manufacturing facilities for speciality lubricants, release agents and process aids. An extended warehouse and bulk storage capacities are also planned. By the end of the expansion, the Qingpu site will have an area of some 66,000 square meters. "Customer proximity and customer service have always been at the core of our successful development in China to date. The new R&D center will enable us to even better meet the ever-increasing demands of our local customers for cutting-edge innovations and technology", expressed Hanno D. Wentzler, Regional Representative Asia of the Freudenberg Group and CEO of Freudenberg Chemical Specialities

www.klueber.com

Pirtek designates Thiehofe as second managing director

Michael Thiehofe has newly joined the managing team of Pirtek Deutschland GmbH as the second managing director. There, he will control the company's activities in Germany together with the previous managing director Dipl.-Ing. Bernd Weber in future.
Since 2007, Thiehofe had been managing director of SMS Mevac, a company of SMS group. SMS Mevac is responsible for the global delivery of plants for steel refinement. In Mid-2014, Thiehofe came to Pirtek Deutschland GmbH. Pirtek has more than 60 sites and 250 mobile workshops in Germany by now. This January, the company expanded to Austria.

www.pirtek.co.uk

Turkish Machinery at Hannover Messe 2015

Sevda Kayhan Yilmaz, member of the board, Turkish Machinery

Turkish Machinery will exhibit again at the Hannover Messe. What will be the topics?

We will be exhibiting at two booths. Our main booth will be in Hall 5, D36. The other booth, the booth of our colleagues from Turkish Pump and Valve Manufacturers will be in Hall 15, F51. As you know, the main goal of Turkish Machinery is to improve the sales of Turkish machineries and accessories all over the world. We are proud to say that Germany is slowly becoming our second homeland. Our partners from all over Germany are very hospitable and we always look forward to coming to Germany. Since we are a union and representing all 5,000 companies, our topic is always: "United, we stand stronger". Moreover, we would like to consider our German friends and partners in this synergy. We are able to serve every single company looking for the right partner in both Germany and Turkey. We will also be emphasizing that Turkey is the 16th largest economy in the world and 6th biggest machine manufacturer in Europe.

What can the Turkish companies offer for the German market?

The machinery industry in Turkey is aware of high quality. We are using German standards and regulations. A high percentage of the staffs working in Turkey had their education in Germany. At the moment, Turkey has only share of 2 % from German import figures in the machine industry. We are not satisfied with this trade volume. We believe that Turkey should mean more than a market for Germans and you should not ignore Turkey as a perfect manufacturing partner. Besides trading between German and Turkish companies, cooperation is also another opportunity for both countries. There are Turkish companies who are looking for cooperation as Joint Ventures, technology transfer, investing in other countries. In the last years, Turkish companies made a lot of effort in eco-friendly products and optimization of energy efficiency. You will see these developments during Hannover Messe.

What awaits the visitor by coming to your joint booth?

Due to the importance of the Hannover Messe, our President, Mr. Adnan Dalgakiran will attend to the fair. Five board members will be in Hannover. More specificly, Turkish Pump and Valve Manufacturers Ass. will have a special booth at Pump Plaza, in Hall 15, F51. You can meet and discuss deeply about Industrial Automation, Hydraulics and Pneumatics and Machine Tool experts as they are representing their associations in Hall 5, D36. The visitors of our booth will have the opportunity to get information about Turkish machinery market directly from the authorities. We will also have a lot of informative materials at our booth – visitors will be able to take information with them for further evaluation. Furthermore, we would like you to experience Turkish hospitality Turkish coffee and Turkish tea!

www.makinetanitimgrubu.com

Worldwide News

Continental concludes Veyance acquisition

Continental has concluded its acquisition of the U.S. rubber company Veyance Technologies Inc, of Fairlawn, Ohio, on January 30. On January 29, the Brazilian antitrust authority CADE (Council for Economic Defence) cleared the transaction with certain conditions, thus providing the approvals necessary for completion. International automotive supplier, tire manufacturer and industrial partner Continental is boosting its worldwide industrial business with this acquisition, which is the most significant acquisition in recent corporate history. The transaction is valued at € 1.4 bn.

www.contitech.de

Schaeffler constructs new European distribution center

Schaeffler AG will be investing around € 200 m in the expansion of its European distribution network, which will include the construction of a new European distribution center (“EDC Mitte”) in Kitzingen. Construction of the EDC Mitte, to which an investment of around € 150 million has been allocated, is set to begin in the first quarter of 2016. The start of operation is planned for the autumn of 2017, and the EDC Mitte will have up to 250 employees. In addition to the Kitzingen location, the European distribution network will also include locations in Sweden and Italy, while a further location in Western Europe is also planned. The construction of the European distribution center is one of the 20 initiatives that make up the “One Schaeffler” program. The aim of the project is to modernize the group’s logistics activities – particularly with regard to industrial business – and to optimize existing processes and significantly increase delivery speed.

www.schaeffler.com

HAWE plant in Kaufbeuren passes EHS audit

Hawe Hydraulik SE, Munich, had its new plant in Kaufbeuren undergo a first external EHS audit (EHS: Environment, Health, Safety). The audit was undertaken by an external certification agency, Intechnica Cert GmbH from Nuremberg. The Kaufbeuren site was examined pursuant to the environmental management standard ISO 14001, the energy management standard ISO 50001 and the occupational health and safety assessment system OHSAS 18001.

www.hawe.com

Business start of Ringspann Nordic

In order to offer Nordic customers better service and to grow business in North Europe, Ringspann GmbH has set-up a new subsidiary. Ringspann Nordic AB will cover Sweden, Finland, Denmark, Norway, Iceland and the Baltic countries. Product groups will include Power Transmission, Workholding as well as Remote Control Systems. The new company has started operation in January. Its office and warehouse are located in Trosa, Sweden, around 70 km south of Stockholm.

www.ringspann.com

Vacon to open a sales office in Turkey

The global AC drives manufacturer Vacon will strengthen its market position in Turkey and ability to offer customer-driven services there by opening a sales office in Istanbul this November. Turkey is the 31st country where Vacon will establish an office of its own. "Vacon has already been present in Turkey for many years via its distributor, installed base and strong after-sales support.

Now the time is ripe for us to establish a sales office of our own and grow our existing network," says Emre Gören, Managing Director of Vacon Turkey. Vacon's own office in Turkey is a clear sign of the company's determination to further strengthen its foothold in the country. The Turkish AC drives market has a good growth potential. The major business areas in Turkey for Vacon are the construction industry, infrastructure, shipbuilding, and energy efficiency applications.

www.vacon.com

Bottom-up rather than top-down!

Now it has been awarded, the so-called "4th Industrial Revolution". A broad alliance of federal government and leading associations are promoting the debate on the future of the industry. The current hype may seem a bit surprising. Why the fuss? IT has established everywhere over the past thirty years. But what is so new about this phenomenon, that it deserves to be called the next „industrial revolution"? The excitement is due to the fact that transfer rates and processor speeds are now performing on levels at which they can be usefully employed in interconnected industrial processes. Not long ago, industrial robots were considered "lone wolves", for example, setting welding spots on cars. Today, they can communicate with one another and automate the entire value chain, without human intervention.

But production cannot be viewed as a closed circuit. Especially in Germany's medium-sized industrial culture, production is not possible without independent suppliers. Germany has benefitted from it and has reached high levels of productivity. Having independent entrepreneurs as car seat- or muffler-manufacturers, for instance, they will by nature act economically. It is in these manufacturers' own interest to optimize the intermediate step in the production, for which they are responsible. So, if many individual profit centers are bound together like beads on a string – optimal production is not the result of a "big umbrella strategy". Their interaction with the other parts of the system is constantly re-balanced. For such actors, the new communication strategy – meant to convince them that "Industrie 4.0" is a good thing – seems strange. Entrepreneurs know what is best for their companies.

Hannover Region offers the best examples of this successful collaboration. Many companies are working in the automotive sector, for example, as suppliers to Volkswagen and others. But similar structures can prove to be beneficial in medical devices or renewable energy here. The region offers its experience to individuals from outside who are interested. More information: www.industry4you.de.

Two risks

At the same time, all parties are aware, that any kind of change also poses risks. But where are they in "Industrie 4.0"? Here, history provides an illuminating insight. Konrad Zuse, a German, developed the very first computer. Thus, we cannot say that Germany missed a trend with regard to that revolutionary technology. But who dominates today? Apple, Microsoft, Amazon and eBay - all US firms. Formerly small, innovative entrepreneurs with a good idea and perseverance have created products and companies that dominate the world. And why? Because, an innovative process cannot be ordered "from the outside". After all, inventions "simply happen". Government programs can indeed provide an impetus, but they should not patronize entrepreneurs and innovators in small and medium-sized enterprises.

Bring players together!

The IT sector, in particular, is full of such stories. Trendsetters of the past are now the standard-setters. And the term "standard" is a keyword for the second big risk. Each of us is familiar with the difficulty of differing software, for example between Microsoft and Apple. A highly networked process chain in the industry cannot tolerate inconsistencies, as we do when we are forced to use a graphically distorted presentation simply because it was created by a different program to that on the presenting computer. Co-operation requires standardization. Standardization is already so optimized, that identical engines are even installed by different car-manufacturers and in different models.

Today's automated process chains are still far from being a standard. Who can blame SME's for being reluctant until an industry standard has been established? For the time being, it is too risky, for many suppliers, to focus on standards for a specific customer while another demands different ones. This is precisely the reason, why SMEs in particular stand hesitantly on the sidelines.

"Industrie 4.0" aims at resolving this balancing act. Large companies must rely on SMEs and the latter's leading role. It is not about small and big players; all must act on equal footing. Small and medium-sized enterprises should not be annoyed by this. The Economic Development Corporation hannoverimpuls is aware of its role as a mediator and actively accepts the tasks involved. With its large network, not only in the region but also internationally, it brings important players together, while always maintaining creative freedom.

Photographs: *teaser fotolia*

www.hannoverimpuls.com

hannoverimpuls

Dr. Christian Brömer, hannoverimpuls GmbH

WE KEEP YOU AHEAD OF THE COMPETITION




Julian Massler (21)
Bronze medal at the
Junior European Championships 2011
Sponsered by ARGO-HYTOS

Fluid power technology for success

Innovations and intelligent system solutions combined with flexibility and productivity – ARGO HYTOS sets new standards in all areas of fluid power technology.

We support young talents in sailing on their road to success. This is also the way our customers experience us: As an active partner – for more than 65 years.

ARGO HYTOS

ARGO-HYTOS GMBH · Industriestrasse 9 · 76703 Kraichtal · Germany · Tel. + 49 7250 76-0 · info.de@argo-hytos.com · www.argo-hytos.com

Schaeffler India – Focus on industry

India, the partner country for 2015's Hannover Messe, has plans to significantly strengthen its industrial sector in the future. This means that a major new market for mechanical engineering will be opened up. We sat down to talk with Schaeffler managers Dharmesh Arora and Rajendra Anandpara.

01 Dharmesh Arora, President and CEO Schaffler India and Presdient Automotive Schaeffler India

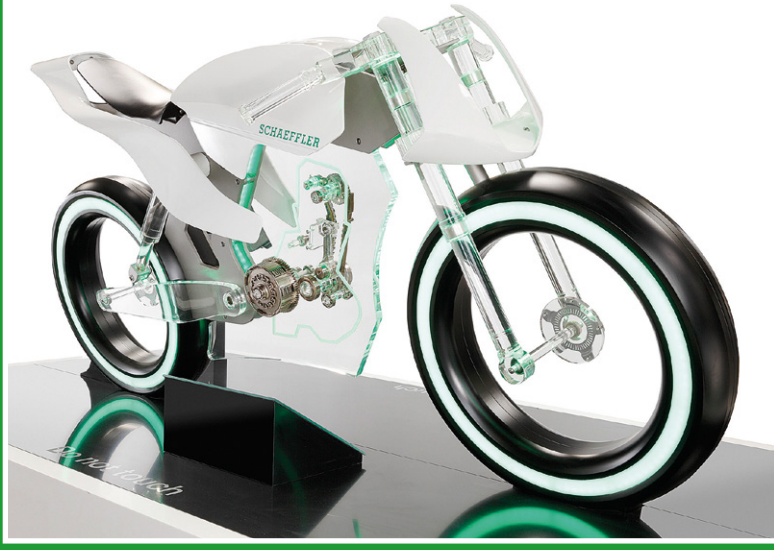
02 Rajendra Anandpara is responsible for all of Schaeffler's industrial activities in India

What stage has India reached in terms of its economic development?

Arora: India has great potential for development – and it has done for a long time – but this has never yet been fully realized. While it is true that India's economy has experienced growth rates in the single-digit range over the last few years, the spirit of optimism that is now taking hold once again has only come about since the new government came to power in mid-2014. Economy and investment are among this government's core priorities, and that gives us all confidence that we will indeed be able to realize the potential that this country has to offer. I am convinced that we will be able to achieve significantly higher growth rates over the next few years.

Will India become an industrial nation in the future?

Arora: The fact that the Modi government is focusing strongly on the industrial sector can be viewed as a positive aspect – not just for Schaeffler but for the country as a whole. When it comes to creating jobs for six to eight million new employees a year, only the industrial sector is up to the task.
Anandpara: Here is a specific example: We have invested around € 150 million in India over the last few years, including a new plant in Savli. This plant produces generation-C ball bearings – some of



03 With the Generation C ball bearings, Schaeffler is dedicated to the Indian two-wheeler industry

which are for the domestic two-wheeled vehicle industry – and large-size bearings for wind turbines according to the same quality standards as Schaeffler's plants in Europe. Thus far, this has allowed us to create more than 160 jobs in Savli alone.

So how can you, as a mechanical engineering company based in Germany, profit from this?

Arora: For a start, Schaeffler has been active in India since 1962. We have five locations in the country, which are run by Indian managers, so we are fully justified in considering ourselves an Indian company.
Anandpara: We profit immensely from the investments being made in the country's infrastructure and the measures being taken to promote domestic production. It all starts with the base materials: India is already the world's second-largest steel producer with an output of around 100 million tons, and there are plans to double this capacity by 2020, even triple it by 2025. Many of this industry's rolling mills even include Schaeffler bearings as part of their original equipment. Business in the replacement part and service sector now also promises significant potential. We ensure the maximum availability of the machines and equipment here, and this is a model that we also plan to implement in other processing industries.

Urbanization in India is in full swing – what contribution can Schaeffler make to solving the problems that this brings with it?

Anandpara: Mobility represents a major challenge for all fast-growing metropolitan areas – one that can only be overcome by increasing the amount of public passenger transport available. That is what is happening here right now: After you touch down at Delhi International Airport, you can be at Connaught Place in the center of town in less than half an hour thanks to the city's metro system. The wheelsets used in the trains are a core design element and are supplied by Schaeffler. However, we also mustn't forget that a considerable proportion of our growth comes from the development of small villages, where living conditions are also improving and people's expectations are therefore going up.

How is the company developing its expertise in conventional mechanical engineering?

Anandpara: India's mechanical engineering sector, like that of Germany, is very much shaped by family-owned companies. Until now, it has been heavily focused on the domestic market, but the level of ambition is going up along with the level of expertise. Our own Special Machinery and Tool Shop departments illustrate this point: We have been able to bring more and more expertise to India over the last few years, and this process is still continuing.
Arora: In-depth discussions are currently taking place in Europe about how production and the digital world can be brought together. India's expertise in the IT sector is undisputed, and thanks to multinational companies like Schaeffler, manufacturing expertise is also available locally.

Can we expect large-scale product development to take place in India, rather than the country simply becoming a factory for the rest of the world?

Arora: We are already on the way to achieving that. For example, we assumed worldwide development responsibility for small motorcycles and tractors for the entire Schaeffler Group in 2014. We are doing this in order to follow the market, because India – with an annual production of around 20 million units – is by far the world's largest motorcycle market, and it continues to grow. The same is true for tractors with an output of up to 50 horsepower. It is important to understand here that, in both cases, India's OEMs are globally active and do not focus solely on the domestic market.

One cause for concern among foreign investors could be employee qualification. How do you deal with the challenge of personnel growth?

Arora: Firstly, let me point out that India is a young nation, and one in which demographic change is still just beginning. The country also has a good system of training in place, even for the engineers and specialists who are so urgently needed.
Anandpara: That being said, every company has to ensure that it provides continuous qualification measures for its employees and specialists. We have set up a comprehensive exchange of expertise that allows us to work to the same technical standards as our colleagues in Germany. After all, it is not enough to simply install modern machinery here – the people involved must be able to work with it.

What is the business culture like in India today?

Arora: This is also an area in which the last 25 years have seen major changes. When I started out, value added chains were still not understood – every company did everything independently. Strictly speaking, there were no suppliers and no supplier industry. These sectors are well developed nowadays, and this is not just because a large number of international companies like ours have established themselves here.
Anandpara: The new government is planning to clear the remaining obstacles that stand in the way of investment – such as the acquisition of land and employment of workers – without the need to compromise our democratic constitution. So you can see, it pays to be active here.

www.schaeffler.com

About

Company name: Schaeffler Technologies
Brands: INA, LuK and FAG
Headquarters: Herzogenaurach, Germany
Turnover: € 11,2 bn (2013)
Employees: more than 80,000 worldwide
Products: Rolling bearing and plain bearing solutions, linear and direct drive technology, as well as high-precision products for the automotive industry

Safety clutches – drive technology for low temperatures to -48 °C

Simone Winkler

With daytime temperatures of well below 0 °C, machines and components at raw material production facilities in Siberia and Mongolia face enormous challenges. Mayr has now developed its element clutches in such a way that they are now also suitable for use at very low temperatures. Tests have proven their functionality at low temperatures of -48 °C.

Simone Winkler (M.A.): *public relations, Mayr Antriebstechnik in Mauerstetten*

Your breath freezes and crackles, the snow underfoot crunches when walking as if crossing over broken glass, and truck motors run continuous from October to April, day and night, otherwise they would freeze. In Siberia, the extreme cold controls a lot of everyday life, as temperatures plummet to -50 °C during the nine winter months. Not only are the coldest inhabited areas on earth located in Siberia and Mongolia, it is also one of world's richest areas in raw materials. Machines that are used to mine and process raw materials, such as coal and ore, are exposed to extreme conditions. Cold-resistant constructions are required. "For high-strength and fully hardened components, low-temperature embrittlement increases the risk of components breaking and there is hardly any technical information available on reliable theoretic designs of components," explains Helmut Kleinheinz, Sales Manager at Mayr

01 The EAS element clutch was successfully tested on an inertia dynamometer at low temperatures and harsh operating conditions

02 The adjusted construction of the specially-designed EAS element clutch guarantees overload protection even at very low temperatures of down to -48 °C

Antriebstechnik. "This means that use in areas with low temperatures must always be critically assessed. Reliable statements regarding suitability can only be made if the constructions are also tested under the expected conditions of the specific applications."

Adjusted for the extreme

EAS quality and overload clutches from Mayr are made of high-quality material as standard and have hardened functional surfaces, which is the only way the required release accuracy and durability can be achieved. Like all of the other standard clutches available on the market, they are not designed for use at extremely low temperatures. To still be able to provide its customers with reliable, technically safe products for extreme conditions, the company has now developed a low temperature design and completed comprehensive practical testing. "We have extensive specialist knowledge when it comes to development and construction and have access to the latest and unique testing facilities," explains Helmut Kleinheinz describing the prerequisites of the clutch specialist. These tests enabled the EAS element clutches to be modified in such a way that they could withstand extremely low temperatures with the same level of robustness.

Unlatching in climate chamber

Mayr Antriebstechnik has a wide range of testing facilities ensuring all of its products undergo extensive functional testing. "For use at low temperatures, the modified EAS element clutch (size 0) was tested at -48 °C on an inertia dynamometer with a connected climate chamber," explains Günter Hable, a design engineer at the family run business in Mauerstetten, Germany. The clutch was set at a torque of 2400 Nm and was able to withstand 100 high-speed overloads without any damage. To ensure that the climate chamber was closed at all times, the clutch was re-engaged automatically using an integrated pneumatic engaging device. This engaging device was used to consciously simulate operating errors to additionally initiate as many impact loads on the components as possible. Application errors are, for example, generated by re-engaging at a differential speed, i.e. during the phase-out period when the clutch has already been triggered. During use at low temperatures, it must particularly be ensured that the application as a whole is taken into consideration to guarantee the correct connection of the overload clutch to the drive train. At very low temperatures, thread-specific characteristics in particular can cause a massive additional burden. This is why risk and application testing is always completed with the customer at the plant in Mauerstetten.

Overload protection for low temperatures

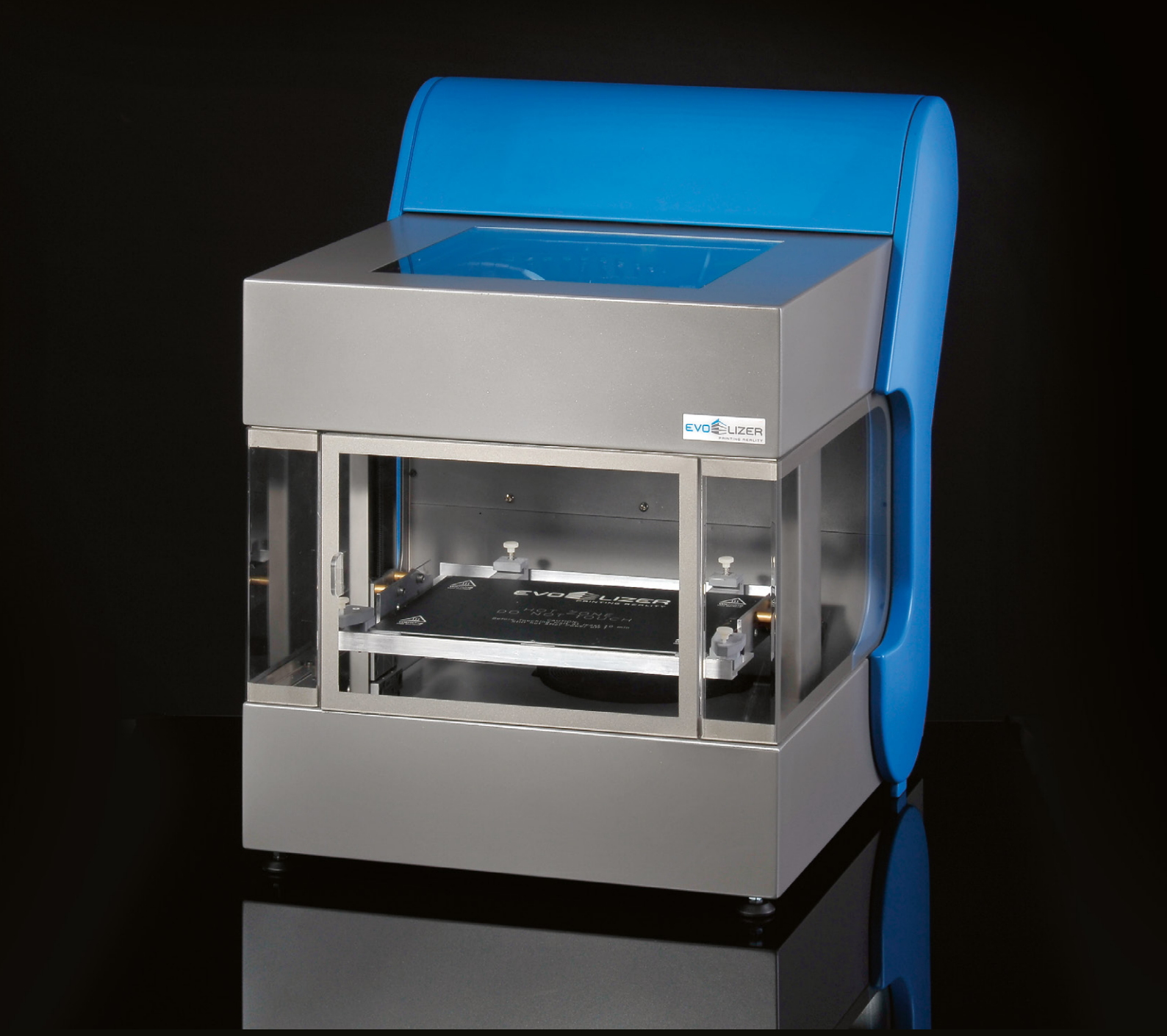
The tests in the climate chamber prove that the special design of the EAS element clutch is suitable for use at very low temperatures down to -48 °C. These safety clutches generally use individual elements to provide overload protection for drives with very high torques within a compact space. They are suitable for limiting the torque on heavy and high-speed drives and ensure that large centrifugal masses can phase out freely in the event of an overload. During normal operation, positive locking EAS element clutches accurately transfer the set torque without any backlash and ensure exact shutdown accuracy in the event of an overload.

Photograph: *Shutterstock/Vladimir Melnikov*

www.mayr.com

About

Company name: Mayr GmbH
Headquarters: Mauerstetten, Germany
Employees: ca. 1,000 worldwide
Products: Torque limiting clutches, safety brakes, shaft couplings



3D printing plates glide smoothly

For both, rapid prototyping or mass production – 3D technology provides fascinating options. Linear and drive technology, plain bearings and energy supply systems from Igus are used in wide range of kits and plans. Design engineers for 3D printers for professional use rely on fully installation-ready linear glide solutions for lubricant-free and low-noise operation.

Very slowly and quietly, the print table moves from top to bottom: the vase emerges layer by layer until it assumes the exact shape of the digital model then the 3D printer releases the product. The components of the EVOlizer 3D printer from the start-up company EVO-tech GmbH, Seewalchen/Austria, need to work with extreme precision to make such delicate artisan structures. Printing is performed based on the fused filament fabrication process (FFF). This involves melting thermoplastic fibres in a heated nozzle, which are then layered on the print table in X and Y direction by the print head. Lowering the table in Z direction causes one layer of the plastic filament to be deposited

onto the next until the object is complete. During this process, the plate structure only moves a tiny distance, in increments of a tenth of a millimetre. In order for the print table to accurately glide from top to bottom with little noise, Markus Kaltenbrunner, design engineer and CEO at EVO-tech, used components from the drylin product range from Igus: "I started out by making my own linear solution using the guide rail, carriage, lead screw nut, and lead screw as individual components. Since then, the EVOlizer uses the entire, ready-to-install fully assembled drylin SLW linear leads screw unit." Among other issues, the key to selecting Igus linear plain bearings is their low operating noise. drylin components glide quietly and vibration-free because there is no mechanical rolling action between hard friction partners, as is the case with metal or ceramic balls. This was an important criterion for EVO-tech since the company wanted to develop a 3D printer for the immediate working environment. The compact desktop 3D printer was developed for architects, prototype builders, and small series fabricators as target groups. The printer can be used to produce demonstration models, prototypes, and small volume series. EVO-tech has therefore positioned its 3D printer exactly in the middle between home-made 3D printers for personal use and large 3D printers for industrial applications.

Lubricant and maintenance-free plain bearings inside

In addition to quiet operation, the quality of the produced objects is important for professional applications. For instance, lubricants can contaminate the raw material or the printed product. Because solid lubricants are integrated into the raw material, Igus high-performance polymer plain bearings completely avoid lubricants. This eliminates any contamination risk. In addition, the dry-running properties render the 3D printer maintenance-free and decrease the likelihood of malfunctions. Other factors, such as acceleration and positioning accuracy also play a role in moving components in 3D printers. These allow detailed features of products to be accurately reproduced based on CAD models. Regardless of travel, smoothly operating drylin linear plain bearings and lead screw units can be used with slow as well as high accelerations.

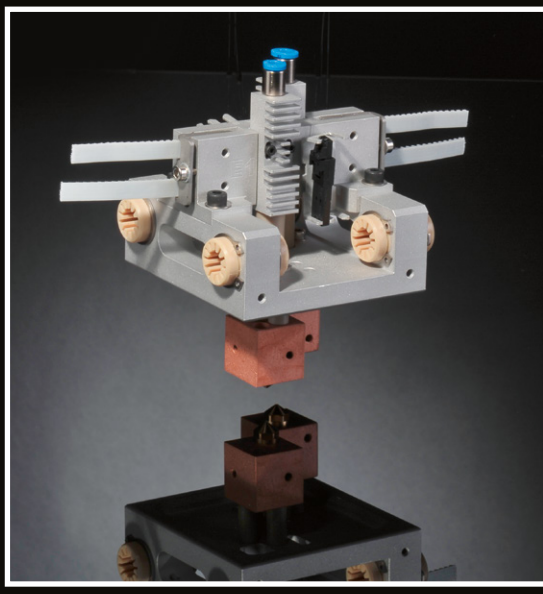
Regardless of whether the extruder head is moved from left to right, forward or backward, or the plate structure is moved from top to bottom – Igus provides a complete construction kit that contains profile rail guides, linear units with lead screw drives or toothed belts, and even complete linear axis including the motor. Designers have access to five drylin linear technology type series. The flexible construction kit provides various sizes and widths, therefore giving developers unlimited options: the drylin W linear guide system alone includes 14 different profiles and 50 carriage versions. The compact linear shaft guides of the drylin R type series are particularly suited for guiding the print head since they do not damage the axis and have very low bearing clearance. Due to its small installation space, the drylin N low profile linear guide system can be installed for Z-axis height adjustments. It has particularly low profiles in various widths. The carriages on all drylin guides operate without lubrication. Due to high wear-resistant polymers and their special geometry, the linear units from Igus are very rugged and promise long service life. Moreover, the compact solutions for the 3D printing industry represent a cost-effective alternative to conventional guide systems.

Everything from a single source

In addition, Igus energy chains ensure that connected cables are reliably guided during the computer-controlled printing process. Due to their low profiles and tight bending radii, products from the micro-chain series are particularly suited for confined installation spaces in 3D printers for dynamic applications in any direction of travel. As is the case for linear bearings, micro-chain series also feature very low weight. The chainflex control and motor cables guided in these are specifically designed for continuous motion applications. This prevents cable failures and guarantees a long service life for 3D printers. In combination with motorised drylin linear axis, which include motor flanges, extensions, and drylin E stepper and direct current motors, Igus can supply a completely ready-to-install operating unit from a single source.

This full-service capability is also important for EVO-tech as it relates to the user-friendliness of 3D printers, an important aspect in professional environments. In order for the EVOlizer to work trouble-free and to prevent downtime, EVO-tech installs and calibrates its 3D printers on-site, trains users, and makes an expert available for the Auto-CAD system. EVO-tech itself also values this comprehensive service in its collaboration with Igus: process costs and development time were reduced based on the advice provided by Igus engineers for selecting the correct plain bearings and energy chain solutions for the desktop 3D printer.

www.igus.com



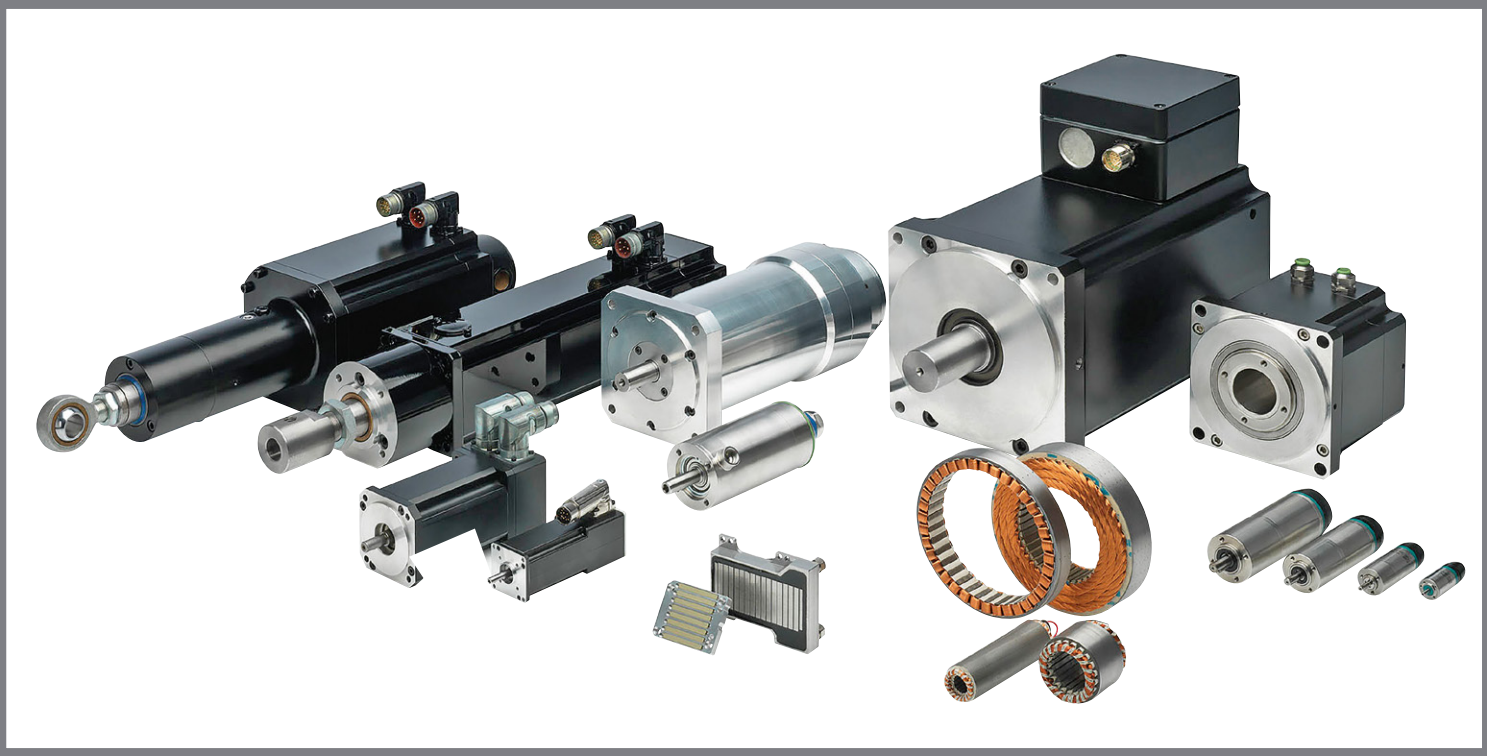
01 The print head layers the plastic fibres on the print table - dry-running drylin R linear bearings ensure accurate travel

02 The dry-running characteristics of the plastic plain bearings from Igus render the 3D printer maintenance-free and reduce the likelihood of malfunctions

About

Company name: igus
Established: 1964
Headquarters: Cologne, Germany
Turnover: € 427 m
Employees: 2,400 worldwide
Products: motion plastics, plastic components for moving applications: energy chain systems, cables, polymer bearings, linear bearings, low-cost-automation

Drive technology for extreme conditions



Radioactive environments, extreme ambient temperatures, ultra-high vacuum, strict cleanroom requirements, operation in explosive atmosphere – with its cyber special motors, Wittenstein is excellently positioned as a supplier of motor solutions for extreme conditions.

Cyber special motors are permanent magnet, rotary and linear synchronous motors and actuators. They are made for extreme conditions far exceeding standard industrial applications, where special design features are called for.

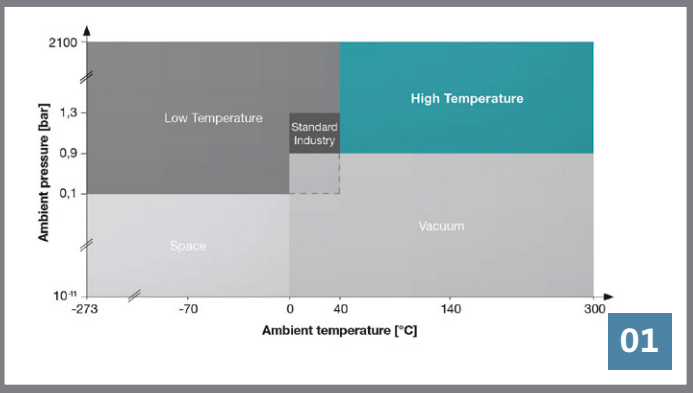
The radiation resistant motors and actuators manufactured by Wittenstein cyber motor can withstand radiation doses up to 107 Gy – about twenty-five million times the amount pilots are allowed to be exposed to in the course of their career – and ambient temperatures up to 200 °C. With their stainless steel housings, optimized materials and specially qualified production processes, they guarantee maximum stability, reliability and availability – a crucial aspect considering that if they were to fail, a robot would be required to recover or replace them in a very expensive operation. Radiation resistant solutions such as these are a must, for example, in nuclear power plants to the drive robots which handle contaminated material. One particularly challenging application is when they are integrated in test tools for carrying out non-destructive examinations of fuel channels in CANDU pressurized heavy water reactors (CANDU = CANada Deuterium Uranium reactor, developed by Atomic Energy of Canada Ltd.). The motors are used during reactor operation and meet very high durability specifications. The limited space available for installation places additional demands on the compactness of the servo motors because the test probes of the tools are fully inserted into the fuel channels.

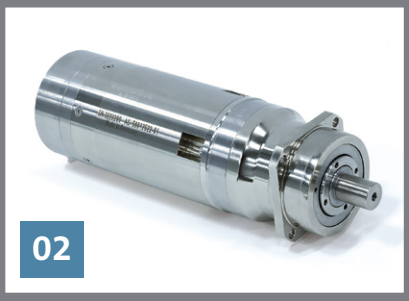
Spark ideas, not an explosion

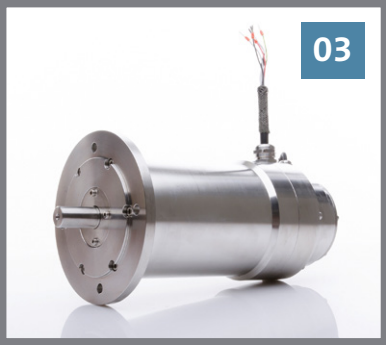
This vision is now a reality courtesy of the explosion-proof motors and actuators in the cyber special motors family. Flameproof enclosure “d” and increased safety “e” versions satisfy the requirements of the ATEX Directive / DIN EN 60079 Annex F “Explosive atmospheres”. They are certified for use in zone 1 (gases) or zone 21 (dusts) in explosive atmosphere and hence also suitable for zones 2 and 22. These explosion-proof motor solutions are ideal, for instance, for driving pumps, valves and ventilation systems, for extracting and processing oil and gas, in the chemical, pharmaceutical and food industries, for processing solvent or alcohol based printing inks and varnishes or for industrial packaging machines for printing fluids. Solutions featuring cyber special motors for zones 0 and 20 (explosive mixture continuously present or present for long periods) are currently in preparation. “Double safety” concepts are recommended here, in other words the motors have both “increased safety” and the “flameproof enclosure” protection as well as additional temperature sensors.

Maximum availability

A very long lifetime at ambient temperatures up to 300 °C is a hallmark of all high-temperature motors and actuators manufactured by Wittenstein cyber motor. Their high shock resistance up to 1,000 g, vibration resistance up to 50 g and pressure resistance up to 2,100 bar testify to the exceptional robustness of these motor solutions. The same applies to the frameless versions, whose weight and physical volume have







been kept to a minimum to allow optimal integration in bespoke applications. Amongst other things, these motors are a popular choice in oil and gas exploration as electromechanical drilling head controls in directional drilling systems. They are also found in high-temperature furnaces, gas and steam turbines, generators and combustion engines.

High performance in a vacuum

The vacuum models in the cyber special motors family are specifically designed for maximum performance in ultra-high vacuum. Owing to their extremely low outgassing rate, these motors and actuators can be used directly in the vacuum chamber at up to 10-8 mbar negative pressure. The normally critical feedthrough, which is essential when a motor is installed outside the vacuum, is consequently avoided. This is a great advantage, for example, in semiconductor manufacturing, aerospace projects and numerous other applications in research and development – alongside the temperature stability down to -273 °C.

"Clean" motor solutions

Cleanroom technology is vitally important in a wide range of processes in semiconductor production, micro engineering, the medtech sector or coating plants. The pharmaceutical, food processing and cosmetics industries are other examples that spring to mind. The purpose of cleanroom solutions is to reduce the concentration of particles and microorganisms in the ambient air to a low level that is no longer quality-critical. With their low outgassing rate, cyber special motors – which are offered up to class 5 according to DIN EN ISO 141644-1 – can be used to realize drive concepts that are perfect for cleanroom applications. They thus make a valuable contribution to controlled manufacturing and packaging processes for any product that is sensitive to environmental contamination.

Experts for customized solutions

Apart from the cyber special motors described here, Wittenstein cyber motor also develops, produces and distributes miniature servo motors and complete drive systems for use in the robotics, semiconductor and packaging industries as well as for the most diverse tasks in automation engineering. Bespoke, non-standard solutions – often in small volumes – are a particular "speciality".

www.wittenstein.de/home

01 Motor solutions for extreme conditions at ambient temperatures from -273 to 300 °C

02 Radiation resistant actuator for radiation fields up to 107 Gy and ambient temperatures up to 200 °C

03 Explosion-proof motor in "flameproof enclosure" protection type "d" for operation in explosive atmosphere

04 High-temperature motors and actuators for ambient temperatures up to 300 °C and pressures up to 2100 bar

About

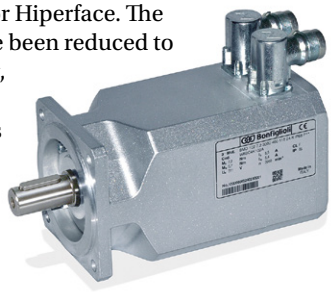
Company name: Wittenstein alpha
Headquarters: Igersheim, Germany
Turnover: € 254 m
Employees: 1,800 worldwide
Products: Low-backlash planetary gearheads, Servo-right-angle gearheads, Linear systems, Mechatronic system solutions, Stage and lifting technology, sensors

Product News

LIVE@ HANNOVER MESSE

Torque range for synchronous motors expanded

Bonfiglioli presents six new sizes of its BMD synchronous motor series. The series of brushless motors covers the torque range of 1.7 to 45 Nm with a supply voltage of up to 400 V. The sizes are available in the speed range from 1500 to 6000 min-1. The motors are equipped with different feedback options so that they can be adjusted to applications such as resolvers, EnDAT logs or Hiperface. The motor dimensions have been reduced to improve torque density, dimensions and dynamics. The magnets used offer high acceleration values and a high overload capacity without demagnetisation risk.



www.bonfiglioli.com

Frequency converter supports even PM motors

Danfoss VLT drive technology was brought the success of the VLT 2800 on the market in the frequency converter VLT Midi Drive. New functions include support of PM motors, integrated safety functions and setting of parameters via storage module.

All high-end frequency converters support all motor types up to synchronous reluctance motors. The automatic motor adjustment is able to quickly evaluate SynRM drives and operate them in an optimised manner. The device offers all important field buses and has pluggable control and power terminals up to 7.5 kW, a serial brake control and integrated STO.

www.danfoss.com/vlt

Marathon tests for aircraft parts

An aerospace componentry dynamometer test rig that can run continuously for 3,000 hours and longer has been built by Manchester's Automated Technologies Ltd. Among the key components are a TorqSense transducer, made by Sensor Technology of Banbury, and a variable speed drive made in mid-Wales by Invertek. With the core requirement for 3,000-hour continuous testing (day and night for over four months), the engineers knew that the rig would have to be very robust and that simplicity would improve the overall reliability. The basic design is that a motor drives the test piece against a load in a closed loop control system and the TorqSense provides feedback by measuring its performance in terms of torque and speed. Variations in the performance data over time indicate the level of wear and tear the component is experiencing, and from this safe working lifetime profiles can be developed. The data is logged to a database to allow trending to be mapped. Also a web based real-time display allows live parameter viewing remotely.

www.sensors.co.uk

Frequency converter offers on-demand control functions

Rockwell has expanded its PowerFlex 520 series and introduced its new PowerFlex 523 frequency converter with on-demand control functions. The motor control was designed in line with demands in order to speed up installation for users. Mechanical engineers can upload and download drive configuration files via a standard USB connection. For more complex networking, a dual port EtherNet/IP adapter is available as an option. This module supports ring topologies and offers DLR functions (Device Level Ring), which can increase network stability and machine uptime.

www.rockwellautomation.com

Soft starter – comfortable operation

The new soft starter series PSTX by ABB offers complete motor protection in a single device and works reliably even at load and mains irregularities. PTC and PT100 connections, rotor block and under-load protection, fault current, over- and undervoltage protection secure the motor more comprehensively than ever before. The new power limitation versions standard, double and ramp permit complete control of the motor during start-up and safe motor operation in weaker mains. When the full ramp voltage is reached, the PSTX activates its integrated bypass. This saves energy and reduces the device's heat development. The torque control offers an efficient way of starting and stopping pumps - without water penetration and pressure surges.

www.abb.com

R+W develops metal bellows clutch range

Metal bellows clutches are used for torque transfer and as offset compensation element in applications of general engineering.
In the area of metal bellows clutches, R+W Antriebselemente (Germany) is continually increasing its product and version offer. The different

model series (MK, BK, BX) of the torsion-stiff and play- and maintenance-free metal bellows couplings are available from 0.05 to 100000 Nm and in different connection options. For example, specific series are available, e.g., in specifically balanced designs up to 120000 min^{-1} as well as special clutches for torques up to 850000 Nm and more.

www.rw-couplings.com

Product News

LIVE@ HANNOVER MESSE

Toothed belt minimises safety risks in potentially explosive environments

The newly developed type Poly Chain Carbon Volt toothed belt by Gates meets the requirements of the Atex directive and thus corresponds to the standard for static conductivity ISO 9563. Thus, the toothed belt is suitable for, e.g., applications in grain silos, storage silos, oil refineries and chemical

facilities. The product range of "Poly Chain Carbon Volt" belts is available ex stock in the tooth pitches 8 M and 14 M, with the same widths and lengths as in the standard design Poly Chain Carbon. Additional widths are possible optionally.

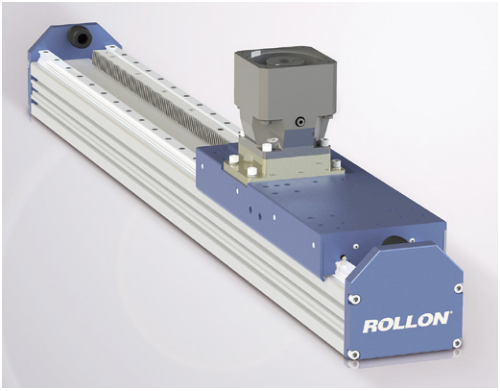
www.gates.com

Play-free clutch for highly dynamic drive solutions

The play-free and torsion-stiff clutch Spinplus by Schmidt-Kupplung has been designed for highly dynamic drive solutions. Development focused on the lowest possible mass inertia of the clutch. This was implemented by the function element produced in the MIM procedure. This permits universal relocation compensation on one level. The clutch is characterised by a compact build and high performance density, connected with a minimised mass inertia. In addition to the already mass-inertia-minimised construction of the clutch, the newly developed hub design supports further optimisation of the concept of the least mass inertia.

www.schmidt-kupplung.com

Showing teeth in axial forces

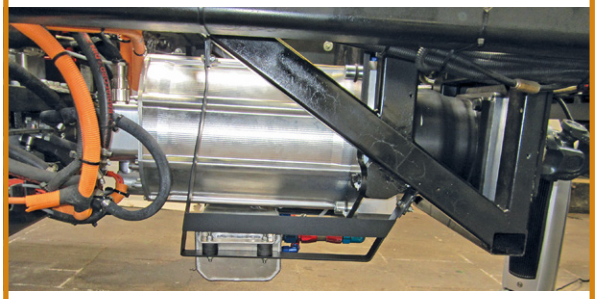


The product family R-Plus System from the actuator line by Rollon includes linear axes with rack drive. The linear unit RP- 160 is designed for very high axial forces, efficient in long strokes and suitable even for vertical applications. Additionally, several propellers can be operated independently of each other on this linear axis. The R-Plus series consists of self-carrying aluminium strand extruded profiles on which linear rails with ball bearings and integrated ball chains are installed. All ball bearings are equipped with ball cage technology. The running grooves of the linear rails are ground in the round bend profile and have a contact angle of 45°. The force transfer takes place via a diagonally interlocked hardened and tempered rack (module 2, quality 6) with ground teeth. Each linear unit is delivered completely with a pre-installed reduction gear and integrated lubrication kit to grease the pinion.

www.rollon.com

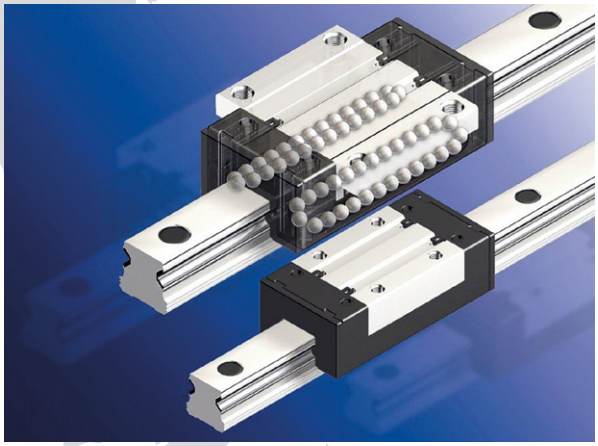
Gear for E-industrial vehicle

SPN Schwaben Präzision developed a single-stage drive train for an E-industrial vehicle with a manufacturer of electrical machines. With it, up to 20 % can be overcome at a total weight of 12 t, and maximum speeds of at least 90 km/h can be reached. Due to the large wheel circumference, an axle torque of just below 10,000 Nm and an axle speed of just below 600 rpm were necessary. This can be achieved with a drive train with a large spread. Initially, AVL Deutschland developed an electromotor (AVL 889) with a maximum output of 210 kW and a maximum speed of 9000 min^{-1}. To achieve the high axle torque, a SPM gear with a transmission of 3.0:1 is used.



www.spn-hopf.de/en

Tretter supplements torque ball sleeve series



Dr. Tretter has supplemented its series of torque ball sleeves with further types. Constructors are now able to access nuts without fitted key slot as well as flanged nuts that are flattened on both sides. The company has also supplemented the rotation ball sleeves with two more types in which the flange has ball bearings and thus is suitable for higher torques. The range now also includes short-stroke torque ball sleeves of corrosion-resistant steel. Stroke lengths of 20 to 28 mm are available.

www.tretter.de

Lightweight and robust DC servo motors with power

Brushless DC servo motors of the series 3274 BP4 by Faulhaber are particularly lightweight at 320 g and a permanent torque of 165 mNm. Their diameter is 32 mm, and their length 74 mm. The four-pole motors are, for example, suitable for joint drives of humanoid robots,

electrical grippers in process automation or high-performance drives in inspection robots. They are overload-capable and work without mechanical commuting. The increase of the motor characteristic curve is 3 rpm/mNm at a stopping torque of 2.7 Nm They can be used even under the harshest ambient conditions, such as in aviation and aerospace.

www.faulhaber.com

Product News

LIVE@ HANNOVER MESSE

Servo inverter with secured remote maintenance

Stöber goes on technically and legally secured paths in remote maintenance with the Posidyn SDS 5000 servo inverter: all data and processes are the same as for on-site access. Personal and system safety are very important. Extensive port releases that give reasons for concerns about safety are not necessary, since only the responsible employee on site at the converter or PLC can release remote maintenance. After completion of the maintenance work, system access is no longer possible. Thus, no safety gap in the operator's system results.

www.stober.com

Ball bearing housing units ready for installation

Timken has introduced a product line of ball bearing housing units within its UC series. The metric and imperial housing units for standard loads are available ready for installation in five different designs. The site range comprises shaft diameters from 12 to 90 mm, with the most common sizes available ex stock immediately. The output of the units is validated in internal inspections. Service engineers of the manufacturer make extended maintenance cycles and maximum operating times for the facilities possible.

www.timken.com

Electrical motors meet efficiency standards early

Bauer Gear Motor has developed permanent magnet synchronous motors with series S that are approved as speed-controlled motors of efficiency class IE4 for potentially explosive areas. The IE3 motors from the manufacturer between 0.75 kW and below 7.5 kW already comply with the provisions applicable from January 2017 onwards. The new installation motors of the performance range from 7.5 kW to 375 kW must either be classified in IE3 now or equipped with a frequency converter as IE2. Standard EN50598-2 relocates the focus from the individual component to the efficiency of the entire drive system. The average range is IES1. Systems that do not reach the minimum value for IES 1 are assigned class IES0. Systems with values from 20 % above IES1 onwards are classified as IES2. All electro motors by Bauer Gear Motor are at least IES1-compliant.

www.bauergears.com

Protocol converters with eight integrated I/Os

Deutschmann Automation introduced the Unigate CL protocol converter models that can be fitted with eight integrated, freely configurable I/O interfaces. The housing size stays the same.The I/Os are provided as plug-in connections on top the housing. The converters for DIN rail installation enable the integration of existing devices in diverse fieldbus and Ethernet environments. The models additionally support direct and application-specific control of actuators, sensors, and signaling devices – external I/Os from other manufacturers are no longer required. The integrated I/Os are configured via the same script that is the basis of all Deutschmann gateways, handling the conversion of the terminal device protocol to the respective fieldbus or Ethernet protocol. Users are free to define each I/O as an input or output, and to apply their individual switching logic in associating I/Os with each other.

www.deutschmann.com

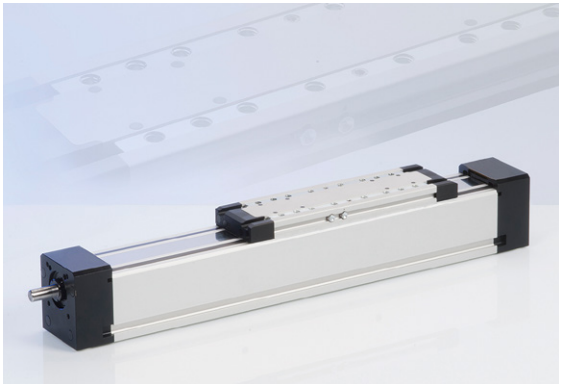
Intelligent continuous chain monitoring system

Iwis has developed a new monitoring system for measuring chain elongation. The patented CCM (Chain Condition Monitoring) system can be integrated in numerous chain applications and retrofitted in existing plants and machines without the need for special add-on components for the chain. The device determines the wear in a chain drive and notifies maintenance personnel where and when preventive maintenance is required. Operating state and wear status are indicated by LEDs and readings can be transmitted to a computer through USB and viewed with a special interface. The CCM system can be used independently of chain speed. Depending on the chain size, possible chain speeds range from 0.02 m/s to over 15 m/s. The device has protection class IP67 and can be used under normal environmental conditions and at temperatures from 0 to 60 °C.

www.iwis.com

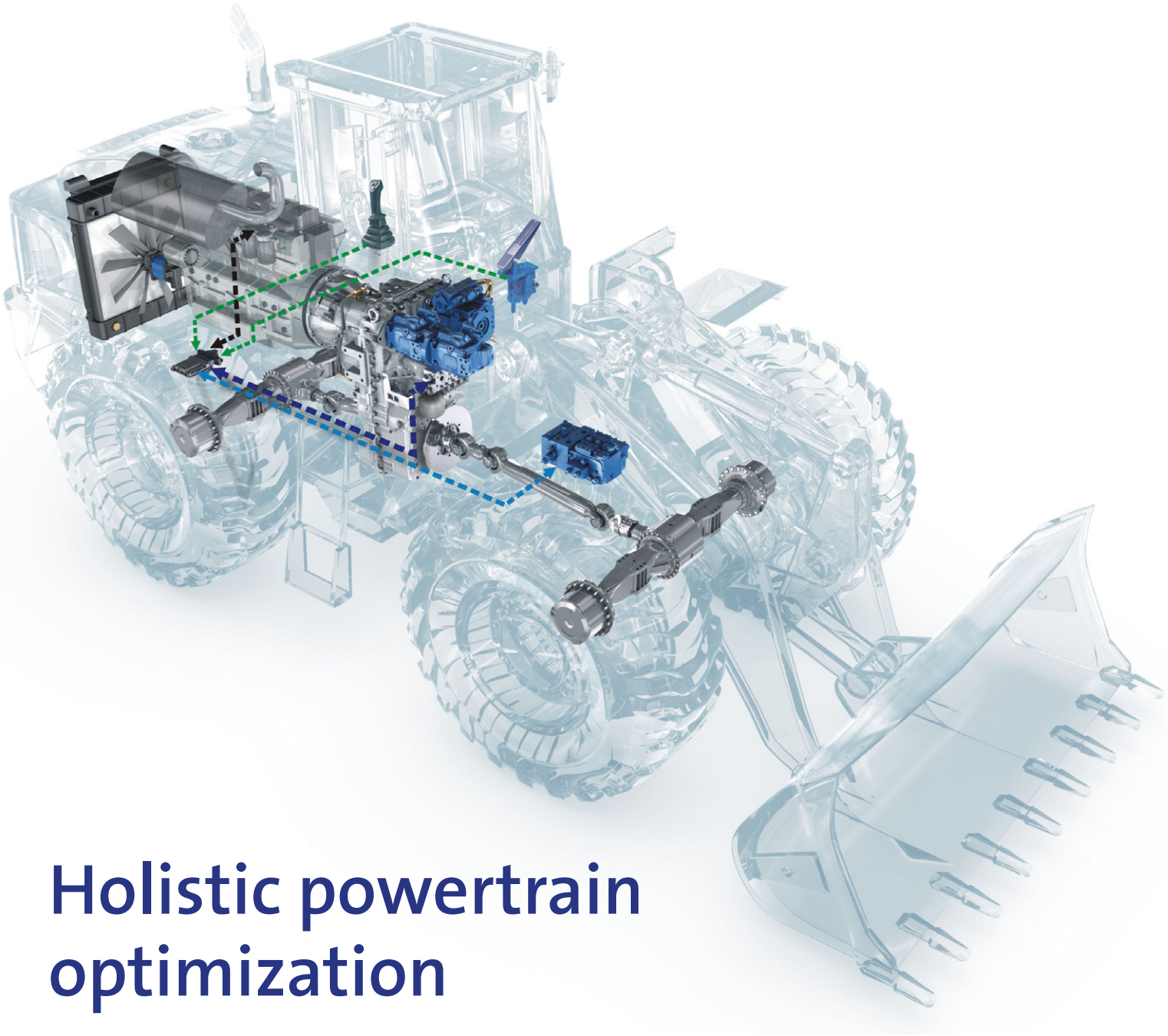
New versions for linear axes for clean rooms

RK Rose+Krieger offers the profile linear unit RK Duoline for clean rooms in spindle and toothed belt driven versions now as well. RK Duoline Clean is available with and without vacuum connection in sizes 60 and 80, either with a ball thread drive or a toothed belt of polyurethane. They all have cover tapes of stainless steel. If the axis is applied with a vacuum connection, the particle emission will further reduce. The eight total versions have been tested according to EN ISO 14644-1 and are certified



for clean rooms in the classes 1 to 5. Among others, they can be used in the semi-conductor industry, photovoltaics, microelectronics, aviation and aerospace technology or the automotive industry.

www.rk-rose-krieger.com



Holistic powertrain optimization

Dennis Möller

The hydraulic-mechanical powersplit transmission from Dana Rexroth Transmission Systems offers a modular hardware platform and modular transmission control software in addition to decoupling of engine and vehicle speed. This opens up new options with regard to increased efficiency and performance optimization of the vehicle and its powertrain including working hydraulics.

Dipl.-Ing. Dennis Möller, *Team Leader System Application and Simulation, Dana Rexroth Transmission Systems Srl, Arco, Italy*

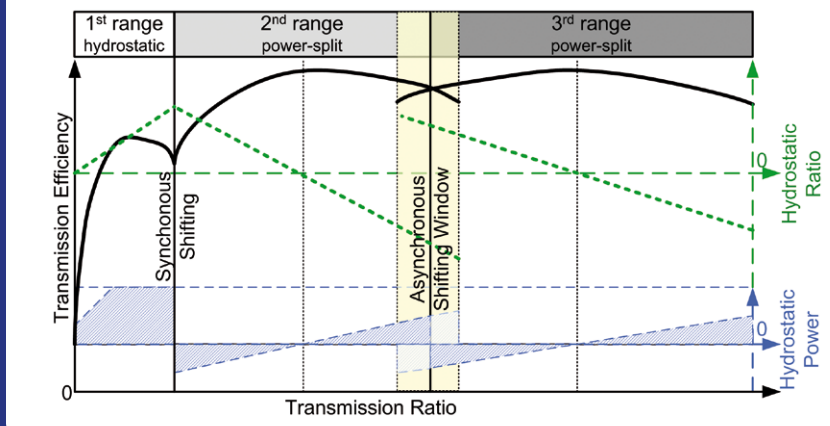
Stricter requirements regarding emission limits and increasing fuel prices lead to higher requirements for vehicle efficiency in the Off-Highway market. While improving driving and working comfort with increased functionality, the fuel consumption shall be reduced without restricting the vehicle dynamics or productivity. Transferring this requirements to the powertrain of a mobile working machine, results the necessity to design all components in the powertrain to gain a high efficiency and to have an optimal coordination amongst them. This is applicable for both the hardware and the controller software. The transmission, as central interface between engine, vehicle drive axle and working hydraulics, plays here a crucial role. For this reason modern and advanced transmission concepts need to contribute towards improving the efficiency of the powertrain and vehicle holistically; bringing a high efficiency, an improved transmission controller and a high level of integration.

HVT and its advantages

The joint venture Dana Rexroth Transmission Systems (DRTS) was established between Dana Holding Corporation and Bosch Rexroth AG in 2011 with the objective of deve-

loping efficient powersplit transmissions for mobile working machines. The resulting hydrostatic-mechanical powersplit transmission HVT offers by its transmission concept the best premises for a holistic optimization of the complete powertrain, including working hydraulics and operation strategy for the internal combustion engine. Thus, it is the central element to react to the above mentioned requirements for a modern mobile working machine and to achieve best possible results regarding efficiency and handling performance. The HVT combines the comfort, a simpler positioning control at low driving speeds and the good efficiency of a purely hydrostatic first drive range with the high efficiency of a hydrostatic-mechanical powersplit transmission in second and third drive ranges at higher vehicle speeds (Image 1). The change of drive ranges is performed without noticeable interruption in traction; with synchronous shift point between first and second drive range and through an asynchronous powershift between the second and third drive range. The latter allows to move the shifting point within a specific transmission ratio range in favour of efficiency and vehicle dynamics. A decoupling of vehicle speed and diesel engine speed and thus a reduction of diesel engine speed in driving mode is possible through the continuous variable transmission ratio. The main operating range of the internal combustion engine can be moved closer to the optimal operating point from specific fuel consumption point of view and additional fuel savings can be achieved with an optimized control.

The purely hydraulic first drive range provides the advantage of an almost wear-free, steady and very dynamic reversing without the required clutch shifting close to zero speed. This results in high efficiency and a good fine positioning capability. As even the braking in all drive ranges can be done hydrostatically through the transmission supported by the drag torque of the internal combustion engine, the wear of brakes can be reduced and even avoided in many cases, depending on the vehicle weight and load. The operating and maintenance costs for the vehicle owner are hereby reduced through almost wear-free braking and reversing. Overall the HVT makes it possible to achieve fuel savings of up to 35% depending on the application and possible downsizing of the internal combustion engine. Of course with equal or even an increased handling and driving performance.



01 Drive ranges and efficiency characteristic of the hydrostatic-mechanical powersplit transmission HVT-R2

Modular approach

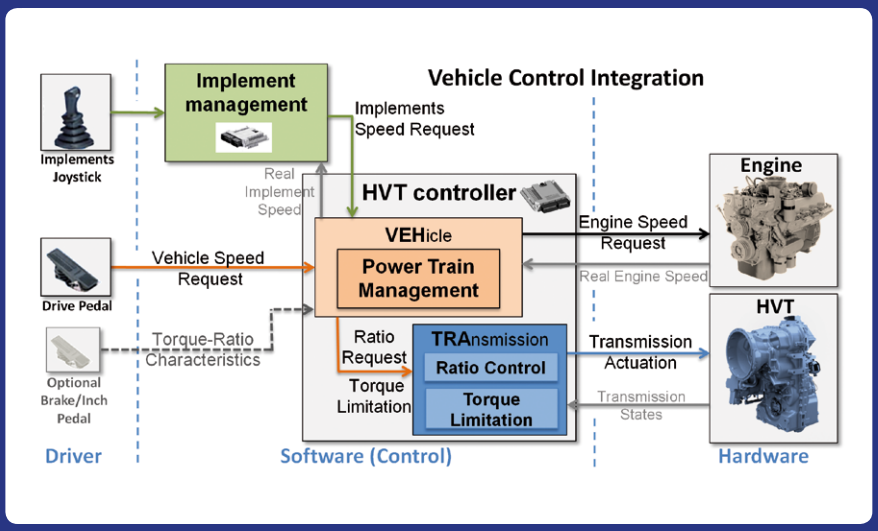
The HVT-R2, which is currently undergoing a final testing in field tests and whereby its start of serial production is planned for the first half of 2015, can be customized to a series of different applications with a transmission input power between 135 kW and 195 kW due to its modular design. This includes wheel loaders, graders, skidders, reach stackers, empty container handlers, heavy forklift trucks and RoRo tractors. Simultaneously the HVT-R3 is being tested in first prototype vehicles. It is developed in DRTS for applications with a higher input power ranging from 200 kW to 260 kW and offers a similar hydrostatic-mechanical powersplit transmission concept and thus the same high potential for a holistic powertrain optimization.

The modularity of the HVT is based on both transmission hardware and transmission control software. The HVT-R2 has for example up to three power-take-off interfaces for connecting working hydraulics and steering pumps. These interfaces offer a by approx. 20% to 35% increased operating speed of the working hydraulics compared with engine speed and thus enable using the same working hydraulics as in a standard transmission but with a simultaneous reduction of diesel engine speed and without restricting the maximum volume flow. Furthermore, the HVT is available with four different final gear ratio options in the transmission without changing the installation space, which corresponds to the space occupied by a standard torque converter. This allows a flexible adjustment of maximum output torque and output respectively driving speed to the requirements of different applications. In addition, it also offers the option of using a hybrid module with energy storage connected to a power-take-off on the transmission input side. This can feed back the recovered braking energy into the drivetrain or working hydraulics for reducing the load of the internal combustion engine and thus opens up an option for further fuel savings or further down-sizing of the internal combustion engine and hence a reduction of emissions.

The transmission control software ensures the modularity mainly by providing a structure that reflects the physical components of the real transmission. It consists of three main components namely transmission control, vehicle control and electrical control unit. Each one of these components is again built in layers: Application Layer (AL), Communication Layer (Com) and Sensor/Actuator Layer (SAAL). The Physical Abstraction Layer (PAL) represents in the transmission controller each individual transmission hardware component in its own software module. By this design it is foreseen to replace only the respective software module when customizing or replacing individual physical components and their characteristic properties, without having to change the complete control software. This helps in achieving a high portability and simpler customization for different powertrain configurations. Additionally, the transmission control software becomes the central point for processing and controlling signals from the engine, transmission, working hydraulics, vehicle and brake/inch pedal and any hybrid modules.

Optimized connection of powertrain and working hydraulics through powersplit transmission possible

The HVT is completely integrated in the powertrain and the vehicle control by its modularity in hardware and software. Due to a high level of networking, the information from the accelerator pedal, brake/inch pedal and



02 Integration of the transmission control into the vehicle control and networking with working hydraulics and engine management

control joystick of the working hydraulics are collected and processed in the transmission controller. Depending on the selected driving and working strategy, the desired vehicle speed specified by the driver, the current engine operating point and the working hydraulics power demand, the transmission control adjusts the transmission ratio and specifies an engine speed requirement (Image 2). In the HVT this control concept used for optimizing the interaction between engine, transmission ratio and working hydraulics is called Easy Drive and Work Concept (EDWC). The EDWC can be parameterized based on application requirements and can be expanded with further modules such as hybrid systems. It gives, for example, the possibility of implementation of a control concept for a reach stacker, wherein the driver can simply control a combined lifting of the boom and a high fine positioning accuracy (constant and well controllable vehicle speed) by the accelerator pedal and joystick of the working hydraulics without usage of the brake pedal. The required transmission ratio and diesel engine speed for driving and working hydraulics is optimized and specified by one central interface. A similar driving manoeuvre with a torque converter transmission requires a very experienced and trained driver and usage of the service brakes to counter balance the transmission output torque. Therefore, the control with EDWC not only results in reduced fuel consumption with the same and in some cases even increased driving dynamics, but it also helps in achieving a more comfortable operating and driving pattern of the machine for the driver.

Comparison of fuel consumption and performance

Due to its advanced control concept and high efficiency, the transmission allows to operate the internal combustion engine in an optimized range. This is achieved on one hand by reducing the power requirement for the driving operation and therefore possible downsizing of the engine, and on the other hand by reducing the engine speed required for driving and working.

Modular approach in hardware and software for complete transmission integration into the vehicle control

Tests conducted by DRTS with a reach stacker equipped with an HVT-R2 show fuel savings of up to 35% when compared to a similar machine equipped with a conventional torque converter transmission (no lock-up). This high reduction in consumption results from the combination of increased transmission efficiency and possible downsizing of the internal combustion engine by approx. 20%. Similar good results were achieved in a wheel loader. A working cycle-dependent reduction of fuel consumption of up to 25% was measured with HVT-R3 when compared to a wheel loader equipped with conventional torque converter transmission. In addition, the cycle time with same handling performance was reduced by 2%.

Further optimization potential

With the hydrostatic-powersplit transmission HVT as the central component of the powertrain, a consistent coordination of the transmission, engine and vehicle control and a holistic view on the drive and working system, the optimization potential for fuel consumption, vehicle dynamics and operability goes beyond the potential of each individual component. The working hydraulics can be improved further, for example, by using electrical-hydraulic valves and an A10VO pump with electrical-proportional volume flow adjustment from Rexroth. By using a hybrid system on the transmission input, which allows for energy recuperation and energy recovery in the drive and working hydraulics, the usage of brakes can be optimized further, the engine can be protected against over speed and a boosting of drive and/or working hydraulics can be achieved. Even a start-stop functionality can be realized by this. In addition, axles and drive shafts specially adapted to the first hydrostatic driving range offer a significant potential in terms of cost reduction and increase of efficiency.

Conclusion

The entire Off-Highway market is focused on reducing fuel consumption without sacrificing performance, functionality or operability. First field tests with vehicles equipped with an HVT have clearly shown that these often contrary objectives can be achieved in the future with an innovative transmission and control concept. In order to exploit the complete potential, it is necessary to optimize each drive train component, but above all to consider the components of the drive and working system as a whole and to coordinate their interaction within the control. The hydrostatic powersplit transmission HVT and its advanced control concept is for this task the central module since the potential of the complete system is greater than the sum of the potential of its individual components.

www.danarexroth.com

About

Company name: Dana Rexroth Transmission Systems
Headquarters: Arco, Italy
Established: 2011
Employees: 35
Products: advanced drive transmission, hydromechanical variable transmission

THIS ARTICLE IS A CONTRIBUTION BY Mobile Maschinen

Product News

Magnetic valve from Bürkert in variants for high-pressure applications

The magnetic valve type 6027 from Bürkert is also available in a high-pressure design up to 250 bar. In this variant the valve seating is sealed with a self-centering ceramic ball seal. The ball material (Al2O3) is resistant to abrasion and wear and is highly resistant to chemicals. Furthermore, the thermoplastic polyether ether ketons (PEEK) are used as seat material. Stainless steel as other material and a laser-welded guide tubes ensure compressive strength, which corresponds to 5x rated pressure, and low leakage. The valve is offered as direct current variant and a rectifier plug is available for devices with alternate current. It is typically used for critical gases and fluids.
A high-pressure design offers solutions for test rig. Filling systems for air conditioners in the automobile industry is an example for this.

www.burkert.com

Intelligent hydraulic units from Bosch Rexroth

The new hydraulic units of ABPAC series from Bosch Rexroth have local intelligence and sensor package, which continuously record all the system conditions of the unit such as oil level and communicate over open interfaces with higher control levels. There the ABPAC provides sensor data, system sizes and the resulting status notifications. The user can read these notifications for example through Ethernet via the machine controller. The series with its container sizes of 100 to 400 l is suitable for common hydraulic applications. The hydraulic basic functions are already integrated in a multi-function block, which also offers an interface for more standardised hydraulic control groups.

www.boschrexroth.com

Tough fluid solutions for numerous industries

Highly resistant, compact cooling water hoses for internal combustion engines, an electrically conductive fuel hose, and a new generation of OLN lines for oil and oil/air mixtures – these are the highlights which ContiTech Fluid Technology will be presenting at the Hanover Fair.

Its resistance to cooling water and the usual additives in the form of anti-freeze and anti-corrosion agents makes the Conti cooling water hose the ideal solution for cooling systems in internal combustion engines. It is suitable for a media temperature of up to 115 °C, or briefly even 135 °C. Thanks to a special strength member, it can be used at ambient temperatures of up to 190 °C, or briefly even 210 °C. This means no additional heat protection is required.

Where in the past steel-braid or Teflon lines were used, ContiTech now uses very light rubber lines which have been adapted to the ever-increasing temperatures in the engine surrounds. The compact hose design also enables very small bending radii. The Conti cooling water hose is also configurable as a molded hose for particularly tight package spaces.

ContiTech has also developed an alternative for higher temperatures up to 230 °C, i.e. cooling water hoses made of silicone. These can be supplied both as bulk stock and as molded hoses.

ContiTech's electrically conductive fuel hose prevents static buildup at high throughflow rates

Inner lining prevents sparking

Electrically conductive fuel lines have been fitted as standard in passenger cars for some time. Now this application – not least because of appropriate regulations in the US – is becoming increasingly attractive for industrial trucks. The conductive inner lining made of FPM (fluorocarbon rubber) prevents static buildup at high throughflow rates which, in the worst-case scenario, could result in sparking and spontaneous ignition of the vehicle.

ContiTech's highly flexible fuel lines are suitable for gasoline, diesel and biodiesel and can withstand operating temperatures from -40 to +150 °C. Another characteristic feature is their low permeation rate, and they also meet the most stringent cleanliness requirements. The outer lining is resistant to radiant heat up to 150 °C, and briefly even 175 °C.

Diesel fuels have been blended with renewable raw materials for some time. In Germany up to 7 % RME or PME (rapeseed or palm oil methyl ester) is currently added to mineral oil-based diesel fuels. Higher RME proportions are under discussion. However, RME has been shown to be more aggressive than the mineral oil diesel, which results in faster aging and thus earlier failure of the conventional NBR-based hoses and lines. ContiTech Fluid Technology therefore uses modern, three-dimensionally cross-linked fluoroelastomer materials (FPM-FPM) for fuel hoses and lines which have a very wide temperature range of -40 to more than +200 °C for use with fuels containing RME. These materials are just as non-critical for the currently used mixing ratios as for the possible increased levels in the future.

ContiTech also offers fuel lines which withstand both pure rapeseed oil and rapeseed methyl ester (RME), also known as biodiesel, but can be used with conventional diesel fuel, in addition.

The next big thing with regard to fuels is dual fuel – the combined injection of gas and diesel fuels. The latest generation of fuel hoses from ContiTech represents an ideal basis for material which can be developed in this direction. The new elastomer fuel lines from ContiTech have been adapted to the ever-increasing pressures and temperatures in truck engine compartments too. At present, they are already resistant to an operating pressure of up to 35 bar and temperatures of up to 135°C, and testing is already in progress at ContiTech with a view to expanding these parameters.

ContiTech is supporting the trend towards the use of alternative fuels, which is particularly prevalent in Europe and North America, with hose assemblies for gases such as CNG and LNG.

OLN lines for hot, tight package spaces

ContiTech's OLN lines are used wherever oil-containing air has to be conveyed, such as in compressors, trucks and industrial applications. The company has now re-engineered these hoses, which have been tried-and-tested components for decades, incorporating the latest in materials technology. FKM-based hoses for oil and oil/air mixtures are the newest development. They withstand continuous temperatures of up to 230 °C at 15 bar, with transient peaks of 250 °C.

This is becoming necessary because of the growing trend towards enclosed units, higher engine outputs and the increasing use of turbochargers. As a result, the ambient temperatures to which the hoses and lines are exposed are rising. These latest adaptations mean that ContiTech's hoses are equipped to cope with these and future requirements. Other benefits of this new development are their very compact design and the capability of forming tight bending radii with these hoses which are also available as molded hoses.

www.contitech.de

About

Company name: ContiTech
Business: Rubber and Plastics Technology
Headquarters: Hanover, Germany
Turnover: € 5.4 bn
Employees: 38,000
Products: components like hoses, belts, mounts and systems for the automotive industry and other important industries

Speed controls in compact power packs

When it comes to increasing the efficiency of your machine, OEMs place particular importance on the drives that are used. This also applies to hydraulic drives and controls that are competing against electromagnetic solutions. The report highlights that hydraulics have great efficiency potentials.

About

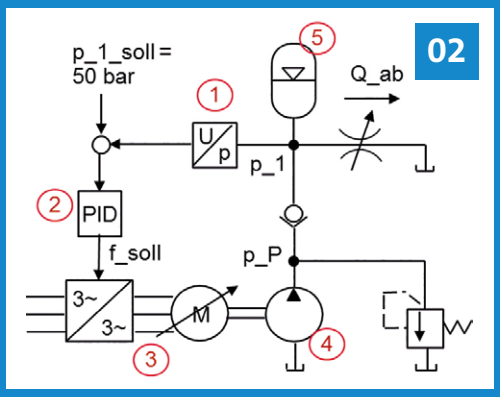
Company name: HAWE Hydraulik SE

Headquarters: Munich, Germany

Employees: about 2,200

Products: high-quality hydraulic components and systems

01 Valve control programmable for pressure, velocity and acceleration processes with short cycle times



02 Control circuit of a speed-controlled power pack

Hydraulic power packs with speed controls open up many new options for the supply of hydraulic systems. In applications such as lathes with constant volume flow requirements, speed controls supply the hydraulic consumers according to demand. In applications requiring exact control of the hydraulic cylinders' power, such as test facilities, they finely adjust the pressure via the speed. The appeal of speed controlled hydraulic power packs is not limited to their technical refinement, however. They also increase the energy efficiency of the machines in which they are deployed and so save hard cash during production.

While the electric-hydraulic operating ratio of conventional systems comes to around 35 %, speed-controlled power packs achieve efficiency ratios of over 55 %. This means that a power pack with a rated output of 3 kW will cut the average power uptake by around 1 kW. For two shifts operations over 240 working days and at energy costs of € 0.15/ kWh, the annual savings accumulate to almost € 600.00 for each machine This recoups any additional one-off costs for the speed-control in a few months.

Application in lathes

In lathes the crucial point is the leakage at the rotary transmission for the hydraulic clamping chuck. While the clamping chuck rotates at 5,000 or more revolutions per minute, the leakage at the rotary transmission accumulates to two to six liters per minute. These losses must be balanced out by a adjusted volume flow. In addition, the hydraulic actuators (clamping chucks, tailstock, steady rest, tool changer, etc.) trigger strong fluctuations in the volume flow uptake. The recommendation for machine manufacturers therefore is to deploy a hydraulic system capable of balancing out these system-inherent fluctuations with minimum loss of energy.

Speed-controlled power units are the solution. They adjust the hydraulic power pack's volume flow to the actual demand, while the motor keeps operating at a good efficiency ratio. Usually the control will be so fine-tuned that the volume flow taken off by the hydraulic consumers is balanced out and the pressure level is upheld.

Such a control circuit necessitates a number of components. These include a pressure sensor to meter system pressure and a PID-controller that calculates the reference speed from the reference pressure and system pressure. A frequency converter in the motor applies the reference speed and the pump finally converts the speed into volume flow. Special attention must be given to the fact that the power pack has to accelerate quickly to balance out any sudden volume flow demand of a consumer. Depending on the size of the motor and the pump it takes about 0.2 seconds until the nominal speed is attained. For this phase an additional hydraulic accumulator is required to offset loss of pressure. Generally, an accumulator's volume of 500 cm^3 is adequate.

Speed-controlled power packs with improved operating ratios reduce the hydraulics system's cooling needs. However, the heat cannot be dissipated with a conventional heat exchanger, as the exchanger needs constant and unpressurized volume flow. HAWE Hydraulik's compact power packs are advantageous here, as their cooling fan dissipates the heat via the housing.

Special attention to the control

To deploy power packs with frequency converter usefully, special attention should be given to the control. Once the exact pressure and volume flow requirements of individual consumers are known, the control can ensure "pinpointed" supply. Thus, no additional valves are needed, for example, to traverse the tailstock at the lath into the clamping position via fast feed and creep speed and set the load there via the pressure control.

The control becomes "smarter", if the system pressure is lowered to the required minimum. Where the preset clamping pressure is 20 bar, for example, and in case no further consumer is active, the system pressure can be lowered to around 25 bar. Compared with a constant system pressure of 50 bar this allows for an additional 50 % in energy savings.

Both approaches require additional small controllers, such as Hawe Hydraulik's programmable logic valve control, type PLVC, which is fine-tuned to the control of hydraulic systems. Communication with the master control of the machine can be realized by means of a Profi-Bus interface.

Use in testing applications

The combination of speed-controlled power packs and a programmable logic valve control makes sense for many other fields of application as well. Highly precise power controls can be realized, if pressure serves as set point. This is of particular interest for test applications. For example, if an increasing force shall be exerted on test specimen over a very long time, such as a couple of days, this can be very well realized by the gradual build-up of pressure. Radial piston pumps are particularly well suited for such an application, because, unlike other pump types, they are not limited in their minimum speed. They can operate at rotational speeds of even 1/sec, so that the smart arrangement of the system enables pressure to build up with an exactness of less than one bar. This system is highly efficient and generates a negligible heat input.

Other test applications require a load-independent build-up of force with predefined velocity sequences. A speed-controlled power pack is once again capable of solving this task. As the velocity of a hydraulic cylinder depends immediately on the volume flow supplied, and as this velocity increases with rotational speed, it is actually an application that is particularly easy to realize. If a highly precise speed control is required, feedback via a position sensor system is recommended.

Power packs with frequency converters offer another feature that was hardly utilized so far. The converter provides output signals on the current rotational speed and the uptake of electric power. There is a direct connection between power and pressure as well as rotational speed and volume flow. The evaluation of signal deviations can therefore be used to detect disruptions in the system, such as pump wear or failure. Thus, it enables system diagnosis without additional sensors.

www.hawe.com

When the pressure has to rise

Does your hydraulic application need a working pressure at 210 bar? 350 bar? 420 bar? Or even higher? Then the Scanwill pressure components could be the solution for you. The fluid power experts will be exhibiting their newly developed pressure solutions at Hannover Messe.

Scanwill Fluid Power will be exhibiting at Hannover Messe for the third time. At their booth, they will host live demonstrations of their product range of energy saving hydraulic pressure solutions. The founder of the company Mr. Jesper Will Iversen, will be present throughout the trade fair. Mr Iversen has 20 years' experience in the design and manufacture of unique, compact, high efficient pressure solutions for applications in industrial hydraulics.

Today the pressure solutions of the Danish specialists are distributed through partners all over the world and are used every day by hydraulic engineers as a common solution to achieve greater hydraulic power. The products are installed in an expanding variety of hydraulic applications, in general industrial sectors where there is a need for increasing the hydraulic power.

New developments

Scanwill Fluid Power will launch the new series of MP-XP pressure solutions at the Hannover Messe that are designed with an additional side outlet port, so that the oil from the high pressure side is returned directly to tank and thereby ensures that the intensifier and the cylinder are always supplied with cool and filtrated oil. The MP-XP series is ideal for small stand-alone hydraulic circuits systems, with a limited consumption of oil at short cycle times and also where there is a risk of collecting contaminants in the oil at quick couplings.

Additionally, the company launches the MP-CT series of pressure solutions systems, which are designed for integration in a valve stacking system. The MP-CT has an external port from which high pressure is

01

02

supplied – without disturbing the supply circuit. The benefit of MP-CT is that it allows, from the supplied low pressure, to get a pressure increase at specific selected application spots – for example clamping, engraving and pressing applications.

The most important exhibition

Sales & Marketing Manager Anders Levinsen commented: "We look forward to meeting many of our dedicated Scanwill sales partners from all over world and especially to present our pressure solutions to hydraulic engineers, that are looking for both energy saving and safe product solutions for their hydraulic circuits. Hannover Messe is, for Scanwill Fluid Power, the most important exhibition window to the hydraulic world - it is also where we meet all our valuable local German customers allowing us to expand our network within the hydraulic industry."

Photographs: *teaser*

www.scanwill.com

01 + 02 **The pressure intensifiers will be exhibited at Hannover Messe 2015**

About

Company name: Scanwill Fluid Power
Established: 2001
Headquarters: Albertslund, Copenhagen Denmark
Products: pressure intensifiers for numerous applications

Product News

Robust wear sensor OPCom FerroS monitors gears

The wear sensor OPCom FerroS from Argo-Hytos enables installation of cost-effective monitoring systems. The sensor has a very high sensitivity and is insensitive to disturbances such as foaming and vibrations. It continuously monitors ferromagnetic particles. Due to an automated status evaluation, no manual inspection or sampling is required. It is very robust against disturbances such as air, vibrations and moisture. Thus it is suitable for monitoring gears.

www.argo-hytos.com

Bonfiglioli expands its portfolio with control terminal BMI

Bonfiglioli, known as specialists for drive solution, has introduced the flexible and high-performance control terminal BMI - Bonfiglioli Human Machine Interfaces. All the converters of AgilE and Active Cube series of the company can implement multiple control tasks. For this purpose, central and decentralised IOs and multiple communication options are available to the drives, which enable implementation of simpler machines without control system. BMI rounds off this solution package into a complete solution. Three device versions with 3.5", 7" or 10" wide-screen displays with touch screen operation in an IP65-compliant enclosure are available. Ethernet, RS232/485, CAN and USB are available for communication.

www.bonfiglioli.com

Extension of Hansa-Flex App

With free Hansa-Flex App the user can locate and contact all the branches of the company by pressing a single button. Now Hansa-Flex extends the App

with another feature for hydraulics immediate service: the emergency call function. This enables the mobile workshops to send messages any time. To do this the user has to enter his data into the screen and an emergency call to the central vehicle tracking will be triggered with a single click. Thus the emergency call can be forwarded to the nearest available service vehicle. In addition, a photo of the damage or X-code hose coding can be transmitted through the App.

www.hansa-flex.com

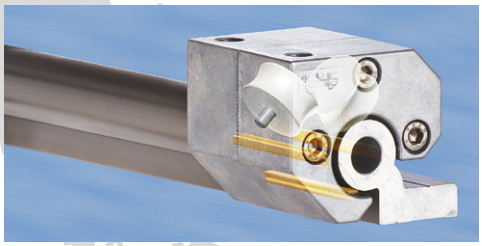
Explosion-protected valves from Hawe for global use

For the requirements in explosive environments, Hawe Hydraulik SE offers valves with certified magnets. In addition to the approvals according to European Atex guidelines and international IECEx scheme, even a certification according to the American Standard NEC 500, Class 2, Division 1 is available now. Thus manufacturers of machinery and systems can use valves with these magnets globally in explosive gas or dust atmosphere, e.g. in petroleum and natural gas drills, in drilling equipments, in petrochemical industry, in oil tankers and tank trucks.

The magnets are suitable for an ambient temperature of up to 55 °C. Twin magnets for proportional sliding valves and simple magnets for directional seat, directional sliding and clamp-in valves are available. For use in mining industry, the inherently safe and firedamp-protected magnets are certified in accordance with Atex, IECEx, ANZEx, MSHA, MA and TR. They are also suitable for all regions of the world.

www.hawe.com

Hybrid linear bearing from Igus in new sizes



The program of double rolling hybrid bearings from Igus is completed through two new bearings in the sizes of 10 and 16 mm. They can be used in camera technology, in sliding doors or machine tool doors. The connection of the gliding and rolling bearings is behind the functionality of these bearings. The concept of two diagonally placed rollers made of high-performance plastic ensures smooth and quiet operation. The rollers take the weight in the direction of main loading and ensure low pushing forces for handling. If there are improper or transverse forces, these are caught through the sliders. The load is placed on the rails safety, which prevents falling from the rails.

www.igus.de

Turboform C combines cutting ring pre-assembly and flanging

With Turboform C Tracto Technik has developed a combination device for the cutting ring pre-assembly and process-safe flanging of the pipe ends for safe connections in hydraulic systems. The hydraulically driven machine has a universal adapter, in which different head can be used. Heads for

cutting ring assembly with manual pressure setting, cutting ring assembly with automatic pressure adjustment, 37°-flanging or 10°-flanging are available as options. The working area covers steel and stainless steel pipes of 6-42 outer diameters. The machine is suitable for single pipes or small and medium series.

pipebending.tracto-technik.com/

Stauff presents new pressure transducer for hydraulics

With pressure transducers of PT-RF series, Stauff is presenting an innovation in the universal pressure measurement technology for fluid-technology applications at Hannover Expo 2015. The functional principle of the pressure transducer is based on Radio Frequency Identification (RFID) technology. The energy required as part of the measurement is transferred to the pressure transducer through the antenna of the associated reading and display unit without any touch. These are available in five variants and cover measurement range between 0 to 16 bar and 0 to 600 bar depending on the

requirements. Temperature values from -40 to +85 °C can be entered. On the connector side, the pressure transducers are also equipped with screw threads of 1/4 inch BSPP or 1/4 inch NPT.

www.stauff.com

New cutting ring system from Voss Fluid for reliable repeater assembly

Voss Fluid presents its new patented cutting ring system "Voss Ring M" with pre-assembly connectors at Hannover Expo 2015. The ring is designed for high pressure and dynamic load up to 800 bars. In addition, the company developed an assembly solution: the Voss Ring Pre-Assembly Connectors As soon as the ring has completed the pre-assembly path, there is a block stop with the tool. A force increase signals the end point of the pre-assembly. In addition, the solution also offers sufficient free room for subsequent cut of the ring with final assembly. This results in leakage-safe and reliable repeater assembly. The final assembly path reduces from 90 to 30°, which then reduces the space requirements.

www.voss-fluid.de

Split roller bearings keep icebreaker generators running

Split roller bearing specialists Cooper has supplied bearings for the generators of an icebreaker operated by the Canadian Coast Guard. The on-board generators' existing sleeve bearings had a short operational life and their maintenance required too much time and effort.

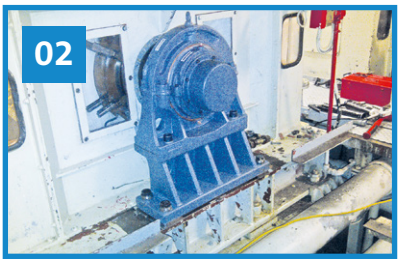
To keep seas and inland waterways navigable during Canada's long, severe winters, the Canadian Coast Guard operates close to 20 icebreakers of various classes for light, medium and heavy-duty tasks. These icebreakers are designed and equipped to navigate frozen sea. They have engines that are much larger and more powerful than those of other vessels of comparable size to be able to plough through the ice and carve a sufficiently wide navigable channel for other ships.

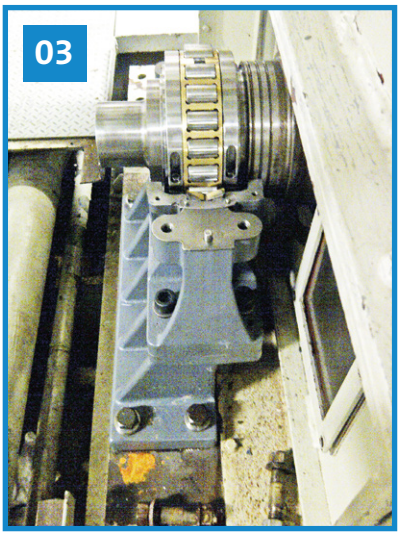
On-board electricity is supplied by generators. Recently, problems occurred with the friction bearings of the on-board generators of one of the icebreakers, and this was followed by the same problem on other ships of the fleet. Each of the two generators has two bearings that hold the generator shaft – one fixed and one floating to allow the shaft to expand as it heats up. The existing sleeve bearings had an unexpectedly short lifespan and required excessively complex maintenance work, partly owing to restricted access to the bearings. The need for oil lubrication also presented generic problems and replacement parts from the manufacturer had long lead times.

Direct drop-in replacement

These problems called for a solution that did not require alteration of the generator itself: The new bearing would have to be a direct, drop-in replacement. Since the icebreakers have heavy work schedules, downtime must be kept to a minimum. The Cooper solution was to provide a high-quality split cylindrical roller bearing as a direct replacement for the existing sleeve bearings. The split bearing has a special cartridge that holds the shaft-end cover and is mounted on a standard pedestal. A support plinth and elevating pedestal were built to customer specifications to provide dimensionally identical support for the shaft.

The new solution allowed rapid replacement without modification of the generator. The roller bearings are fully split up to the shaft, and the labyrinth seal is also of a split design. They have clear advantages over the previous sleeve bearings: Their design allows easy-access inspection and maintenance, since no other components need to be removed. This significantly cuts standstill times and maintenance effort. The bearings have a long service life and do not need oil lubrication, eliminating the need for pumps and filters and the risk of oil leaks. The bearings run cooler and consume less power. There is no longer a risk of damage to the shaft from bearing failure.





01 Bearing unit with split bearing from Cooper

02 Fully installed split bearing unit

03 Cooper bearing installed on the shaft

Not only for marine

Cooper bearings have been tried and tested in marine environments for many decades, and Cooper supplies both OEMs and sub-suppliers. From offshore support vessels to ferries, military vessels, fishing boats and tugs, Cooper split bearings provide the reliability and flexibility crucial in extreme working conditions out at sea. Beside marine propulsion, they can also be found in other shipboard, transport and loading activities.

The split bearing was designed in 1907 by inventor and engineer Thomas Cooper. To this day, the company he established in King's Lynn in Norfolk, UK is a world leader in the development of split bearings. All Cooper products are made in Norfolk and sold throughout the world. Cooper's German subsidiary – Cooper Geteilte Rollenlager GmbH – has its headquarters in Krefeld. Cooper's full range of split roller bearings includes standard bearings such as cylindrical roller bearings and tapered roller bearings as well as special bearings including water-cooled bearings, flat thrust bearings, other solid bearings, high speed bearings, full row bearings and other special types, and large bearings over 600 mm bore size. In addition to maritime applications, Cooper bearings are used in industries including steel, mining, conventional power, cement and other building materials where operating conditions are beyond the average – including situations that are often dirty and feature extreme temperatures. Typical applications beside marine propulsion include conveyors, fans and blowers, cooling beds, continuous casters, stacker reclaimers, and many other applications, especially where bearings are in trapped positions and access is limited.

www.cooperbearings.com

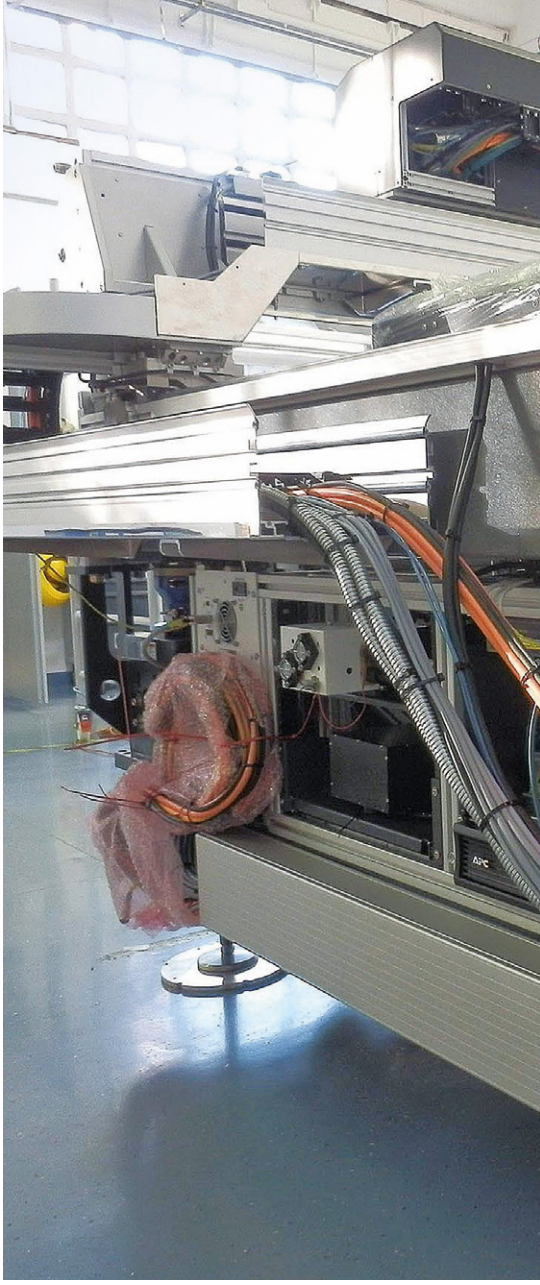
About

Company name: Cooper Roller Bearings Company Ltd.
Group: SKF Group company
Headquarters: Kings Lynn, Norfolk/UK
Founded: 1907
Products: bearings, housings, seals

Low-frequency air springs decouple measuring machine

Robert Timmerberg

Measuring machines are a tricky business. The smallest inaccuracy will lead to unusable results. Which is why ambient vibrations that could be transmitted to the system must be isolated at all cost. This was a task that turned out to be harder than initially expected in a Hungarian application.



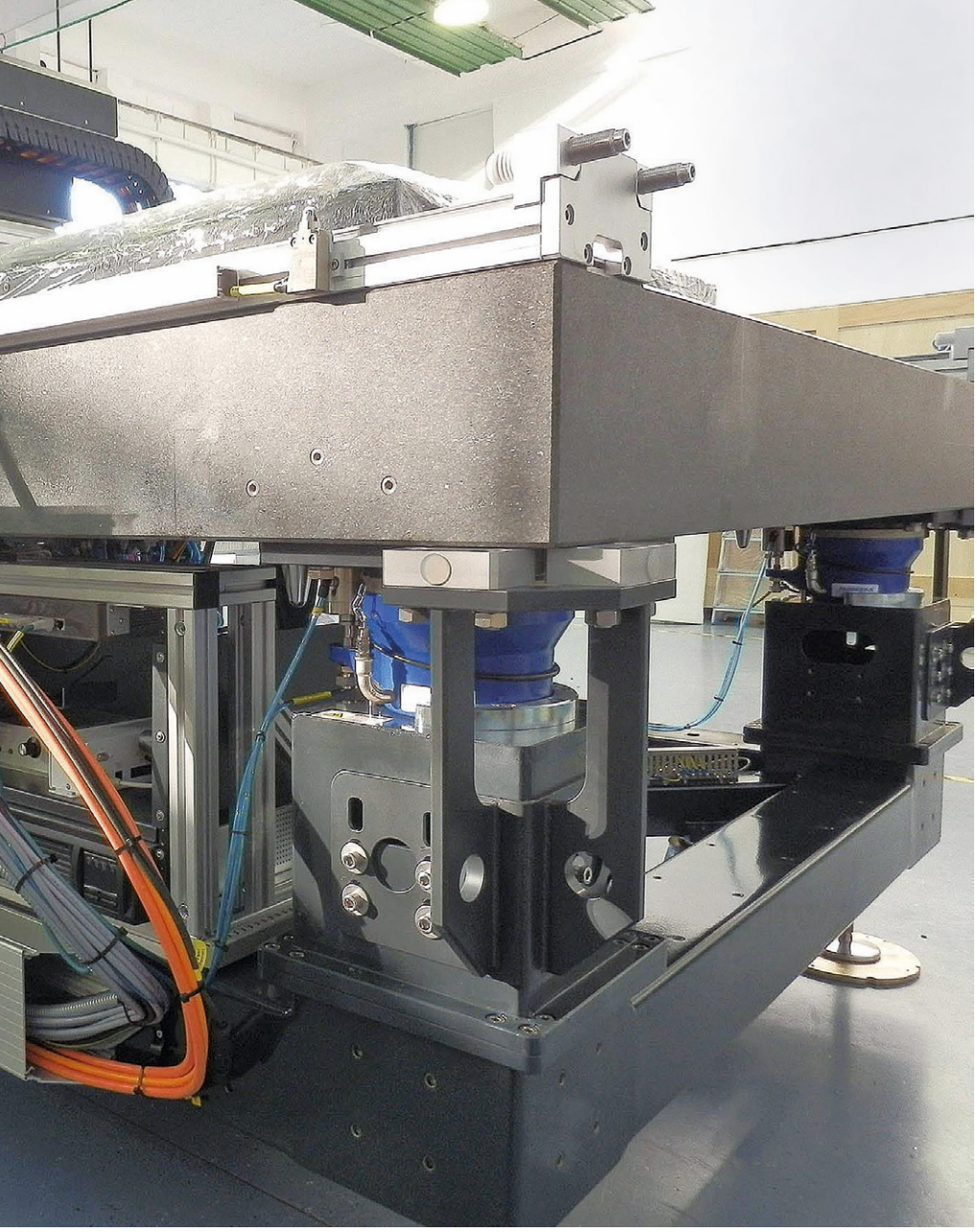
As a full-range supplier from design to distribution, the Hungarian company Semilab provides a great variety of measuring techniques. The measuring portfolio ranges from the characterization of semiconductor and photovoltaic materials through to production process monitoring for semiconductor components and solar cells. The complexity of this range of solutions is a measure of how well this Budapest-based enterprise is handling it. Most of these technologies can be integrated in various platforms. Over 70 physicists and 90 engineers around the world ensure an extremely high quality standard. Further reasons for success: most Semilab measuring techniques are non-contact and non-destructive. The installation of a glass measuring table was nonetheless beset by difficulties. The glass measuring machine had originally been equipped with isolators that worked very softly in the horizontal axis. The relatively low lateral rigidity of the products used led to low internal damping of the isolator and permitted the machine to start vibrating when subjected to dynamic shocks or additional accelerations. The measurement errors resulting from these undesirable motions meant that the problem needed to be remedied as quickly as possible. Semilab hence lost no time in beating a path to the door of Norbert Turi at the Hungarian Bibus branch. And as they had hoped, Norbert Turi, long-standing sales engineer at Bibus, a leading supplier of hydraulic, pneumatic and mechatronic technologies, quickly came up with an answer. In order to offer Semilab the best solution available at the time, he also took ACE Stoßdämpfer GmbH on board, the innovative component supplier and Bibus cooperation partner. But this was not the end of the trail to a successful solution, because wherever vibration isolation and damping is concerned, this company from Langenfeld in Germany in turn puts its trust in a close cooperation with its sister company Fabreeka GmbH from Büttelborn in the German Hesse region. In this case the ACE expert for vibration technology, Dipl.-Ing. Dieter Wohlschlegel, teamed up with his colleague at Fabreeka, Dipl.-Ing. Axel Platen.

Precision isolators for precision systems

The trail was hence leading from Hungary to Langenfeld and Büttelborn near Darmstadt and back again by way of several stops. This is quite remarkable in itself because not that long ago, a project involving four partners at three different locations would have led to virtually insurmountable problems, at least if speed is of the essence. But in the digital age, this kind of challenge can be tackled in no time. Given the dynamic additional forces, the required level of isolation, the static and moveable mass and the machine's dimensions, Fabreeka's engineering manager, Axel Platen, suggested low-frequency air spring elements of the PAL 21-6 type. These ultimately installed membrane air springs are commercially available air spring elements. One distinctive feature of this solution is the level control valve, whose special construction ensures above average longevity. Particularly with horizontal motions caused by relatively great acceleration forces as in the case of the Semilab glass measuring table, the robustness and durability of the isolation system is an important argument. This is especially true given the reduced abrasion of its valve tappet, ensuring precise resetting over a long period of time. Once the right elements had been selected, the experts Wohlschlegel and Platen jointly took on the installation of the system in Hungary. It demonstrated that the new air spring system works a lot better than the old one where the dynamic behaviour and isolation properties are concerned. The assessment criteria to be considered always include the natural frequency, i.e. isolation, the resetting precision of the level control valve, and the settling time, which is the time required by the system to regain its original status after an interference or impulse.

Broad portfolio

Depending on the application, ACE offers various products for noise minimization



Author: *Robert Timmerberg, MA, editor and managing director, plus2 GmbH Düsseldorf, Germany*

About

Company name: ACE Stoßdämpfer
Headquarters: Langenfeld, Germany
Turnover: € 37 m (2013)
Products: industrial shock absorbers, profile dampers, rotary dampers, industrial gas springs

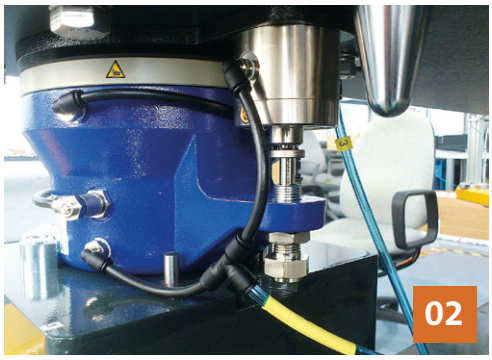
01 **The PAL type low-frequency air spring elements with automatic level control serve to isolate the machine from vibrations and/or decouple it from ambient vibrations**

02 **The PAL air springs ensure optimal vibration isolation thanks to their low natural frequencies**

03 **A complete system of PAL type low-frequency air spring elements is normally made up of three or more isolators**

and vibration isolation from the ACEolator family first introduced in 2013. And if the interference is not as low-frequency as in Hungary, other solutions from the broad ACEolator range can be applied. Rubber-metal isolators and machine feet, for example, will eliminate vibrations for engines, compressors or fans, amongst others. And damping plates of the SLAB type are for example applicable to machine foundations, in pipeline construction or for machinery requiring post-hoc protection.

Everyone is very happy at Semilab by now, because Bibus, ACE and Fabreeka have, by way of their fast and efficient help, successfully ensured that the glass measuring tables work to the full satisfaction of the company's own customers. Not least of all thanks to the system analysis and on-site installation by the engineers from ACE and Fabreeka.



www.ace-ace.com
www.bibus.com
www.semilab.com

Dynamic sealing system for mini excavator actuators

Fabio Bueti

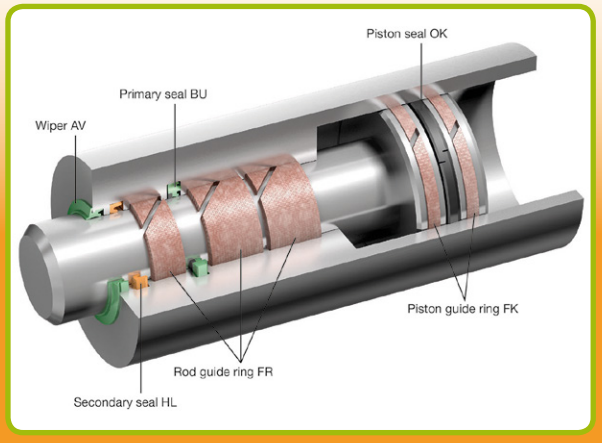
Thanks to their flexibility and versatility modern mini excavators perform a wealth of important tasks in construction and rehabilitation projects, up to and including clearing work after natural disasters, and much more. They often handle a Herculean workload in harshest conditions. A tandem sealing system developed by Parker-Prädifa helps ensure that the little 'heavy-duty diggers' meet current and future demands in terms of loads, service life and eco-friendly operation.

The service life of sealing systems in mini excavator applications today plays a much greater role than it did in the days of the so-called 'disposable excavator.' That was the expression coined at the time for the mini excavators that were frequently utilized in landscape gardening. The reason for calling them 'disposable' was their much shorter lifespan compared with large excavators, as a result of which they would either be scrapped right away or disappear in the second-hand market where they would often be used for non-commercial purposes. Today, in the light of increasingly constrained space conditions, mini excavators play an increasingly important part in diverse projects such as new residential construction, rehabilitation work on existing buildings and facilities, as well as in clearing work following natural disasters. In contrast to large excavators, they can be utilized in tight spaces or hard to access areas and, due to their low weight and small size, they can be loaded on trucks for fast and easy transportation to the project site.

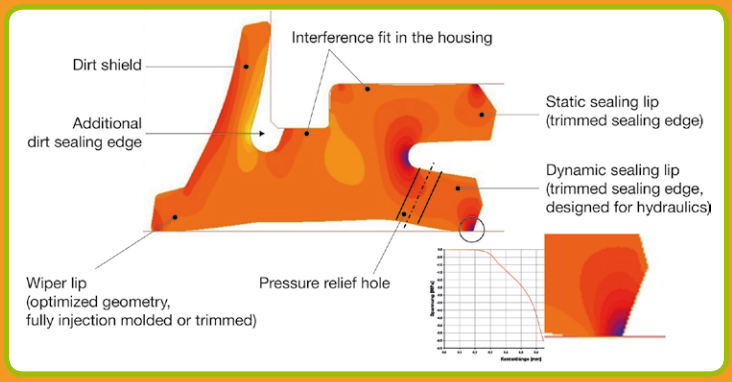
Increasing demand meets with increasing requirements

As a result, mini excavators, thanks to their practical and flexible uses, have been in increasing demand around the world. This demand is being met by a large number of

Fabio Bueti, *Application Engineering Fluid Power, Parker Engineered Materials Group Europe, Packing Division, Parker-Prädifa, 74321 Bietigheim-Bissingen*



01 Parker tandem sealing system



02 AV wiper product features

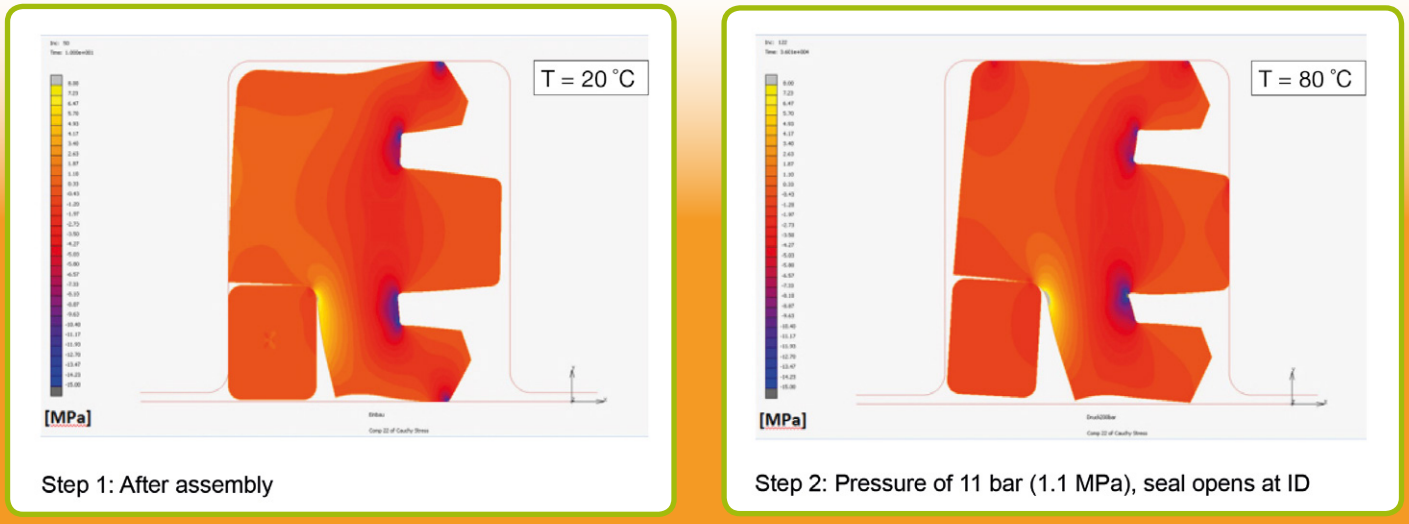
manufacturers offering a wide range of models and sizes. At the same time, however, the extended range of uses and harsher operating conditions lead to higher demands being made on these excavators in terms of service life, performance and efficiency, as well as ease of operation and maintenance. The resulting high design requirements particularly affect the manufacturers of hydraulic cylinders – typically guard, swing, shovel and boom cylinders – and thus the sealing systems used in them. The requirements for longer service intervals in the face of consistently increasing service pressures and significantly changed ambient conditions are fully transferred to sealing performance as well. This also applies to the increasing demand for leak-free cylinders under the heading of 'clean hydraulics.'

Optimal pairing of seal design and material

The sealing and materials specialist Parker-Prädifa began to address the progressively higher demands made in the field of hydraulics several years ago and developed a solution that has since been proven in numerous applications. This solution, which also satisfies the increased requirements in mini excavator actuators, is a tandem sealing system featuring a special design in combination with hydrolysis-optimized and wear-resistant polyurethane materials as described in detail below.**(Figure 01)**.

Wiper with Integrated dirt shield

The wiper is the major element on the hydraulic working cylinder to prevent dirt ingress. It protects the entire hydraulic system against dust, dirt, moisture and other environmental influences. As a result of increasingly sensitive elements within the hydraulic circuit the wiper function becomes ever more important as well because contaminated fluid systems are a frequent cause of total system failures that lead to high consequential costs. The AV wiper profile developed by Parker-Prädifa



03 Finite Element Analysis of the pressure relief function (check valve principle) on a BU rod seal. The graph shows the distribution of radial stress levels

to improve the wiper function in mobile machines features the following characteristics **(Figure 02)**:

- The dirt shield and dirt sealing edge along the groove side prevent ingress of dirt and moisture, also in vertical cylinder applications;
- Pressure relief function with an opening toward the cylinder rod space;
- Leakage oil remains in the cylinder, and in the case of a corresponding pressure gradient between the wiper and the atmosphere flows outward and is evenly distributed on the piston rod;
- The interference fit in the groove guarantees a stable position. The wiper cannot be pushed out of the housing;
- Robust wiper lip with optimized geometry.

The standard material, P5008 polyurethane, exhibits good wear resistance and low compression set. The sealing material can be changed to the hydrolysis-resistant P5000 polyurethane compound, depending on the field of application.

Compact rod seal as a primary seal

The BU profile Ultrathan rod seal is a compact seal with an integrated anti-extrusion ring. It is used as a buffer seal within this sealing system. Cylinders such as those utilized in mini excavators frequently operate under conditions in which pressure peaks up to 1,000 bar (100 MPa) are not uncommon. The BU rod seal is installed in front of it to isolate the load from the secondary seal. Due to its special shape the seal is able to return the pressure that can build up between the primary and the secondary seal under certain conditions to the hydraulic working system like a check valve (**Figure 03**). This prevents damage to the secondary seal due to excessive intermediate pressures and the resultant reduction of service life. The BU rod seal features the following characteristics:

- Excellent sealing performance, also in non-pressurized conditions ;
- Robust seal profile for harshest operating conditions;
- Extreme wear resistance;
- Insensitivity to extreme pressure peaks;
- Maximum extrusion resistance;
- Short axial installation length.

The results of the Finite Element Analysis show that, due to its special design, the primary seal is able to return the intermediate pressure that has been generated between the primary and the secondary seal to the system like a check valve. As shown in this calculation, the dynamic sealing lip of the BU seal opens at a pressure of approx. 10 bar (1 MPa) or higher, thus preventing a pressure buildup between the primary and the secondary seal.

However, there is no absolute requirement for the BU rod seal to be used as a primary or 'buffer seal' in a tandem sealing system. The BU seal is also frequently utilized as a single seal, for instance in the case of significantly varying pressure parameters. Parker recommends the P6000 polyurethane compound to satisfy the demanding operating conditions and to guarantee optimal dimensional stability and wear resistance. The hydrolysis-resistant P5000 polyurethane compound can be utilized as well, depending on the field of application. The anti-extrusion ring made of glass fiber-reinforced W5059 polyamide additionally protects against extrusion in the case of large gap dimensions or pressure peaks.

Low-friction secondary rod seal

A friction-minimized seal profile such as the HL rod seal is suitable as a secondary seal for tandem configurations. The 'secondary seal' typically operates as a non-pressurized seal. The HL rod seal offers the major advantage of hardly generating any additional friction due to its exceptional design even though it essentially operates without pressure.

Due to the cascading dynamic sealing lips the seal is automatically controlled by the system pressure. When pressure increases, the individual sealing lips consecutively latch on to the mating surface. As can be seen in **Figure 04**, the HL rod seal, in non-pressurized conditions, latches on to the mating surface only with the 'tip' of the first sealing lip, thus ensuring optimal ease of movement. In the event that the residual oil film should increase during the course

of seal life due to damage or wear the HL seal intervenes and adjusts to the new working conditions. In a nutshell: friction is reduced to a minimum and optimum ease of movement is ensured not only in non-pressurized conditions but in all pressure ranges as well.

Whether it is utilized as a tandem seal or a single sealing element, the HL seal, due to its properties, supports minimized breakaway friction while delivering good sealing performance in all pressure ranges.

Product features of the HL rod seal:

- Extremely low friction;
- No stick-slip, even in the case of low surface speeds;
- Optimal sealing function;
- High wear resistance;
- High extrusion resistance;
- Increased temperature resistance;
- Easy assembly;
- Short housing.

The advantages of the geometry are systematically supported by the utilization of the P6030 seal compound. The material that has been specifically designed for fluid power applications delivers good media resistance and, among other things, exhibits increased temperature and wear resistance, as well as low compression set.

Robust piston seal

The OK piston sealing set has been primarily developed for heavy-duty hydraulics and is preferably utilized in double-acting cylinders. The design of the OK piston sealing set and profile properties superbly fit the requirements and operating conditions in mobile hydraulics. As a result, this sealing set, in addition to its extreme wear resistance, exhibits further positive properties:

- Insensitivity against extreme pressure peaks;
- Maximum extrusion resistance in the case of high pressures and large gaps;
- Easy installation, without tools, on single-piece pistons due to split design of the sealing ring;
- Dimensions according to ISO 7425-1;
- Short axial installation length.

The sealing ring of the OK piston sealing set consists of the filled modified W5019 thermoplastic compound that is characterized by high extrusion resistance, even in the case of high pressures and large gaps.

Reliably centric guidance

In mobile hydraulics, Parker-Prädifa prefers guide rings based on duroplastic synthetic resins with fabric reinforcements to keep the piston rod in a centric position even in heavy-duty operating conditions. This corresponds to the FR and FK guide rings using the Q5038 compound.

The low guidance lash, due to minimal manufacturing tolerances, and the higher permissible surface compression of the guide materials ensure reliably centric guidance of the piston rod in the application. As a result, neither the surface of the piston rod nor the sealing elements are affected.

The FK piston guide rings are preloaded on the outer diameter and the FR rod guide rings on the inner diameter for optimum functionality **(Figure 05)**.

Compared with thermoplastics and other guiding tape materials, duroplastic synthetic resins exhibit the following advantages:

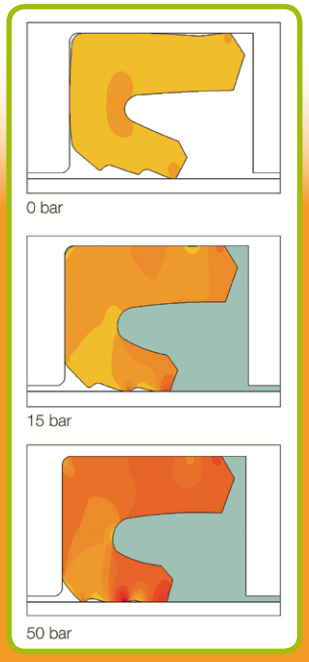
- Very high pressure resistance;
- Significantly higher permissible surface compression;
- Extremely high wear resistance;
- Improved anti-frictional properties;
- High resistance against aggressive media;
- Easy snap assembly on single-piece pistons and in closed and undercut grooves.

Conclusion

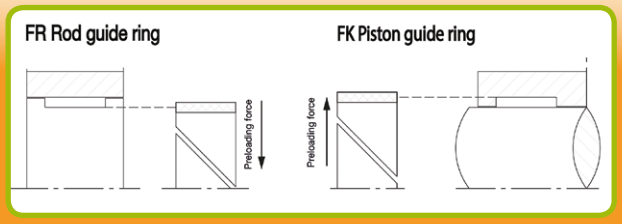
The Parker tandem sealing system has proven its viability in diverse applications and ambient conditions. Due to the continuous further development of the seal design and sealing materials the sealing systems are continually modified to meet the user's requirements. In addition to the seal design, the selection of the materials satisfies the demands made by the relevant operating and application conditions, legal requirements for pressure fluids in certain regions, as well as special climatic conditions.

Photographs: *Parker-Prädifa*

www.parker.com/praedifa



04 The Finite Element simulation shows the operating principle of the HL rod seal in various pressure ranges



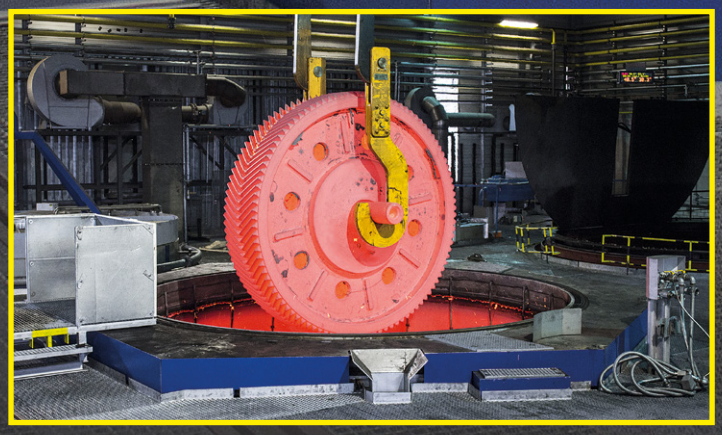
05 Illustration of the preloading force for the FR (on inner diameter) and FK (on outer diameter) guide rings

About

Company name: Parker Hannifin
Division: Praedifa Sealing
Established: 1918 (Group)
Headquarters: Cleveland, OH, USA (Group)
Turnover: $ 13 bn (Group)
Employees: 57,500 worldwide (Group)
Products: Seals and rings

THIS ARTICLE IS A CONTRIBUTION BY
Mobile Maschinen

our big picture



It rare spectacle our editor was able to experience at Härterei Resse in Bochum, Germany: In Europe's largest plant for protective gas hardening a 21-ton gear was in process. Machine parts up to 5.2 m in diameter and 5.0 m height are engulfed in one furnace. Gears can even be treated vertically therein and thereby remain highly customized and dimensionally stable. Fire and flames shoot into the air – for customers all over the world. www.haerterei.com

Photographs: *Holger Seybold, MDA Technologies*

GO GLOBAL

CHICAGO
SÃO PAULO
MILANO
ISTANBUL
NEW DELHI
SHANGHAI
HANNOVER

MDA Technologies represents

- electrical and mechanical power transmission
- control technologies
- latest innovations in hydraulics and pneumatics

www.mda-technologies.com

New business is just one click away.

VEREINIGTE FACHVERLAGE