

Power Transmission Engineering
Fluid Power



Power Transmission Engineering and Fluid Power

Motion, Drive & Automation

4th Edition 2017



Power Transmission Engineering
Fluid Power



Power Transmission Engineering and Fluid Power

Motion, Drive & Automation



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Power Transmission Engineering and Fluid Power for the World of Tomorrow



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Chairman
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Dear readers!

The companies which form the German power transmission engineering and fluid power industries set the standards as technological world-market leaders. When it comes to Industrie 4.0 and Predictive Maintenance 4.0, German manufacturers are the pace-setters for the future. Power transmission engineering and fluid power will play a crucial role in this process, since it is these industries that supply the intelligent components, systems and solutions which will drive the machines and the world of tomorrow.

This present directory entitled “Power Transmission Engineering and Fluid Power – Motion, Drive & Automation” demonstrates the economic and technological capabilities of these two industries and provides details of their “godparents” in the VDMA. This well-proven manufacturer directory with its individual portraits of member companies offers you a guideline for these industries. It also offers you an opportunity to learn more about the topics and timeframes which are the driving force behind our industry.

We hope you find the directory interesting and informative!

Power Transmission Engineering and Fluid Power – Successful Enabler for the Future

Leading the World with Innovations

The German power transmission engineering and fluid power industries impress customers throughout the world with their quality products, innovations and services. This is underlined by the industries' leading position in world trade, with a high proportion of output going for export and total industry turnover at a high level. The two industries have been able to maintain their position of export champion in the world market for years – despite increasing competition from outside Germany and the current difficult market environment. In 2016, too, power transmission engineering and fluid power were once again able to demonstrate that technological leadership.

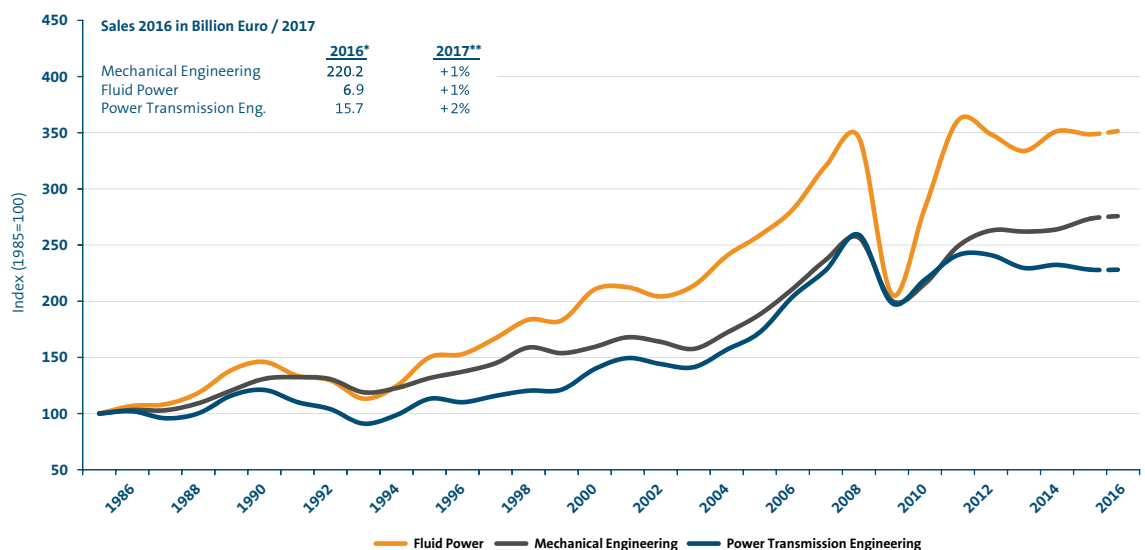
With total sales of almost €23 billion, these two innovative supplier industries form the largest segment within the German mechanical engineering industry and provide employment for almost 130,000 people.

The prospects for the German power transmission engineering and fluid power industries are currently subject to pronounced economic and geopolitical uncertainties. Future opportunities can, however, be described fundamentally as promising. The forecast growth for 2017 of 1% for mechanical engineering industry, the most important customer group, is a positive signal for power transmission engineering and fluid power, for which the forecast for 2017 is also modest growth.

The two industries are looking to the future with confidence: the investment backlog of recent years will be resolved, the fundamental interests of the companies concerned in innovation and

Sales Development

Mechanical Engineering / Fluid Power / Power Transmission Engineering



Source: VDMA

* estimated

** Forecast as of November 2016

the fact that both industries have a key function and a leading international role to play within the context of Industrie 4.0 will open up new potential for growth for German manufacturers.

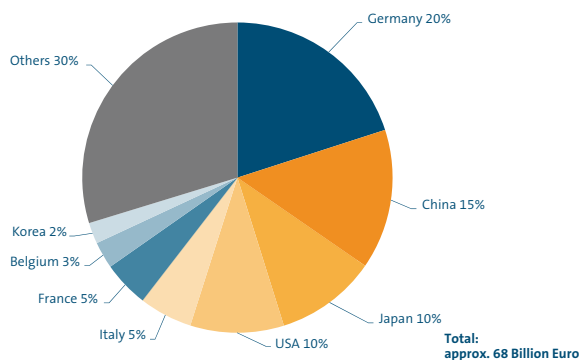
A Reliable and Innovative Partner for Customers

Cutting-edge technology and a capacity for innovation are crucial requirements if these German industries are to continue in future to play a leading role in global competition and win customers

world-wide with attractive products and services. The companies concerned therefore place their faith squarely in research and development, continuously improve their already well-proven products and play an active part in shaping the change to new technologies such as digitisation and networking.

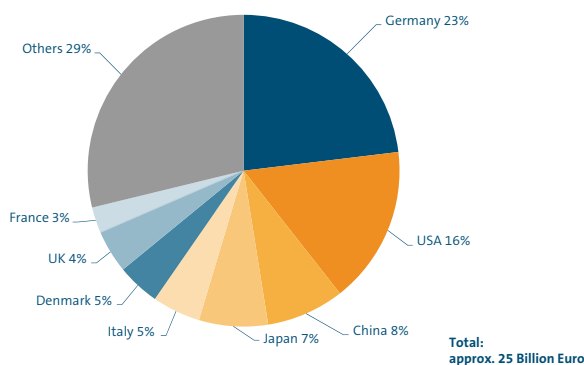
The supplier industries of power transmission engineering and fluid power are technological pioneers in all kinds of applications and requirements relating to markets and customers. They supply solutions for automation technology, the automotive industry, construction machinery, printing and paper technology, energy and environment technology – no matter whether in the form of wind farms or solar energy installations, conveyor systems, woodworking machinery, plastics and rubber machinery, agricultural machinery, air and space travel, medical technology, food and packaging machinery, shipbuilding, machine tools, etc.

Power Transmission Engineering: Export Shares of the most important Supplier Countries



Source: National Statistical Offices, VDMA

Fluid Power: Export Shares of the most important Supplier Countries



Source: National Statistical Offices, VDMA

Power Transmission Engineering and Fluid Power – Reliable Partner

The German power transmission engineering and fluid power industries have been world export champions for years, exporting a high proportion of their output, over 50% in the case of fluid power and 80% or more with power transmission engineering – clear proof of the high level of competence of customers world wide in German cutting-edge technology.

Many German companies in the mechanical engineering industry produce directly in their most important sales areas, key locations being China, India, Eastern Europe and the USA. The companies within the German power transmission engineering and fluid power industries provide local support for their customers with the necessary technology, innovative solutions and customer-friendly service. All around the world, customers place their faith in technology, products and services “Made in Germany”.

Cutting-Edge Technology “Made in Germany”

As global competition becomes ever more intensive, the companies in the power transmission engineering and fluid power industries who will emerge as the winners will be those with the most modern technology for all kinds of application areas throughout the value creation chain. As the most important suppliers to the entire mechanical engineering industry, these two industry segments play an important part in achieving the political conditions necessary to reach climate-protection and energy-policy goals. The two industries are facing up to the new challenges of the world's changing markets. The philosophy “Think global, act local”, is more applicable to supplier industries today than ever before. The classic industrial products of drive technology and fluid power, despite the increasing intensity of competition, are responsible for securing the future of Germany as an industrial location.

Industrie 4.0 offers German companies the opportunity to expand their world-wide lead in the area of production technologies.

In order to maintain this position, German companies must get to grips with the topic of “Industrie 4.0”. They need to implement the topics of digitisation, networking and communication in their corporate structures and organisations, and also in production processes and the products themselves.

The entire value chain needs to be adapted in accordance with the Industrie 4.0 philosophy. New business models must be generated. Companies which even today are working intensively with the topic of Industrie 4.0, expect concrete benefit to emerge from the fusion of IT and mechanical engineering. Workpieces which can communicate with each other and production machines open the way to new processes and new functionalities. Industrie 4.0 opens up completely new solution paths which allow the fulfilment of the increasingly stringent requirements regarding energy and resource efficiency and flexibility and individualisation in produc-

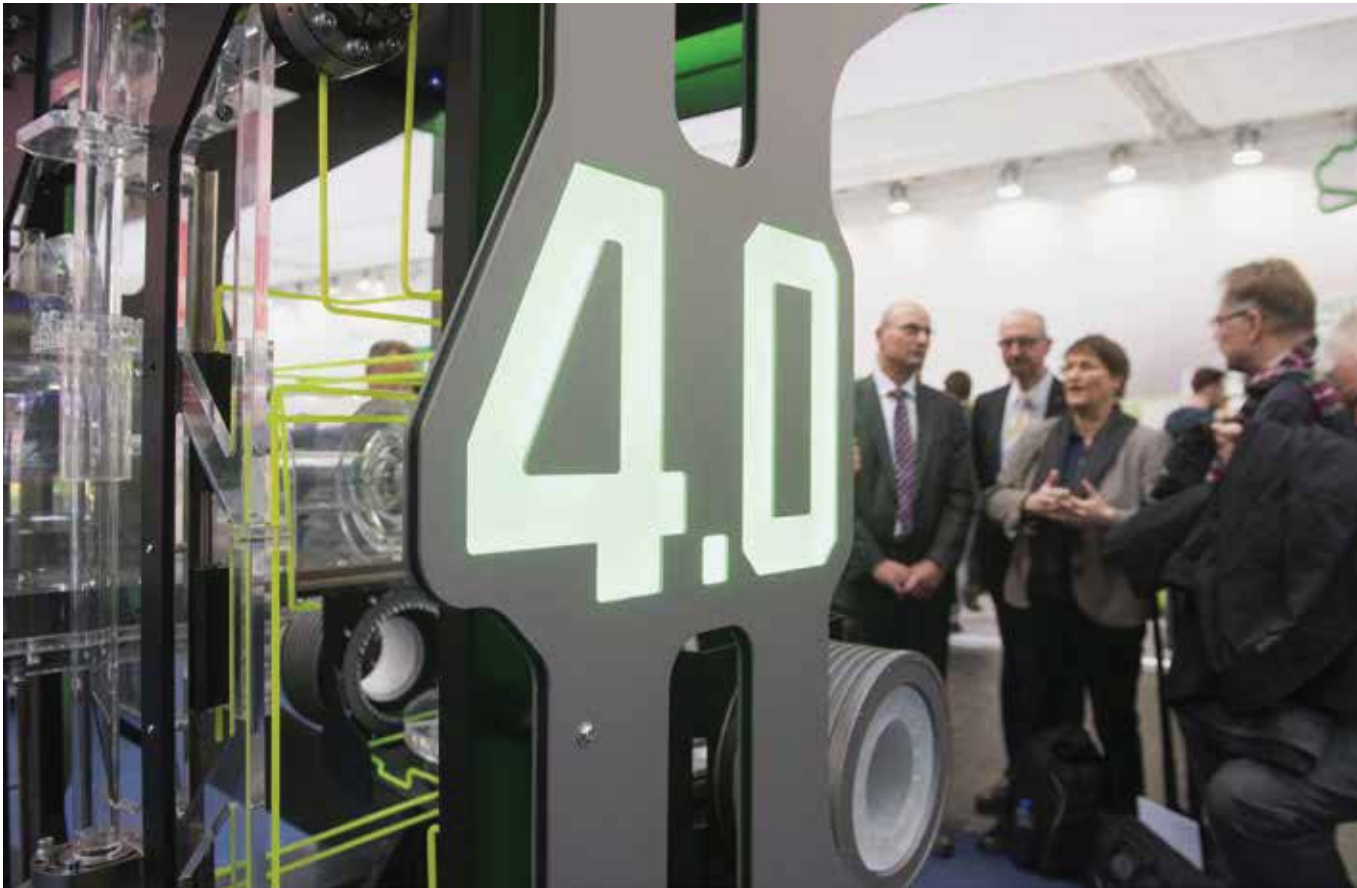
tion. New business models, better after sales service, total cost of ownership and predictive maintenance systems are already being taken up on a large scale by industry.

Predictive maintenance is an important element of networked production and an Industrie 4.0 environment

The basic task is to meet the expectation or demand of the operators of machines and plants for higher productivity, functional safety and reliability. These requirements are implemented through shorter development processes for components and systems. Among the key aspects are, for example, the greater use of simulation tools to achieve optimum dimensioning and the increasing level of mechatronisation. Customers must be able to expect that the actuators which they are offered are the most efficient ones possible. This also means close cooperation in the dimensioning of components and systems to match the relevant customer process.

Further important criteria are increasing the digitisation of components and systems, modularisation and, not least, ways of working with materials and energy which make fewer demands on resources. The criterion of energy efficiency in industrial processes is now and will certainly remain in the future the greatest challenge for manufacturers and also operators with regard to energy costs.

The concept of cutting-edge technology “Made in Germany” is based on the assumption that the technological leaders for the most important client industries remain physically located in Germany, together with the suppliers of important basic technologies such as open-loop and closed-loop control technology, sensors and also production technology. Physical closeness and synergistic business relations between suppliers and client industry segments leads to a climate in which new concepts, new solutions can easily be generated.



Predictive Maintenance 4.0

In order to increase the availability and reliability of production equipment, machine and plant builders are increasingly adopting preventive maintenance based on intelligent data analysis. Predictive maintenance, an important aspect of the implementation of Industrie 4.0, offers structured data linkage and seamless monitoring which allows rapid fault diagnosis and plays a decisive part in reducing unplanned downtime and the associated losses of production. The digital networking of machines, products and components makes it possible to acquire status data from machine components in real-time and combine this with information from third-party systems such as ERP or CRM. This allows the detection of operating states and the planning of optimum maintenance times.

Predictive maintenance stands for:

- Higher customer satisfaction through higher machine availability
- Customer loyalty through improved after-sales service
- Optimum deployment of resources in maintenance operations and spare-part logistics
- Lower maintenance and servicing costs
- Faster reaction speeds within disruptive production operations

“Motion, Drive & Automation” (MDA) – The Heart of the HANNOVER MESSE

With seven leading international exhibitions, the HANNOVER MESSE 2017 will act as a focus for the key industrial technologies and thus creates a horizontality which is unique throughout the world. The concept of the exhibition, the platform which allows all participating industry segments and the technologies to work together, is unequalled: nowhere else can interested parties gather information on all areas of industrial value creation in such a comprehensive and integrated form. The most important segments of industry show their strengths and facilitate the interdisciplinary knowledge transfer which allows bridges to be built to adjacent technologies.

Lead Theme of the HANNOVER MESSE:

Integrated Industry – Creating Value

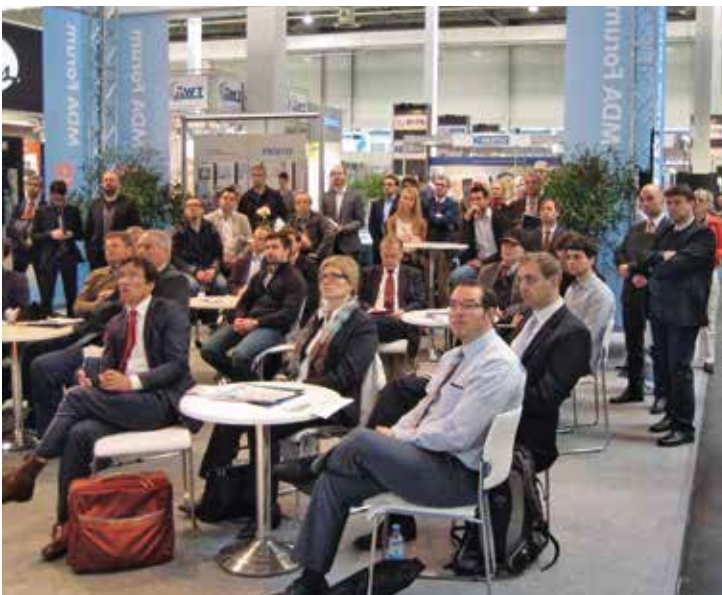
As part of this leading world exhibition, the MDA – Motion, Drive & Automation – is held every two years. This is by far the world’s leading exhibition for key components of industrial automation and offers interested parties an opportunity to gather information from some 1200 exhibitors from more than 35 countries describing concepts and solutions.

As manufacturers of the core components for all industrial applications, the companies in the power transmission engineering and fluid power industries supply basic technologies to the entire industry. For them, the MDA every two years is a meeting point for designers, development engineers, researchers and company management from the world’s investment goods industry. At the coming event in April 2017, “Integrated Industry – Creating Value” will be the main theme of the entire HANNOVER MESSE. This main theme represents the major challenges of Industrie 4.0 – for example, generally-valid standards for machine-to-machine communication, questions of data security and the search for the business model of the future – challenges which can only be met in a network. Come and see us at the heart of the HANNOVER MESSE 2017 in Hall 19.

MobilTec has 2016 been integrated into the leading exhibition “Energy”. The VDMA electromobility forum E-MOTIVE will be represented on the stand of the VDMA Power Systems Association in Hall 27 in Hanover.

MDA Forum

The VDMA and the exhibition organiser Deutsche Messe AG organise exciting lectures and discussions every two years at the MDA Forum in Hanover on topics of current interest relating to all aspects of power transmission engineering and fluid power. The programme is organised into half-day blocks – in accordance with the motto “Integrated Industry – Creating Value” it begins at noon on Monday with the theme blocks “Sustainability, Energy Efficiency”, “Drive Technology for Wind Energy Plants”, “Development of the Indian Market”. “Sealing Technology” and “Predictive Maintenance” and “Smart Manufacturing” within the context of Industrie 4.0. From 2017 onwards, the MDA Forum will be located in Hall 19. All the visitors to the exhibition are recommended to take part in this presentation in order to ensure that they remain up-to-date with the latest stage of developments.





VDMA Joint Company Stands Within Germany

The VDMA Power Transmission Engineering and Fluid Power Associations offer an MDA joint company stand every two years. In response to the keen interest displayed by a member companies, we have also since 2012 been represented at the IA Industrial Automation exhibition as part of the HANNOVER MESSE in various ways, including a joint company stand in Hall 17. This further development of the joint company stand concept in even-numbered years is generating increasing interest among our member companies and offers the opportunity to be present in Hanover every year. From 2018 onwards, the range of exhibitions being held in parallel will be expanded to include CeMAT, the world's leading exhibition of intralogistics and supply chain management.

Joint Company Stands – a World-Wide Presence for German Industry

Since 2007, the two VDMA associations have been organising joint company stands at leading industry-segment exhibitions, such as “Systems and Components”, which forms part of AGRI-TECHNICA 2017 and bauma 2019. The range of services offered by the associations means that small- and medium-sized companies in particular can buy a ready-made package for an exhibition presentation, including an all-round worry-free package, for a fair price.

HANNOVER MESSE Events Worldwide Under the Motto of “Made in Germany”

The VDMA has worked with the Deutsche Messe AG to expand its world-wide MDA exhibition policy: in the last 20 years, the PTC ASIA in Shanghai has grown into the second-largest industrial exhibition in the world; in India, the industry segment holds exhibitions at rotating locations (Bangalore, Mumbai and New Delhi) and has since 2007 exhibited its products and solutions at WIN/MDA INDIA, which will once again be in Mumbai in 2018.

German companies have been participating successfully for years in WIN EURASIA AUTOMATION with the MDA sector in Istanbul. In September 2014, a further satellite exhibition was launched, MDA NORTH AMERICA in conjunction with INDUSTRIAL AUTOMATION NORTH AMERICA as part of the IMTS International Manufacturing Technology Show in Chicago.

The exhibitions outside Germany mentioned above are supported by the Federal Ministry for Economics Affairs and Energy in the form of German Pavilions under the motto “Made in Germany”. Applications for financial support are made by the VDMA associations.

MDA forums of the type mentioned above are organised by the VDMA Power Transmission Engineering and Fluid Power Associations and the Deutsche Messe AG in the above-mentioned foreign markets, in each case during the exhibition in question.

VDMA Joint Stands on Trade Fairs – in Germany and Worldwide

2017 – Germany*

- Motion, Drive & Automation (MDA)
at HANNOVER MESSE
24 – 28 April 2017
VDMA joint stand
in hall 19
- AGRITECHNICA
incl. Systems & Components
Hanover
12 – 18 November 2017
VDMA joint stand

2017 – Worldwide

- WIN EURASIA Automation
Istanbul, Turkey
16 – 19 March 2017
German Pavilion
- PTC ASIA
Shanghai, PR China
31 October – 3 November 2017
German Pavilion

2018/2019 – Germany*

- Industrial Automation (IA)
at HANNOVER MESSE
23 – 27 April 2018
VDMA joint stand
- bauma
Munich
08 – 14 April 2019
VDMA joint stand

2018 – Worldwide

- WIN INDIA
Mumbai, India
22 – 24 February 2018
- WIN EURASIA Automation
Istanbul, Turkey
15 – 18 March 2018
- MDA und IA NORTH AMERICA
at IMTS (International
Manufacturing Technology Show)
Chicago, USA
10 – 15 September 2018
- PTC ASIA
Shanghai, PR China
October/November 2018

*only for VDMA member companies



Sealing Technology Within the VDMA

The manufacturers of seals and sealing systems are organised within the VDMA in the Fluid Power Association.

VDMA activities relating to sealing technology include the following:

- Three economic working groups: fluid power sealings, sealing sheets and mechanical seals, each meeting twice a year (including external meetings with suppliers, research institutes, test laboratories, etc.).
- Technical working groups: organisation of committees for DIN and ISO standardisation and of ad-hoc groups for VDMA position papers and policy documents (e.g. relating to elastomer guideline, ATEX technical instructions on air quality control).
- Promotion of science and education: supporting initiative for „Promotion of Knowledge Relating to Sealing Technology

at the University of Stuttgart“ and provision of training materials and failure mode atlas for sealing systems in fluid power applications.

- Sealing technology statistics for fluid power sealings, sealing sheets and mechanical seals.
- Support of marketing activities through multi-lingual brochure „Innovative Sealing Technology“, including list of German suppliers.
- Organisation of the world's largest international sealing technology conference: the International Sealing Conference (ISC), affiliated with an exhibition (see also www.sealing-conference.com), which has been held in Stuttgart since 2001.

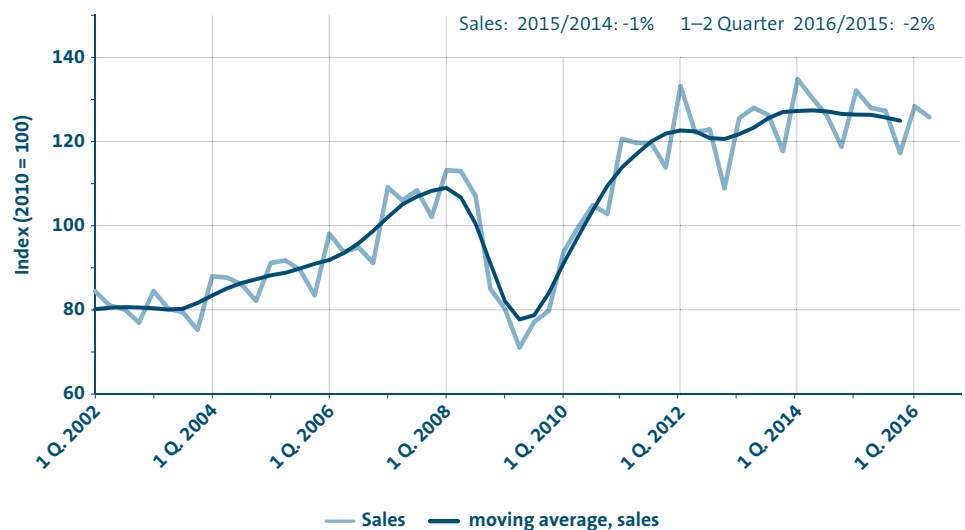
20th ISC
Stuttgart, Germany
Oct. 10 – 11, 2018

Brochure
Sealing Technology
3rd Edition 2016



Sales Development Seals

Fluid Power Sealings, Mechanical Seals and Sealing Sheets



The figures for turnover and levels of orders received by the sealing technology companies organised within the VDMA remain at a very stable level despite political and economic crises and weaknesses in client industries.

Source: VDMA

VDMA Network Abroad



The representations of the VDMA in Kolkatta, Moscow, Beijing, Shanghai and São Paulo serve as international contact points.

Local German speaking employees facilitate the market entry for VDMA member companies. They serve as international bridgeheads between governmental organisations, associations and companies.

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Activities in the Past Three Years

- Organisation of Management-Meetings in China (1x/year) and India (2x/year)
- Representation on sector specific trade fairs like PTC ASIA and WIN INDIA
- Organisation of the MDA Forum as part of WIN INDIA and PTC ASIA
- India Fluid Power Industry Report (4x/year)
- Power Transmission Engineering Quarterly Reports China, India and Russia



Services – Freely Requestable for Members

Establishing of Contacts

- Ministries/Associations
- Trade and business press
- Trade Fair organisers

Market Penetration

- Site research
- Trends/Potentials
- Newsletter/Industrial reports (Brazil, China, India)

Network

- Entrepreneur meetings
- Embassy/Consulates
- Local administration

Lobbying/Monitoring

- Representation of industry interests
- Observation of the local legal conditions
- Standardisation activities (China)

Special Services

Against Compensation of Expenses

- Establishment of offices/foundation of companies
- Personnel recruitment
- Market analyses
- Visas-invitations
- Provision of interpreting services
- Registration of trademarks
- Provision of legal and tax counselling
- etc.



Services in the Indian Industry

- VDMA Directory
“Who makes machinery in Germany”
- VDMA Managers Navigator India
- German Machinery Industry Newsletter
- Information about branch specific trade fairs in Germany
- Business Matchmaking Service

FVA Nacelle – Joint Industrial Research into More Reliable Wind Turbines



Wind turbines are on average at an unplanned standstill of 1 to 2 weeks per year. These standstill periods due to damage continue to occur despite the highly-developed technology and result in high costs because of the need for expensive service technicians, spare parts and loss of power generation. Minimising downtime periods is therefore in the interests of all the companies involved in the wind industry. This is by no means an easy task, since wind turbines are technically complex systems which are exposed in operation to very many different and widely-varying loads.

The project „FVA Gondel“ (FVA Nacelle) conducted by the German Research Association for Drive Technology (FVA) for the first time makes it possible to conduct pre-competition joint industrial research on complete wind turbine systems. Using the system test bench of the Center for Wind Power Drives (CWD) of the RWTH Aachen, a generic research wind turbine

was assembled with a rating of 2.75 MW and with a complete drivetrain, separated from the rotor and the tower. The test bench is able to simulate wind fields and reactive power grid of various types, allowing components to be studied under various operating and load conditions. At the same time, a detailed simulation model was created for the entire system and harmonised with reality by using the test bench results. Using the knowledge gained, it will in future be possible to design turbines and components even more accurately to meet real-world requirements.

The research project is scheduled to take three years (2015-2017) and has a total value of around € 5.9 million. It is being promoted as part of the sixth energy research programme of the BMWi (German Federal Ministry for Economic Affairs and Energy). The project consortium consists of the CWD, Siemens AG and the FVA. Above and beyond this, member companies of the FVA are engaging in the project by contributing know-how and technical services as associated partners. The FVA network is being used to communicate the results to the entire power transmission engineering industry. As a side-effect, a rising generation of scientists has the opportunity to carry out research, including doctoral theses, on a ready-to-market wind turbine generator.

In addition to the FVA Nacelle, the FVA is currently conducting round about 30 research projects relating to the wind industry. These are concerned with everything from calculation methods and test procedures for gear boxes and components through to an assessment of roller-bearing damages and a study of lubricants.

FVA Workbench: Calculation and Simulation Platform for Drive Technology



The FVA Workbench is a calculation and simulation platform for a wide range of issues concerning the design of drive systems. The software bundles leading calculation methods, for individual machine elements through to the entire drive system, that have been developed from 50 years of research within the FVA e.V. (Forschungsvereinigung Antriebstechnik, the German Research Association for Drive Technology) network of experts. In addition to standard calculations according to national and international standards and classification societies, the software offers extensive additional calculation methods according to the latest research.

Intuitive Operation for Increased Productivity

The input logic of the FVA Workbench is directly aligned to users' calculation objectives. Users are guided intuitively through the input process. The system also provides assistance and additional information. This helps users to achieve consistent results in less time.

Information Where You Need It

For a quick introduction to the world of FVA calculations, the integrated FVA KnowledgeBase knowledge management system provides easy access to information related to the calculation methods and functions of the FVA Workbench. Users also benefit from useful context-sensitive help, tutorials, and graphical content. Additionally, FVA members can directly access relevant information from the comprehensive FVA „Themis“ knowledge database from within the software.

3D Animation Reduces Complexity

The FVA Workbench uses a professional CAD kernel to generate 3D models. Very detailed, geometrically correct representations allow direct, visual verification of results. High-quality animations make complex movements and power flows intuitive and easy to understand. Gear models can also be exported in a neutral .SAT format for use with external CAD programs.

The Latest FVA Workbench Features Include:

- Comprehensive enhancements to calculation options
- Automatic dimensioning of shafts
- Local and global cutting planes
- Import of gearbox housings for consideration of the housing stiffness
- Connection of finite-element meshes to analytical models
- Visualization of shaft bending lines and load flanks

Power Transmission Engineering and Fluid Power in the VDMA – the Global Service Providers

The VDMA Power Transmission Engineering and Fluid Power Associations represent the interests of around 400 member companies, the largest supplier segment within the German mechanical engineering industry, to the world of politics, national and international authorities, customer, supplier and competitor organisations and the public. Moreover, the Associations take up matters specific to the power transmission engineering and fluid power industries within the VDMA.

The Associations regard themselves as industry-segment-specific service providers and advisers. They are able to draw on the resources of the VDMA as an experienced and competent partner

which covers the entire mechanical engineering industry. What is more, thanks to their incorporation into the VDMA, the Associations work via the further 36 associations and individual state associations to provide contacts and information relating to the most important client industries, such as agricultural technology, construction machinery, robotics and automation, machine tools, plastic and rubber machinery, materials handling and intralogistics, printing and paper technology.

Main Aspects of the Associations' Work:

- Representation of technical interest and standardisation
- National and international market information
- Industry-segment-specific publicity
- Organisation of exhibitions and joint company stands
- Entering and surveying markets through liaison offices abroad

Joint research is well provided for by the Research Association for Drive Technology (FVA) and the Fluid Power Research Fund. In the field of international cooperation, the two associations provide general secretariats for the European sector committees EUROTRANS, FEBMA and CETOP and provide secretariat functions for international fluid power statistics.



ant.vdma.org/en
fluid.vdma.org/en

cetop.org
euro-trans.org



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FVA Workbench

Norbert Haefke

Managing Director FVA-SoftwareService










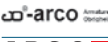













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The above mentioned contacts refer to the articles in this brochure.

List of German Suppliers

Power Transmission Engineering
Hydraulics
Pneumatics
Sealing Technology

List of German Suppliers		Power Transmission Engineering										Hydraulics										Pneumatics																
		Gears and gear units	Bearings	Transmission elements (couplings, clutches, brakes, chain and belt drives, etc.)	Spindle units / Working spindles	Linear motion systems	Geared motors / Electric motors	Frequency converters / Servo converters	Control systems	Diagnostic systems / Sensors	Services	Cylinders	Valves		Pumps	Motors	Hydrostatic transmission	Manifold blocks	Power units	Hydraulic accumulators	Heat exchangers / Coolers	Filters	Piping and connectors	Water hydraulics	Hydraulic accessories	Generator accessories	Measuring / Analysis devices	Electrical equipment / Electronics	Services	Hydraulic test and simulation arrangements	Actuators	Valves and manifold assemblies	Treatment of air	Sensors and monitoring equipment	Piping and connectors	Other pneumatic devices and accessories	Services	Sealing Technology
	ABB Automation Products GmbH www.abb.com/drives	•	•	•			•	•	•	•	•																											
	ACE Stoßdämpfer GmbH www.ace-ace.com			•																																•		
	ADE-Werk GmbH www.ade.de				•	•					•						•											•										
	ADMOS Gleitlager GmbH www.admos-gleitlager.de		•																																			
	AEM - Anhaltische Elektromotorenwerk Dessau GmbH www.aemdessau.de						•	•	•		•																											
	Alfa Laval Mid Europe GmbH www.alfalaval.com																			•	•																	
	AMK Arnold Müller GmbH & Co. KG www.amk-group.com				•	•		•	•		•																											
	Amsbeck Maschinentechnik GmbH www.amsbeck-mt.de/index.php?lang=en			•																																		
	ANDREAS MAIER GmbH & Co. KG www.amf.de										•	•		•	•	•		•	•		•	•		•	•		•	•				•		•				
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	ARGUS Fluidtechnik GmbH www.argus-fluidtechnik.de																					•																
	ARIS Stellantriebe GmbH www.stellantriebe.de/																													•						•		
	AROS HYDRAULIK GmbH www.aros-hydraulik.de											•						•																				
	ASCO Numatics GmbH www.asco.com																													•	•	•	•			•		
	ATEK Antriebstechnik Willi Glapiak GmbH www.atek.de	•		•			•																															
	ATLANTA Antriebssysteme E. Seidenspinner GmbH & Co. KG www.atlantagmbh.de	•		•		•																																
	AUTOKÜHLER GmbH & Co. KG www.akg-gruppe.de																			•				•														
	Aventics GmbH www.aventics.com																													•	•	•	•	•	•	•	•	•
	AVIT-Hochdruck Rohrtechnik GmbH www.avit.de																					•		•														
	Balluff GmbH www.balluff.com								•	•														•		•	•					•						
	BANSS Schlacht- und Fördertechnik GmbH www.banss.de								•																	•		•										
	bar pneumatische Steuerungssysteme GmbH www.bar-gmbh.de					•		•				•																		•	•	•			•			

Power Transmission Engineering
Hydraulics
Pneumatics
Sealing Technology
























List of German Suppliers		Power Transmission Engineering										Hydraulics										Pneumatics																
		Gears and gear units	Bearings	Transmission elements (couplings, clutches, brakes, chain and belt drives, etc.)	Spindle units / Working spindles	Linear motion systems	Gearred motors / Electric motors	Frequency converters / Servo converters	Control systems	Diagnostic systems / Sensors	Services	Cylinders	Valves	Pumps	Motors	Hydrostatic transmission	Manifold blocks	Power units	Hydraulic accumulators	Heat exchangers / Coolers	Filters	Piping and connectors	Water hydraulics	Hydraulic accessories	Generator accessories	Measuring / Analysis devices	Electrical equipment / Electronics	Services	Hydraulic test and simulation arrangements	Actuators	Valves and manifold assemblies	Treatment of air	Sensors and monitoring equipment	Piping and connectors	Other pneumatic devices and accessories	Services	Sealing Technology	
 Barksdale <small>CONTROL PRODUCTS</small>	Barksdale GmbH www.barksdale.de																																					
 Bauer <small>Gear Motor</small>	Bauer Gear Motor GmbH www.bauergears.com																																					
 BAUMÜLLER	Baumüller Nürnberg GmbH www.baumueller.de																																					
 BECKHOFF	Beckhoff Automation GmbH & Co. KG www.beckhoff.com																																					
 BEKO	BEKO TECHNOLOGIES GMBH www.beko-technologies.de																																					
 DR. BENDER GmbH	www.dr-bender.de																																					
 BERGES	Berges Antriebstechnik GmbH & Co. KG www.berges.de																																					
 BOLLFILTER <small>Protection Systems</small>	Boll & Kirch Filterbau GmbH www.bollfilter.com																																					
 Rexroth <small>Bosch Group</small>	Bosch Rexroth AG www.boschrexroth.com																																					
 BRACKER <small>INNOVATION</small>	Bracker GmbH Innovativer Maschinenbau www.bracker-imb.de																																					
 BRÄUTIGAM	Bräutigam Gear & Mining Tech GmbH & Co. KG www.braeutigam-group.com																																					
 Dr. BREIT <small>Hydraulic Power Units</small>	Dr. Breit GmbH www.dr-breit.de																																					
 BUCHER <small>hydraulics</small>	BUCHER HYDRAULICS GmbH www.bucherhydraulics.com																																					
 BUHLER TECHNOLOGIES	Bühler Technologies GmbH www.buehler-technologies.com																																					
 burkert <small>FLUID CONTROL SYSTEMS</small>	Christian Bürkert GmbH & Co. KG www.burkert.com																																					
 CAMOZZI	Camozzi GmbH Pneumatic www.camozzi.com																																					
 CATERPILLAR	Caterpillar Global Mining Europe GmbH www.cat.com/mining																																					
 CEJN	CEJN-Product GmbH www.cejn.com																																					
 CENTA	Centa Antriebe Kirschey GmbH www.centa.de																																					
 CEROBEAR <small>ceramic bearing technology</small>	CEROBEAR GmbH www.cerobear.com																																					
 CHESTERTON <small>Seal Solutions Lead Experts</small>	CHESTERTON INTERNATIONAL GmbH www.chesterton.com																																					
 CHETRA	CHETRA Dichtungstechnik AG www.chetra.de																																					
 CLAAS <small>INDUSTRIETECHNIK GMBH</small>	CLAAS Industrietechnik GmbH www.claas-industrietechnik.com																																					

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		Gears and gear units	Bearings	Transmission elements (couplings, clutches, chain and belt drives, etc.)	Spindle units / Working spindles	Linear motion systems	Gear motors / Electric motors	Frequency converters / Servo converters	Control systems	Diagnostic systems / Sensors	Services	Cylinders	Valves	Pumps	Motors	Hydrostatic transmission	Manifold blocks	Power units	Hydraulic accumulators	Heat exchangers / Coolers	Filters	Piping and connectors	Water hydraulics	Hydraulic accessories	Generator accessories	Measuring / Analysis devices	Electrical equipment / Electronics	Services	Hydraulic test and simulation arrangements	Actuators	Valves and manifold assemblies		Treatment of air	Sensors and monitoring equipment	Piping and connectors	Other pneumatic devices and accessories	Services
	Eich Rollenlager GmbH www.eich-rollenlager.de		●																																		
	Eickhoff Antriebstechnik GmbH www.eickhoff-bochum.de	●																																			
	Eifeler Maschinenbau GmbH www.emb-eifel.de																				●																
	Eisele Pneumatics GmbH & Co. KG www.eisele.eu/en/																													●			●	●			
	EKOMAT GmbH & Co. KG www.ekomat.de											●				●	●							●													
	Elbe Holding GmbH & Co. KG www.elbe-group.de	●		●						●																			●								
	EMAG KOEPFER GmbH www.emag.com	●																																			
	EMG Automation GmbH www.emg-automation.com					●			●		●						●										●										
	esco antriebstechnik gmbh www.esco-antriebstechnik.de	●		●			●																				●										
	ETO MAGNETIC GmbH www.etogruppe.com	●				●			●	●		●											●		●	●	●	●	●	●	●	●	●	●			
	Famic Technologies GmbH www.famictch.com									●																		●	●							●	
	FCMD GmbH www.fcmd-gmbh.de/	●		●																																	
	Ferrocontrol Steuerungssysteme GmbH & Co. KG www.ferrocontrol.de						●																														
	Festo Vertrieb GmbH & Co. KG www.festo.com	●		●	●	●	●	●	●	●																				●	●	●	●	●	●	●	
	Fietz GmbH www.fietz.com																																			●	
	Filtration Group GmbH www.FiltrationGroup.com																			●	●			●	●	●		●	●								
	FireDos GmbH www.firedos.de																					●															
	Flexitallic GmbH www.flexitallic-gmbh.de																																			●	
	Flowserve Dortmund GmbH & Co. KG www.flowserve.de/																																			●	
	Fluitronics GmbH www.fluitronics.com										●	●		●	●	●	●			●			●	●		●											
	FMB-Blicke GmbH www.fmb-blicke.de							●		●					●	●							●	●	●	●	●	●									
	Föhrenbach GmbH www.foehrenbach.com					●																															
	FORKARDT Deutschland GmbH www.forkardt.com/									●							●	●					●	●	●	●				●	●		●				

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	Gears and gear units	Bearings	Transmission elements (couplings, clutches, brakes, chain and belt drives, etc.)	Spindle units / Working spindles	Linear motion systems	Gear motors / Electric motors	Frequency converters / Servo converters	Control systems	Diagnostic systems / Sensors	Services	Cylinders	Valves		Pumps	Motors	Hydrostatic transmission	Manifold blocks	Power units	Hydraulic accumulators	Heat exchangers / Coolers	Filters	Piping and connectors	Water hydraulics	Hydraulic accessories	Generator accessories	Measuring / Analysis devices	Electrical equipment / Electronics	Services	Hydraulic test and simulation arrangements	Actuators	Valves and manifold assemblies	Treatment of air	Sensors and monitoring equipment	Piping and connectors	Other pneumatic devices and accessories	Services	Sealing Technology	
 Harmonic Drive AG www.harmonicdrive.de	•	•	•			•	•	•		•																												
 Hauhinco Maschinenfabrik GmbH & Co. KG www.hauhinco.de												•		•			•	•					•			•	•	•	•									
 HAWE Hydraulik SE www.hawe.de												•		•	•		•	•						•														
 HAWE InLine Hydraulik GmbH www.hawe-inline.com											•			•										•				•										
 Hecker Werke GmbH www.heckerwerke.de																																						•
 Dr. Johannes Heidenhain GmbH www.heidenhain.de					•																																	
 HERION & RAU Fluidtechnik GmbH www.bar-control.de																								•	•						•		•					
 Herrenknecht AG www.herrenknecht.de																																						
 HEUTE + COMP GmbH + Co. www.heutecomp.de																								•				•								•	•	
 HIWIN GmbH www.hiwin.de		•		•	•																																	
 HOERBIGER Automatisierungstechnik Holding GmbH www.hoerbiger.com					•						•	•		•		•	•				•						•	•										
 HOERBIGER Micro Fluid GmbH www.hoerbiger.com/de												•				•	•																					
 Walter Hunger GmbH & Co.KG www.hunger-hydraulik.de											•												•															
 Hunger DFE GmbH www.hunger-dichtungen.de																																						•
 HYDAC INTERNATIONAL GMBH www.hydac.com					•						•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
 HydraForce Hydraulics, Ltd. www.hydraforce.com								•				•					•										•											
 hydraulik-liftsysteme walter mayer gmbh www.liftsysteme.de																																						
 HYDROKOMP Hydraulische Komponenten GmbH www.hydrokomp.de											•	•		•					•			•						•										
 Hydropa GmbH & Cie. KG www.hydropa.de											•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
 HYDROPNEU GmbH www.hydropneu.de											•	•		•	•	•	•	•	•		•	•	•	•	•			•	•								•	
 HYDROTECHNIK GMBH www.hydrotechnik.com																						•		•		•	•	•	•							•		
 IDG-Dichtungstechnik GmbH www.idg-gmbh.com																																						•
ifm electronic gmbh www.ifm.com								•	•																	•						•						

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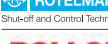












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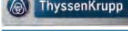





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	Dipl.-Ing. Herwarth Reich GmbH www.reich-kupplungen.com			•																																		
	REINTJES GmbH www.reintjes-gears.com	•																																				
	RENK Aktiengesellschaft www.renk.eu	•	•	•																																		
	Rhein-Getriebe GmbH www.rheingetriebe.com	•					•		•	•	•																											
	Rickmeier GmbH www.rickmeier.de/de/											•					•																					
	RINGFEDER POWER TRANSMISSION GMBH www.ringfeder.com			•																																		
	RINGSPANN GmbH www.ringspann.com			•																																		
	Rodriguez GmbH www.rodriquez.de		•				•																															
	RÖMHELD GmbH Friedrichshütte www.roemheld-gruppe.com			•		•				•	•		•				•	•		•	•			•	•			•										
	Röteltmann GmbH www.roeteltmann.de										•	•				•						•	•															
	Rollon GmbH www.rollon.com		•	•	•	•																																
	ROSS Europa GmbH www.rosseuropa.com																													•	•	•			•	•		
	Roth Hydraulics GmbH www.roth-hydraulics.de															•		•						•		•		•										
	RS Getriebe GmbH www.rsgetriebe.de/	•			•		•		•		•						•																					
	RT-Filtertechnik GmbH www.rt-filter.de																			•																		
	Ruhfus Systemhydraulik GmbH www.ruhfus.com										•						•							•	•			•	•									
	SAMSOMATIC GMBH www.samsomatic.de																														•	•	•	•	•	•	•	
	SAMSON AKTIENGESELLSCHAFT www.samson.de							•						•															•	•		•			•			
	Santasalo Gears GmbH www.dbsantasalo.com	•																																				
	SAUER BIBUS GmbH www.sauerbibus.de											•	•	•	•	•	•		•	•							•											
	C.H. Schäfer Getriebe GmbH www.ant-schaefer.de	•																																				
	Schäfer Pumpen & Hydraulik GmbH www.schaefer-urbach.com											•		•		•	•	•			•	•														•		
	Schaeffler Technologies AG & Co. KG www.schaeffler.de/en		•	•		•				•	•													•	•			•				•				•		

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Sealing Technology																																								
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 SPN Schwaben Präzision Fritz Hopf GmbH www.spn-drive.de/en.html		●				●	●										●								●					●		●								
 staiger Staiger GmbH & Co. KG www.staiger.de													●				●						●				●			●	●									
 STÄUBLI Stäubli Tec-Systems GmbH Connectors www.staubli.com																						●		●							●		●							
 STAUFF Walter Stauffenberg GmbH & Co. KG www.stauff.com													●								●	●		●	●	●														
 Steinmeyer August Steinmeyer GmbH & Co.KG www.steinmeyer.com			●	●	●																																			
 STIEBEL Stiebel-Getriebebau GmbH & Co. KG www.stiebel.de		●					●																																	
 Stieber Stieber GmbH www.stieberclutch.com			●																																					
 STÖBER STÖBER ANTRIEBSTECHNIK GmbH & Co. KG www.stober.com		●			●		●	●	●		●																													
 Stromag Stromag AG www.stromag.com			●																																					
 SUCO Robert Scheuffele GmbH & Co. KG www.suco.de/en/			●																					●	●		●					●								
 SUMITOMO (SHI) CYCLO DRIVE GERMANY GmbH www.sumitomodriveeurope.com																																								
 SUN hydraulik SUN Hydraulik GmbH www.sunhydraulics.com													●														●													
 SUNFAB SUNFAB Hydraulik GmbH www.sunfab.com														●	●									●																
 TEADIT Teadit Deutschland GmbH www.teadit.com/de/																																								●
 DEMAG Terex MHPS GmbH www.demagcranes.com		●					●	●	●		●																													
 Thomas Thomas Magnete GmbH www.thomas-magnete.com													●			●											●													
 THOMSON THOMSON NEFF GmbH www.thomsonlinear.com		●	●	●	●	●																																		
 ThyssenKrupp ThyssenKrupp Industrial Solutions AG www.thyssenkrupp-industrial-solutions.com/de.html		●																																						
 TIMKEN Timken GmbH www.timken.com			●	●																●				●																
 TRELLEBORG Trelleborg Sealing Solutions Germany GmbH www.tss.trelleborg.com/de																																							●	
 Dr. TRETTER Dr. Erich Tretter GmbH + Co. www.tretter.de				●	●					●																														
 TRIES Tries GmbH & Co. KG www.tries.de												●	●				●	●				●				●	●		●											
 TURCK Hans Turck GmbH & Co. KG www.turck.com																									●	●					●									

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| 50 ACE Stoßdämpfer GmbH | 70 KTR Systems GmbH |
| 51 AMK Arnold Müller GmbH & Co. KG | 71 LINAK GmbH |
| 51 ATEK Antriebstechnik Willi Glapiak GmbH | 71 Moog GmbH |
| 52 ARGO-HYTOS GMBH | 72 A. MANNESMANN MASCHINENFABRIK GmbH |
| 53 ASCO Numatics GmbH | 73 Chr. Mayr GmbH + Co. KG |
| 54 AVENTICS GmbH | 74 Parker Hannifin GmbH |
| 55 Barksdale GmbH | 75 PIV Drives GmbH |
| 55 Baumüller Nürnberg GmbH | 76 RENK Aktiengesellschaft |
| 56 BERGES Antriebstechnik GmbH & Co. KG | 77 RINGSPANN GmbH |
| 57 Danfoss Power Solutions GmbH & Co. OHG | 78 Schaeffler Technologies AG & Co. KG |
| 58 Bucher Hydraulics GmbH | 80 Römheld GmbH Friedrichshütte |
| 58 Eckart GmbH | 80 STÖBER ANTRIEBSTECHNIK GmbH & Co. KG |
| 59 ETO MAGNETIC GmbH | 81 SEW-EURODRIVE GmbH & Co. KG |
| 60 Festo AG & Co. KG | 82 SKF GmbH |
| 61 Freudenberg Sealing Technologies GmbH & Co. KG | 84 SIEMENS AG |
| 62 HANSA-FLEX AG | 85 Spieth-Maschinenelemente GmbH & Co. KG |
| 63 HIWIN GmbH | 86 Sumitomo (SHI) Cycle Drive Germany GmbH |
| 64 Walter Hunger GmbH & Co. KG | 87 TOTAL Deutschland GmbH |
| 65 HYDAC International GmbH | 88 VOSS Fluid GmbH |
| 66 HYDROTECHNIK GmbH | 89 WITTENSTEIN SE |
| 67 ifm electronic gmbh | 90 ZF Friedrichshafen AG |
| 68 Liebherr-Components AG | |

Your Specialist for Industrial Damping Technology



Automation Control



Motion Control



Vibration Control



Safety Products

We absorb the shock, so you don't have to

ACE is the worldwide accepted specialist in the field of industrial damping technology – with distributors in 45 countries on all continents. Since 1978 ACE has been represented very successfully on the German market.

Here alone 25 application engineers are working day in day out on the improvement of ACE's product range. Customers of ACE benefit from our well-thought-out solutions, useful innovations and exemplary service in 'damping technology'. Through close co-operation with leading machine manufacturers the ACE subsidiary in Germany has established itself as a precursor of technical progress.

Top products enhanced by service

ACE develops, produces and distributes a wide range of damping products. These include industrial and safety shock absorbers, profile dampers, rotary dampers, industrial gas springs, hydraulic dampers, feed controls and pallet stoppers. Our portfolio of vibration isolation is completed by the ACElator product range and the new "VibroChecker" App for the iPhone™.

These products succeed especially in future-oriented businesses as there is virtually no better damping solution to decelerate moving masses quickly, softly and precisely.

The advantages for our customers are obvious:

- Competent personal counselling on site and by phone
- Individual dimensioning for the client
- Delivery of small quantities, even one piece without extra charge
- Elaborate accessory range
- Realistic prices
- Shortest delivery times

ACE is a partner of the Fluid Power Research Fund.



ACE, BIBUS Kft and Semilab Semiconductor Physics Laboratory Co. Ltd.



ACE/Bosch Rexroth AG



ACE Stoßdämpfer GmbH • Albert-Einstein-Str. 15 • 40764 Langenfeld • Germany
Phone +49 2173-9226-4100 • E-Mail info@ace-int.eu
Internet www.ace-ace.com

AMK – front runner in Drives and Automation



The AMK Group, a family-owned company with headquarters in Kirchheim/Teck, Germany, has been one of the market and technology leaders in the electric drive technology, control technology, industrial automation engineering, and automotive areas for more than five decades.

Leading technology results from know-how and passion. Whether servo motors, intelligent servo converters, motion control for machines, or e powertrain solutions for the automotive industry – the innovations developed in Kirchheim/Teck are ensuring technical advancements in numerous industry sectors.

Numerous landmark AMK developments have formed the market of the electrical drive and control technology. AMK is very proud of providing the impetus, to move the sectors of industry of its customers by means of innovations in order to further advance technological progress.

The know-how and passion of our about 900 employees worldwide set the machines, systems, and automobiles of our customers in motion. Day after day.



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Gaußstr. 37-39 • 73230 Kirchheim unter Teck • Germany
Phone +49 7021 5005-0 • E-Mail info@amk-group.com
Internet www.amk-group.com

Precision and efficiency is our drive



For us as a medium-sized gearbox manufacturer, everything has “revolved” around right-angle force transmission for more than 30 years.

Today, after 4 years at the expanded company seat in Rellingen near Hamburg, signs are still pointing to growth.

The modularly structured product range primarily comprises bevel gears and worm gears and the servo series which can be combined with modern servo-motors. In addition to standard versions, also special customer-specific drive solutions are

part of our aspiration. Our angular gearboxes stand out thanks to their compact build, extensive performance spectrum and variety of feasible step-up/down ratios.

Our customers benefit from well-engineered drive train solutions, top-quality products and processes, established know-how and very reasonable value for money.

Let us convince you, too, of our extremely short delivery periods and our excellent service.

Please contact us – without any obligation – or visit us on our website **www.atek.de**.



ATEK Antriebstechnik Willi Glapiak GmbH
Siemensstr. 47 • 25462 Rellingen • Germany
Phone +49 4101 7953-0 • E-Mail atek@atek.de
Internet www.atek.de



Fluid Power Technology has been our passion for over 65 years



As a medium-sized family business with more than 1300 employees worldwide ARGO-HYTOS has more than 65 years of experience in Fluid & Motion Control and Filtration technology in mobile and industrial hydraulics.

Filtration

ARGO-HYTOS manufactures sophisticated filter solutions, mainly applied in hydraulic and lubrication systems as well as in transmissions, for the mobile and industrial hydraulics industry.

Fluid Management

Besides reducing maintenance and servicing costs, efficient fluid management is also a key factor in improving the reliability, productivity and cost-effectiveness of the operation. ARGO-HYTOS supplies application-oriented products for manual and automatic cleaning of hydraulic fluids.

Sensors & Measurement

Systems that provide reliable assessment of the condition of hydraulic fluids are the key feature of continuous fluid monitoring. Sensors and measurement technology from ARGO-HYTOS precisely target this range of tasks. Our fluid monitoring products comprise equipment and system solutions to enable online monitoring during continuous operation as well as analysis of bottled samples under laboratory conditions.

Fluid & Motion Control

We produce a wide range of valves, power units and integrated manifolds featuring all commonly used design features and functions, together with proportional valves and the associated control electronics.

Our strength is in developing customised solutions based on tried-and-tested fundamental technologies, specifically adapted to each individual case.



Fluid Control Valves, Fluid Power Components and All-in-One Systems for Fluid Automation

With 4,700 employees worldwide, Asco – a division of the EMERSON Group of companies – is a global leader in the field of fluid control and fluid power. At our location in Germany, 230 employees focus on the development and manufacture of proportional valves, valves for analytical and medical technology, valve islands as well as dedicated custom solutions for fluid automation.

ASCO's portfolio includes solenoid valves for the control of gases and liquids ranging from inert to aggressive. Pressure ranges extend from vacuum up to 350 bar. Nominal diameters range from 0.03 mm up to 100 mm.

Another key area is our range of fluid power components with a large choice of cylinders, valve islands, air-operated valves and air preparation equipment.

Pioneering innovations from Germany have attracted attention worldwide. Taking the first

step towards Industry 4.0, our high-resolution proportional valve "SENTRONIC HD" is among our latest developments. Our tried-and-tested "SENTRONIC" series was further developed and successfully introduced on the market under the name "SENTRONIC PLUS".

New valves for analytical and medical technology are also continually being developed and manufactured at the location in Germany. This includes the proportional flow control valve type "PRECIFLOW-IPC" which is especially developed for breathing apparatus. ASCO also successfully launched a 16-mm wide fluid-isolation flapper valve for analytical technology at the beginning of 2014.

When designing products, we place great emphasis on plug & play. As a systems partner, we can provide our customers with bespoke all-in solutions (valve technology, electronics, sensors and software) uniquely suited to their application needs – all from a single source. Here too, as with all our developments, our focus is on reliability and ease-of-use.



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Internet www.asco.com



AVENTICS: Intelligently networked pneumatics brings on highest machine availability

The history of AVENTICS goes back to the invention of the compressed air brake and is proceeded now by the Internet of Things. With the new “Smart Pneumatics Monitor” module, AVENTICS ensures intelligently networked pneumatics and sensor technology. The operating states are recorded locally, thus the state of the system and wear can be detected at an early stage.

The “Smart Pneumatics Monitor” collects the data of serially controlled valve systems and sensors connected via integrated I/O modules. While other solutions gather all available data and transfer it unfiltered, the AVENTICS electronic module evaluates the data locally and uses it to generate information about the status of the system.

Via drag & drop on a graphical interface, users define the components of the pneumatics system they want to evaluate. Based on many decades of application experience, AVENTICS experts

defined limits in the software. Once these limits are reached, the electronics automatically send messages to ERP and MES systems. Maintenance technicians or other staff are also informed. Thus, the Smart Pneumatics Monitor supports predictive maintenance concepts. Since wear is recognized at an early stage, machine breakdowns can be avoided. This increases machine availability and reduces maintenance costs.

Customer benefit thanks to condition monitoring

The sensor data collected via the I/O modules also enables monitoring and optimization of the pneumatic systems' energy efficiency. The electronics use pre-installed algorithms to process data such as the pressure and flow in the maintenance units. This data can be used to generate and regularly transmit energy reports for the monitored systems. The Smart Pneumatics Monitor also issues warnings if limits are exceeded or irregularities are detected. High availability in production based on intelligent data analysis: It's that easy.

Innovative products – custom made solutions



The name Barksdale represents high quality sensors and switches in the area of measurement and control functions.

For more than 60 years Barksdale has developed and manufactured custom-made and future-oriented solutions to control pressure, temperature, level and flow. Proximity to the markets and the dialogue with the customers are the basis of Barksdale's success. By means of the world-wide sales network as well as new developments and modifications of standard products, our customers' demands can be realized fast and individually.

Of course, our products meet the highest quality standards in terms of accuracy and performance with On Time Delivery being a top priority. Whether in mobile or stationary hydraulics, shipbuilding or mechanical engineering, Barksdale meets high safety standard in many markets.

Barksdale is a division of Crane.Co. Stamford CT.

Barksdale
CONTROL PRODUCTS

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Baumüller – Specialist for intelligent drive and automation systems



An eye on the complete system: Baumüller covers complete system solutions with life cycle service

As a system partner, Baumüller offers industry- and customer-specific automation solutions. The top priority is the development of an overall concept for the machine.

Baumüller is one of the leading manufacturers of innovative automation and electric drive systems. At six manufacturing locations and over 40 subsidiaries spread all over the world, 1700 employees plan, develop, produce and install intelligent system solutions for mechanical engineering; from operation and visualization tools to Motion Control software as per PLCopen, from software modules to controllers, also including converters, electric drives and the whole service range for ready to use automation solutions.

The areas service, installations, fitting, and relocation add to the wide range of Baumüller's services. In the mechanical engineering industry, Baumüller is one of the leading partners for automation solutions worldwide.


BAUMÜLLER

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Variable-speed drives with asymmetrical variable speed pulleys, „Becker” system



BERGES variable-speed drives with symmetrical variable speed pulleys



BERGES... everything under control

Shortly after the brothers Carl and Wilhelm Berges founded the company in 1926, BERGES concentrated on the infinitely variable, mechanical drive technology range. In 1971, a subsidiary was formed in Naturns, South Tyrol, followed by expansions to Switzerland and Great Britain. With the acquisition of the “System Becker” asymmetrical pulley technology in 2003, BERGES is now the specialist in mechanically variable pulley technology with the widest range of products.

Mechanical speed regulation covering a power range of 0.25 to 200 kW.

Drive technology in machinery and plant engineering needs an economical speed regulation. Our mechanical infinitely variable V-belt drives convert power into precisely the speed that is currently needed, while maintaining optimum motor efficiency.

We can deliver an appropriate system for every application field: standard and wide V-belt technology, single and double pulley drives, spring and cam pulleys, ready-to-fit assembly units, all suitable for upgrading with three-phase motors and reduction gears.

The requirements for precise speed control vary with technical conditions. According to that, BERGES delivers spindle and angle adjustment devices with hand wheels or scale wheels, hydraulic and electric remote controls, including speed indicators and tachometers.

As a leading specialist, BERGES not only provides proven technology of the highest quality, but also substantial application specific consulting services.



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Engineering Tomorrow connects proven performance with exceptional efficiency

Danfoss Power Solutions

Danfoss Power Solutions is a world leader in hydraulic solutions and electronic controls that power and propel the equipment that builds our world. We provide know-how in motion across a wide array of industries – including construction, agriculture, material handling and more. Using our robust hydraulic components, you can multiply the work capacity of your mobile machinery many times over. But there's more to us than hydraulic components and electronic controls. We're also the place to go for support and systems expertise. Whether we visit your facilities or you join us for a demonstration or co-development project at one of our application development centers, you will experience a level of collaboration and application expertise unmet

in the industry. We work with you to efficiently develop innovative solutions that help separate you from your competition and provide real value for your customers.

Learn more about Danfoss Power Solutions at powersolutions.danfoss.com

Danfoss Group

Danfoss engineers solutions that enable the world of tomorrow to do more with less. We help meet the growing need for infrastructure, supply, energy efficiency and climate-friendly solutions. Across our total business, our products and services are used in areas such as refrigeration, air conditioning, heating, motor control and mobile machinery. We are also active in the field of renewable energy as well as district heating infrastructure for cities and urban communities. Danfoss' innovative engineering dates back to 1933 and today we are a world-leader in our industries, employing 25,200 employees and serving customers in more than 100 countries. We are still privately held by the founding family. Read more about us at www.danfoss.com.



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Your Partner for Hydraulic System Solutions



Bucher Hydraulics is an internationally leading provider of innovative drive and control technologies. Contributing high levels of technical expertise, we support our clients' product development

activities from the initial project phase to the finished machine. We provide components, sub-systems and complete systems with emphases on pumps, motors, valves, cylinders, power units, manifold control blocks, and electronic control systems. Bucher Hydraulics develops tailor-made and cost-effective applications that provide optimum performance in the areas of:

- Construction Machines
- Materials Handling
- Municipal Equipment
- Renewable Energy
- Agricultural Machines
- Stationary Machines

BUCHER
hydraulics

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Eckart – your partner for hydraulic rotary actuators



Eckart offers solutions in the area of restricted rotations and combined rotary-linear movements.

Eckart is one of the world's leading manufacturers that develops, designs, manufactures and distributes hydraulic rotary actuators, valve actuators, rotary-linear combinations, linear cylinders and special equipment. With nearly 50 years of experience, the name Eckart represents for innovation, reliability and success.

ECKART[®]
HYDRAULIK • PNEUMATIK

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ETO – The Heart of Motion

Since 1948, the ETO GRUPPE's electromagnetic systems in cars, trucks and trains from the leading manufacturers have ensured safe braking or efficient acceleration and clutch operation and that machines and devices reliably produce, dispense, fill, print, measure and package worldwide.

Important brake components in more than half of all trucks come from ETO. In addition, other vehicle components are controlled, monitored and regulated by ETO's electromagnetic actuators and sensors: ETO products are found wherever highly dynamic processes take place and improve safety or efficiency and environmental sustainability – in electronic brake systems with ABS and ESP functions, camshaft valve control systems as well as automatic transmissions or injection systems for conventional and alternative drive systems. In the mobile and stationary hydraulics as well as in medical technology, actuator-sensor systems from ETO ensure an increased level of safety.

With 1,900 employees worldwide, the companies of the ETO GRUPPE research, develop and produce wherever their customers are located: in Germany, Poland, USA, China, India and Mexico. ETO's optimised manufacturing technology, highest standards of quality and competitiveness as well as the commitment to be an innovation leader inspires customers around the world.

The high number of patents is further proof of the company's unbridled spirit of innovation. ETO GRUPPE engineers have, for example, developed MAGNETOSHAPE®, a pioneering technology based on magnetic crystals that can change their shape and are used in highly energy-efficient, high-performance drives.

Just as its actuators often serve as impulse generators in the customer system – the heart of the machine, so to speak – the ETO GRUPPE also strives to be a driving force in cooperating with its customers:

The heart of motion.

[Click here to learn more about innovative actuators and sensors from ETO.](#)



Festo is a leading worldwide provider of automation technology for factory and process automation. As a global, independent family-owned company with its headquarters in Esslingen, Germany, it has become the performance leader in its industry over the last 50 years, thanks to its innovations and problem-solving competency in all areas of pneumatics as well as its unique range of industrial training and vocational education programs. Today, the company provides pneumatic and electric drive technology for both factory and process automation as well as cutting-edge training solutions.



Motion with air – Festo's core competency



Innovation for the best possible productivity of customers, a global presence and close, long-term partnerships with customers are the hallmarks of Festo. In doing so, Festo uses the simplest drive medium in the world: air. Today, pneumatics – with compressed air or vacuum – is one of the leading

technologies in automation and represents Festo's core business.

Innovation and variety for the world of automation

The portfolio offers over 30,000 pneumatic and electric products for factory and process automation technology which can be tailored to specific customer needs in a variety of modular programs. Festo's basic product range comprises pneumatic and electric drives, valves, servo controllers, motion control, valve terminals, installation-saving connection technology, handling and assembly technology, air preparation equipment, fittings, vacuum technology, position and quality inspection, sensors and

control technology, as well as a comprehensive range of basic and further training products. One of the measures of the company's innovative spirit consists of the roughly 100 new products which are introduced to the market every year, as well as 2,600 patents around the world. Globally, the proportion of turnover allocated to R&D in 2015 was 8 %. New approaches to product development using bionics and biomechanics represent a true first in the field of automation technology. In 2010 the company received the German Future Award, one of the most prestigious scientific prizes, for its Bionic Handling Assistant.

Wide range of training programs for industrial applications

Festo has become a leading provider in the field of industrial training services. The company has brought together a comprehensive range of learning systems for basic and further training in industrial areas – from training courses and consultancy in 40 languages, to e-learning and the construction of complete, fully equipped learning centres.

FESTO

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Freudenberg Sealing Technologies is a supplier as well as a development and service partner to customers in a wide range of market segments, including the auto industry, civil aviation, machine-building, ship construction, the food and pharmaceutical industries, and the agricultural and construction machinery sectors.



iStock.com/Sasha Radosavljevic

Often Invisible. Always Essential.



Starting with the Simmerring, which was developed at Freudenberg in 1932, Freudenberg Sealing Technologies now has a broad portfolio of products that are constantly geared to the customer – ranging from made-to-order custom solutions to complete sealing packages.

Freudenberg Sealing Technologies – a World Leader in Sealing Technology

Seals from Freudenberg Sealing Technologies are used in everything from dental drills to bottling and wind power facilities, all the way to car transmissions and aircraft. The company's unique materials expertise and its ongoing innovations create the foundation for customer satisfaction in all of its applications and sectors.

With an impressive product portfolio, Freudenberg Sealing Technologies is one of the leading seal suppliers for powertrain technologies. Especially in the auto industry, the company has established itself as the market leader and has set new standards in technology, quality and service: In its "LESS" sustainability initiative, which was launched in 2009, Freudenberg Sealing Technologies bundles innovative sealing solutions offering less friction, weight, fuel consumption and emissions and making a lasting contribution to the environmentally friendly mobility of the future.

Freudenberg Sealing Technologies has also implemented innovative solutions for hydraulic, pneumatic and fluid applications, whether the use involves a hydraulic pump, hydraulic motor, cylinder, valve or pump for a critical process. Freudenberg Sealing Technologies develops sealing materials and forms that are perfectly adapted to increasingly demanding operating environments.

HANSA-FLEX AG is a leading systems supplier for hydraulics. In addition to hose lines and connecting elements, HANSA-FLEX delivers a wide range of products from adapters to ZSS OW hoses.

The name HANSA-FLEX is globally synonymous with unrestricted customer proximity. A complete focus on customers and exemplary customer-oriented services make HANSA-FLEX the hydraulic partner of choice for companies from all sectors.



Service: Mission statement for all business activities



In the OEM department, these services even begin when planning new systems. HANSA-FLEX takes responsibility for engineering tasks, helps to build prototypes and supplies all hydraulic connecting elements from a single source. Highly qualified technical experts make sure that the hydraulic systems are correctly installed and commissioned

at customer sites. Services such as industrial assembly, fluid services and hose management enable the regular maintenance and preventative servicing of the systems.

In the Production department, mobile scanning systems make it possible to order all hydraulic components in a matter of seconds. Whether customer-specific assembly kits or kanban shelves, depending on requirements, the exact processes needed to offer customers the best added value are in place.

In the spare parts business, HANSA-FLEX impresses with its fast response times and outstanding availability. More than 100,000 hydraulic products can be selected at all times. With the unique network of 400 branch offices and the 24 x 7 mobile rapid hydraulic service, customer needs can be quickly met at any time, any place. Its online services also give HANSA-FLEX great

customer proximity. The online shop can be used by customers to conveniently procure materials, without having to make any compromises. The online shop offers customers the same levels of product quality and diversity that they have enjoyed from the HANSA-FLEX branch offices for over 50 years now.

The app offers the quickest connection to the mobile rapid hydraulic service. If a hose line fails, customers can share their location, photos of the damage and the hose line code with just a few clicks. This ensures that HANSA-FLEX service engineers are optimally prepared even when making initial contact and always show up at repair sites with the right spare parts.

The My.HANSA-FLEX customer portal sets new standards in hose line management through the use of the X-CODE. All information is centrally recorded and can be accessed within seconds. The database contains details such as the installation site, machine type as well as replacement-related parameters and wear and tear categories. A clear dashboard makes it easy to see all the key information at a glance. With direct contact to the HANSA-FLEX service engineers, preventative maintenance is now simpler than ever.

HIWIN is renowned the world over for high-quality drive technology. The product range includes:



HIWIN – We live motion.



Linear guideways

HIWIN linear guideways are characterised by high guidance accuracy, ease of assembly and lubrication and a long service life.

Ballscrews

HIWIN ballscrews provide impressive, low-friction and precise running. They only require a low torque and are very rigid.

Linear motors

HIWIN linear motors are of increasing importance in highly dynamic movements. This design converts electrical energy directly into a linear movement.

Linear modules

HIWIN linear modules are complete positioning units, which combine a ballscrew and linear guide in one rigid substructure. The motor and/or gearbox is flange-mounted directly on the linear module.

Rotary tables

HIWIN rotary tables can be used in many different ways thanks to their clearance-free and rigid structure and compact design.



Special Hydraulic Cylinder for a Dredger

The Hunger Hydraulic Group of Companies – Your Partner for Complete System Solutions

Filling Valve /
Seals and Bearing Elements

The Hunger Hydraulic Group trades international in the metal and capital goods industry and is one of the leading manufactures in the field of hydraulic engineering. For more than 70 years the company is dedicated to problem solutions in the hydraulic and automotive fields that require intensive consulting

services. In accordance with growing customer requirements the group of companies has diversified its product range and is nowadays represented by 15 companies in 7 countries. Thanks to the cooperation of specialized group companies the customer can get custom-made complete solutions which fulfil highest requirements even in extremely demanding applications. Hunger systems are installed worldwide in various applications, e.g. steel and aluminium plants, presses, offshore and dam projects, bridge construction, open pit mining, machine-tool manufacture, test bed engineering, renewable energies, building machinery, fire fighting equipment, environmental technology, trucks and large mobile cranes as well as air and spacecraft.

Range of Products

- Hydraulic cylinders (special, standard and telescopic cylinders)
- Surface coatings: Ceraplate, Ultraplate, Chrome
- Seals and bearing elements
- Spherical plain bearings and rod ends
- Rotary distributors and rotary actuators
- Hydraulic valves
- Hydraulic power packs
- Abrasives: honing stones and tools
- Commissioning and repair services



Hydraulic Power Pack for a Bridge

Wherever fluid technology combined with electronics and engineering is needed, HYDAC is there. With over 8000 employees, 48 companies abroad and over 500 sales partners worldwide, we can provide engineering advice, supply and service to our customers directly. The large percentage of the company that is based outside of Germany (70 percent) underscores HYDAC's global presence.



Fluid technology, hydraulics, electronics and service. Worldwide.



Implementing a predictive maintenance strategy allows the service life of all critical machine elements to be fully utilised, by detecting a variation from the fluid's normal condition early on. HYDAC provides products and solutions for this that extend fluid lifetimes and ensure the optimisation of new and existing systems, minimising costs.

Delivery programme:

Components, sub-systems and complete systems for hydraulics, fluid power, process engineering and environmental technology, focusing on: filters for fluid power, filters for process engineering, fluid service, accumulator technology, compact hydraulics (insert valves, control blocks, compact powerpacks).

Other product areas include:

fittings, pumps and power unit accessories, electronics and measurement equipment, electronic control technology, solenoid technology, mounting technology, cylinder and systems technology, hybrid technology, condition monitoring, KINESYS variable-speed drives, fluid

engineering, engineering support. Our own training centre with e-learning platform, and the FluidCare Center for research and development.

Range of services

With numerous service support points around the world, HYDAC offers a comprehensive range of services for hydraulics, consisting of:

- Inspection service
- Maintenance service
- Repair service
- Installation service
- Optimisation service

Applications

The wide product range is used in: construction machinery, agricultural machinery, lifting and material handling, rail technology, machine tools, plastics machinery, hydraulic and mechanical presses, the iron and steel industry, thermal power plants and hydropower plants, wind power, process engineering, marine and offshore technology, the paper industry, aerospace and underground applications.



Hydretechnik

„Measure with confidence” is the philosophy of Hydretechnik.

With the invention of the Minimesse® test point, a mechanical non return valve, Hydretechnik has made the first step to become a leader in industrial measurement technology.

The several functions of Hydretechnik products are covering the whole measuring chain for fluids: Beginning with the mechanical connection to the system to multiple sensors (for different measurements: pressure, temperature, flow) to electrical measuring equipment to record the data and special software to transfer, analyze and present the data. Several services like customer support and maintenance of our measuring devices round out our product portfolio. These features allow engineers and service mechanics simple and easy monitoring and supervision of their equipment. Different industries like manufacturers of agricultural machinery, aircraft construction, oil and gas drilling or renewable energies rely on the expertise of Hydretechnik.



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20th ISC

International Sealing Conference *Internationale Dichtungstagung*

Stuttgart, Germany
Oct. 10 – 11, 2018



www.sealing-conference.com

Eine Kooperation von





ifm-Top-Product: Pressure sensor PN7



Point-to-point communication with IO-Link systems from ifm

The ifm group of companies – Specialists in factory and process automation

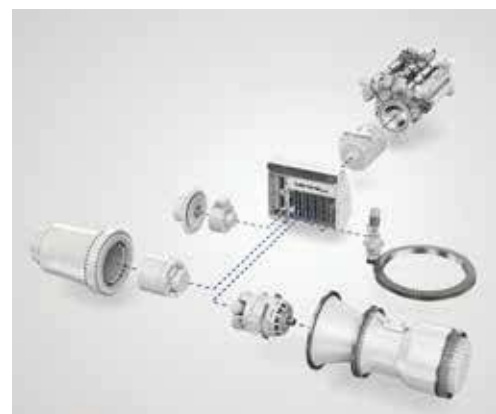
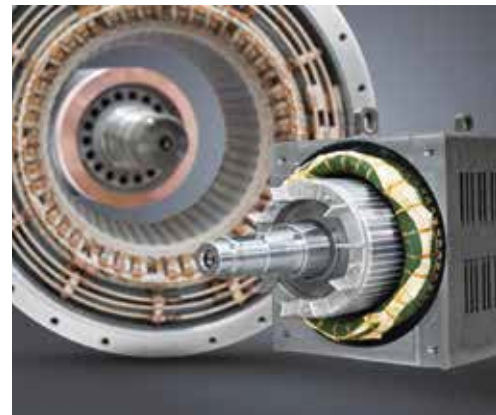
The core competence of the ifm group of companies is the development and manufacture of sensors, controllers and systems for industrial automation. 6,000 employees worldwide do research and develop versatile and demanding customer-specific solutions. No compromises are made when it comes to the high demand on quality. This ensures reliable function and a long life from the sensor to the system. For good reasons ifm grants a five-year warranty on its entire product range.

A successful example from fluid technology is the PN7 pressure sensor that received the Red Dot Design and iF Design Awards. The distinctive mark of this product highlight is the black head and the orange ring of the sensor which was launched in November 2016 with new functions developed in cooperation with the users.

From sensor developer to software expert

In future more extensive networking and communication of production processes in the manufacturing industry will be the basis of economic efficiency and competitiveness. This is one of the topics permanently pushing ifm onwards and supporting customers and partners to further develop their machines to make them fit for the future. Starting with the creation of data in the sensors with digital IO-Link as input signal via defined gateways and without intervening with the existing IT company structure. All new ifm products have IO-Link capability and are therefore the basis for data transparency. Many experts within the ifm group who see the potentials in production and work out pioneering solutions are working on this.





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System-engineered components

The product areas of Liebherr-Component Technologies AG: diesel engines, gas engines, common rail fuel injection systems, hydraulic pumps and motors, hydraulic cylinders, large diameter bearings, gear boxes and rope winches, electric machines, control technology and electronics, measuring technology, remanufacturing.

Liebherr-Component Technologies AG is responsible for all activities involving the components sector within the Liebherr Group. The companies and corporate units belonging to this sector are specialised in the development, design, production and remanufacturing of high performance components in the field of mechanical, hydraulic and electrical drive as well as control technology. These products are developed and produced at ten production sites in Germany, France, Switzerland, China, North America, Canada, Russia and Mexico.

Top quality for every application

The wide range of Liebherr components includes diesel and gas engines, common rail fuel injection systems, hydraulic pumps and motors in axial piston design, hydraulic cylinders, large diameter bearings, planetary gearboxes and winches, electrical machines, as well as electric and electronic controls and components. Parts and systems developed by Liebherr are particularly robust, and work safely and reliably under extreme environmental conditions such as heat and dust, or maritime environments.

For more than 60 years Liebherr has stood for sophisticated, practical products and services in a diverse range of technological fields: Today, with more than 130 companies and over 41,545 employees on all continents, the Group is one of the world's largest manufacturers of construction machinery. Components and systems produced by Liebherr are not only used within the Group's applications, other manufacturers also integrate them in their own machines. For example, in wind turbines, maritime applications, in cranes, construction and mining equipment, agricultural machines or in decentral energy systems.

Highlights of the product range are the 20 cylinder V-diesel engines of up to 4,500 kW power output, mining cylinders with 8,000 mm stroke length, single-piece large diameter bearings of 8,000 mm diameter, heavy-duty rope winches with an output torque of 2,500,000 Nm or complete electronic systems for machine operation.

From single components to complete system solutions

Liebherr is able to design both the complete diesel-hydraulic and diesel-electric drive trains of mobile machinery. Depending on requirements, individual components from the broad product selection can be extended up to the complete drive train. This creates system solutions with real conviction, which can be integrated into a whole range of applications.

A high degree of vertical integration and the use of flexible, state-of-the-art production systems allow Liebherr to offer its customers tailor-made solutions.

Lifecycle-Management

For the mechanical and hydraulic drive train components, Liebherr offers reconditioning in different stages from a specialised works – starting from repairs up to a complete remanufacturing in the quality of new parts.



Drive technology – brakes – hydraulic components – coolers

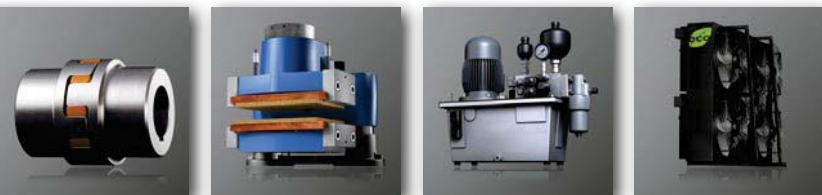
KTR develops, produces and markets drive components, brake and cooling systems as well as hydraulic components for industrial applications with 24 subsidiary companies and 90 sales partners globally.

The portfolio of drive components comprises mechanical couplings, overload systems, torque measuring shafts and clamping sets covering the torque range from 0.2 to 2.75 million Nm as well as precision joints for speeds up to 4,000 rpm for manifold applications in drive technology.

Our hydraulic and electromechanical brake systems are available as floating caliper, yaw and fixed caliper brakes generating clamping forces from 3 to 1,600 kN. The brakes are designed in such a way that they can be used as flexibly as possible – no matter if this is done with traffic engineering or materials handling, mining or crane construction, onshore or off-shore.

We even have an extensive standard portfolio of hydraulic components: bellhousings, foot flanges, damping elements, steel and aluminium tanks, temperature sensors, tank heaters, accessories with special sizes and special designs being added. As you like it. Made to measure.

The KTR cooling systems are used in stationary and mobile hydraulics cooling hydraulic and lubricating oils as well as cooling water, charge air or fuel. Our coolers are either selected according to the catalogue or accurately to the application.



Innovation – more than just the key to success



LINAK develops and produces electric linear actuators for various industrial segments – thus offering very individual and innovative automation solutions.

Electric linear actuators can be a smart alternative to hydraulic and pneumatic cylinders. LINAK products offer a long lifetime, they are maintenance-free and perform flawlessly in the most extreme conditions. LINAK customers do not only profit from individual solutions but also from the excellent service, be it from the technical or sales aspect.

LINAK-solutions contribute to an improved functionality in numerous applications, i.e. in the industrial automation, in agricultural and construction machinery as well as in commercial vehicles and vehicle construction in general. In these areas of application LINAK ensures a safe and reliable movement.

- Simplicity – even in the most complex application
- Feedback options with an intelligent system solution IC



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Internet www.linak.de

Moog – High-Performance Motion Control Solutions



Moog Servo Drives



Moog Radial Piston Pumps



Moog Servo Motors

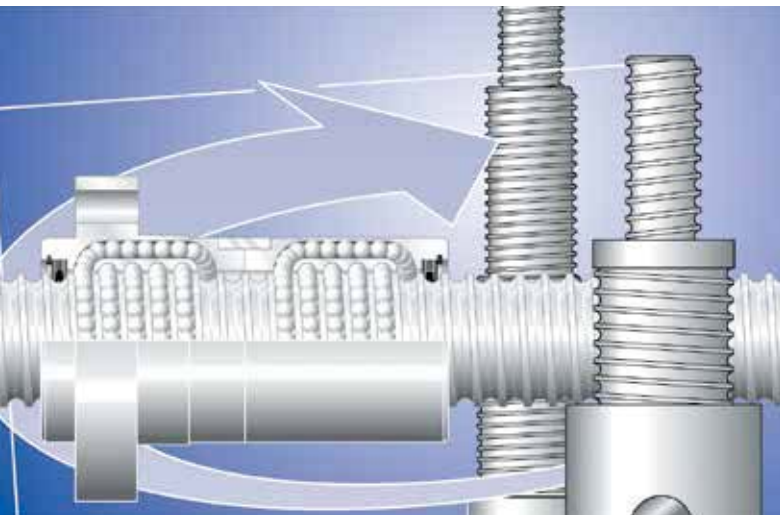
Moog is a global supplier of high-performance motion control solutions for a variety of industrial applications.

Moog's Industrial Group, a division of Moog Inc., designs and manufactures high performance motion control solutions combining electric, hydraulic and hybrid technologies with expert consultative support in a range of applications including energy production and generation machinery, industrial production machinery and simulation and test equipment.

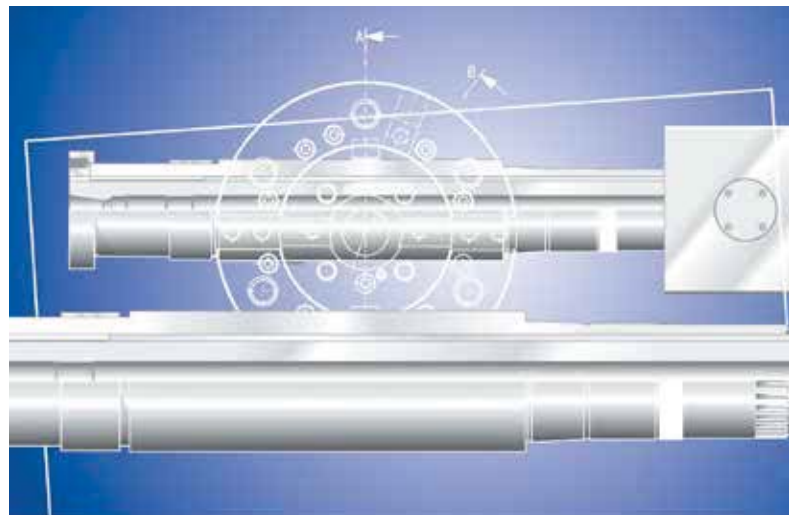
With operations in more than 26 countries, Moog delivers a high level of service, support and collaborative expertise tailored to the requirements of machine builders and design engineers worldwide.



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**Ball screws:** Your gain – marketing success

You will succeed in increasing the operating security and performance of your machines using AM ball screws. They are the pace setters in high speed: up to $n \times d = 235,000$ $v = 150$ m/min and faster, perfect in dynamic and running quality – also **telescopic ball screws** and **high-load ball screws** with up to dia. 160 mm for load capacities up to 500 kN.

**Boring Spindle Assemblies:** Your gain – high speed and accuracy

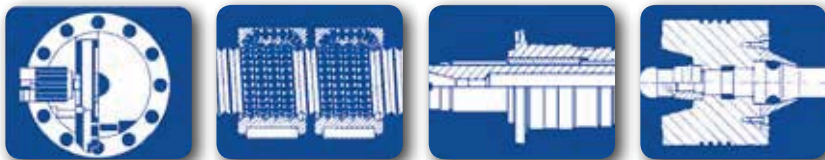
Boring mills of the new generation work with high speed, up to 5,000 rpm. Our manufacturing techniques in boring spindle assemblies will ensure that your profit from highest balancing qualities enabling quiet and most accurate operation. We have developed some special production measures against heat influence. For rams up to about 5,000 mm length we have special know-how for the inside grinding of bearing seats with narrowest tolerances.

Our specialities – highlights in manufacturing engineering

Your gain – quality and profitability
Internationally successful mechanical engineering companies benefit from our long years of experience. Our know-how in manufacturing technology guarantees top quality, high accuracy, economic efficiency and profitability.

Our products – tailored to your needs

Our efficiency is concentrated on machine components of high precision and wear resistance – one-off-parts, units and series of all dimensions in lengths up to 15,000 mm in one piece are manufactured completely in our own workshops, individually according to your drawings, ready-for-installation.



**We are your competent partner
for special solutions!**

For machine tools, general engineering:

Boring and milling spindles, complete main spindle assemblies with rams, ball screws, telescopic screws, quills, spline shafts, threaded spindles, driving shafts, knife shafts, pressure spindles, piston rods, compressor shafts, control shafts for heavy Diesel engines ...

For over 100 years, mayr® power transmission has stood for innovation and maximum quality. Today, the family-run company is a globally-leading manufacturer of safety brakes, torque limiters and backlash-free shaft couplings. The wide product portfolio also includes electromagnetic clutches and brakes as well as highly-dynamic DC servo drives.



Safety does not allow for compromises

Safety does not allow any compromises. Only top products of a top quality can guarantee that people and machines do not suffer damage in case of malfunctions, collisions and other hazardous situations. For mayr® power transmission, the safety of people and machines represents the motivation to always provide the best and most reliable torque limiter, shaft coupling or brake.

The company's products are utilised, amongst others, in filling plants, machine tools, packaging and printing machines as well as in wind power plants, elevators and in stage technology. In particular in the fields of elevator and stage brakes, the Allgäu-based company is today a global market leader. The products are used daily

on the big theatre and opera stages all over the world. But mayr® brakes, torque limiters and shaft couplings are also used in large-scale sporting events, during TV productions or on ultra-modern cruise ships, protecting people and systems in front of and behind the scenes against uncontrolled machine movements. And everywhere where people are transported in elevators, whether in skyscrapers, shopping centres or at airports, patented, low-noise mayr® brakes guarantee the safety of passengers at all times.

Today, approximately 600 employees work at the headquarters in Mauerstetten; in total, mayr® has approximately 1000 employees across the globe. With factories in Poland and China, sales subsidiaries in the USA, France, Great Britain, Italy, Singapore and in Switzerland as well as 36 further country representatives, the company provides its customers with direct local contacts worldwide.



As a global leader in motion and control technologies, Parker contributes to more efficient design of processes, increase of machine availability and increase of plant productivity. Parker develops innovative products and system solutions that integrate electronics and software to smartly support mobile machines and industrial processes.



Smart solutions and global availability in all areas of motion and control technologies

Parker provides the broadest range of products available from any single supplier in motion and fluid technology. With its experience in hydraulics, pneumatics, electromechanical, filtration, process control, fluid & gas handling, process control, sealing & shielding, as well as many years of experience from aviation and aerospace, Parker is able to develop integrated solutions customer-specifically. From wind wheels to aeroplanes, nearly anything that moves contains Parker technologies: valves, pumps, filters, seals, hoses, fittings, regulators, motors, drives and controllers, as well as further components and diagnosis tools from standard products to customer-specific solutions.

Parker develops complex system solutions in cooperative partnership with its customers. Requirements to the machines increase: components are to communicate with each other and cycle times are to increase continually. Electronics offer support here by establishing plant suitability for industry 4.0 and permitting flexible control in the production process in real time.

With a view to Total System Health Management, Parker not only looks at individual components, but at complete systems. It considers diagnosis and prevention, as well as maintenance and fast servicing of complex machines and plants. Thus, Parker keeps an eye on the Total Cost of Ownership for the sensitive and cost-intensive investment assets.

Globally acting companies require high-quality system components that correspond to a global standard and that have the same specifications. The global network of Parker distributors and ParkerStore guarantees that the matching components, repair and service parts are available everywhere on short notice.



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Phone +49 +49 2131 4016-0 • E-Mail parker.germany@parker.com
Internet www.parker.com

PIV DRIVES is a worldwide renowned Brand of Dana Inc. and specialist for complete drive solutions and gearboxes for industrial applications. Since 1928 we manufacture powerful drive solutions of high quality, reliability as well as durability. Whether standard or special, we live “Made in Germany” and convince with powerful and innovative products. Within the Dana Brevini Sales Organization we have a high-performance subsidiary and service network worldwide.



Powerful solutions – your worldwide partner for gearboxes, drive packages and hydraulic solutions



The product portfolio of PIV and Brevini includes helical and bevel helical gearboxes, single- and double shaft extruder gearboxes as well as planetary gearboxes, winches, hydraulic products like motors, pumps and valves and also electronic controls and sensors.

These products are used in nearly all sectors in the industrial and mobile field: steel and metal processing, materials handling, logistic, agriculture, construction machines, harbour cranes, machines for the plastics and rubber manufacturing and in the sector for renewable energy and waste management.

„The centre of our work – besides the manufacturing of gearboxes – is developing the optimal solution for our customers.“

PIV Drives belong to the Dana Brevini Group, one of the leading manufacturers of mechanic drive engineering, planetary gearboxes and hydraulic products for mobile and stationary applications.

Always the proper gearbox also for the toughest requirements

Innovative solutions contribute to the success of the company. Whether extremely specific applications like plastics and rubber extruder technology or in the crane or handling industry we belong to the market leaders. Our formula of success: we work closely together with our customers.

The most important products are: POSITWIN series for double shaft extruder drives, POSIREX for single screw extruder drives, POSIRED 2 series for helical and bevel helical gearboxes and the new POSIRED ADVANCED series for high-efficient drives launched in 2013.



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Phone +49 6172 102-0 • E-Mail info-piv@brevini.com
Internet www.brevini.de

In 1873, RENK was founded in Augsburg as mechanical workshop to manufacture any type of gears. Therefore the enterprise can look back on more than 140 years of experience and own development work in propulsion technology. Since 1923, RENK Aktiengesellschaft is a member of MAN group, one of the leading European offerers of capital goods.



Global benchmark for power transmission technology



Today RENK is one of the worldwide acknowledged manufacturers of high-quality special gears, components of propulsion technology and test systems. RENK products excel by highest precision and reliability as well as excellent quality. Experience and creativity in development, design and manufacture guarantee RENK products a top position on the international market.

Production takes place at three plants in Germany as well as at associated companies in France, Switzerland and in the USA.

RENK is divided into four independent strategic company divisions:

Vehicle transmissions

Comprise the vehicle transmission division at the Augsburg plant and the French affiliated company RENK FRANCE S.A.S. RENK is the leading manufacturer of tracked vehicle transmissions worldwide. Moreover, the Augsburg-based associated company RENK Test System GmbH manufactures testing rigs. The company develops and builds ready-to-key test systems for devel-

opment, manufacture and quality assurance of products of automotive, railways and aircraft industry.

Bearings

This business unit produces slide bearings as well as flexible couplings at the Hannover plant. RENK is also worldwide leading on the sector of electric machine bearings.

Special gear units (Industrial and marine gear units)

The Augsburg plant is focused on the construction of special bull gears for marine and specific stationary applications whose performances reach values up to 140 MW and torques up to 15 million Nm.

Standard gear units (Industrial and marine gear units, gear units for wind power stations, couplings)

The Rheine plant is specialized in the product ranges of general industrial and large marine gear units as well as in couplings of all design types. In addition RENK produces multi-megawatt gear units for offshore wind plants.





RINGSPANN GmbH

Innovative achievements have made RINGSPANN a leading manufacturer for Power Transmission, Clamping Fixtures and Remote Control Systems.

RINGSPANN customers include some of the most important international manufacturers of machine tools and systems as well as the aerospace industry.

From our headquarter in Bad Homburg, Germany, and from a worldwide network of subsidiaries and agencies, we ensure personal on-site service. Production and assembly plants in various countries provide rapid, reliable delivery.

With more than 70 years of experience in research and design, RINGSPANN is a specialist in Power Transmission Components, Precision Clamping Fixtures and RCS-Remote Control Systems. Professional application engineering guarantees RINGSPANN customers optimum technical and economical solutions in the following product-fields:

- Freewheels
- Brakes
- Shaft-Hub-Connections
- Overload Clutches
- Couplings
- Precision Clamping Fixtures
- RCS® Remote Control Systems

RINGSPANN is totally committed in our Corporate Policy to customer service, both now and in the future.



RINGSPANN®

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Precise, reliable, and increasingly interconnected – products and services for the industries of the future





Over 40,000 volume-production catalog products and application-specific special solutions:

The Schaeffler Group's Industrial division offers one of the broadest ranges of rolling and plain bearings, linear guidance systems, direct drives, maintenance products, and services. 1250 sales engineers around the world are on hand to provide consultation services locally to customers from around 60 industrial sectors – from agricultural engineering and wind power through to bicycle applications and the steel industry. This comprehensive support is rounded out by a global network of authorized sales partners.

Schaeffler's engineers work closely with the customer to find the optimum solution to the demands made by the application – with products from the company's standard range, specially-developed products, conventional services, and now even digital services. The optimum solution always takes account of the entire system and the specific environmental influences and operating conditions of the application. This sector-specific knowledge, which Schaeffler's engineers have spent decades gathering, goes into every stage of development, including product design, calculation and simulation program optimization, and test stand-based validation. Schaeffler's technological expertise and understanding of systems are at the core of every product that the company develops for its customers.

Photographs: Schaeffler

With innovative bearing solutions for mobile and stationary applications, Schaeffler also makes a decisive contribution towards "Mobility for tomorrow". The cost-effective operation of machines and equipment requires efficient and reliable bearing supports for mechanical, electric, and hydraulic drives as well as for every other mounting position. Aside from the bearing supports used in the subsystems, the integration of additional functions – such as measuring and supplying data for more precise control and optimized maintenance – is becoming increasingly important when it comes to increasing efficiency and performance.

Within the next few years, all vehicles and machines will be connected with each other via the internet of things. Smart products with sensors measure and report the vibrations, forces, and temperature of all relevant bearing positions and thus offer "added value by digitalization". Machine downtimes must always be prevented and maintenance work carried out at the optimum time – whether it's in wind turbines, machine tools, or rail vehicles. Condition monitoring systems can now communicate with the Schaeffler cloud and directly provide an automated diagnosis or remaining useful life calculation for rolling bearings on the machine operator's mobile end device, for example.

Bearing solutions and services for every industry

- Wind power
- Rail vehicles
- Drive technology
- Mobile machinery
- Aerospace
- Industrial automation
- Raw material extraction and processing
- Two-wheelers
- and many more...

SCHAEFFLER

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Internet www.schaeffler.de/en

Market leader through high technology



Worldwide, ROEMHELD is now considered to be the market leader in the field of hydraulic power workholding for metal-cutting production engineering. With expertise in this field and backed by a team of around 300 employees at the location Laubach, Germany, ROEMHELD has a strong business base to realise high technology.

Due to the intensive development work, which we undertake partially in close co-operation with customers and partners, we are in a position to not only meet the continuously increasing demands of the market, but also to influence the market development through our futuristic innovations.

The wide product range of the ROEMHELD Group from its three sites in Laubach and Hilchenbach in Germany and Götzis in Austria, consists of around 16,000 catalogue items.



ROEMHELD
HILMA ■ STARK

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We guarantee movement



STÖBER Antriebstechnik GmbH & Co. KG
was founded in 1934. Today, with
approx. 700 employees worldwide, it is

**the specialist for precise and dynamic
drive technology particularly for system
solutions.**

STÖBER supplies following components – perfectly in tune with each other: digital drive controllers, motion controllers, gear units, motors and user software. These are available as complete entities or stand-alone units.

Service is a key feature of our approach. Advice during drive design, support during commissioning on-site as well as application trainings are a matter of course at STÖBER.



STÖBER

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Internet www.stoerber.com

SEW-EURODRIVE is movement, tradition, innovation, quality, and service all in one. We prove this to our customers every day and have done so for 85 years. We do not just move countless conveyer belts, bottling plants, sports stadium roofs, gravel plants, assembly lines or even you on escalators. We also are moving ourselves. In our company, there is no such thing as standing still. Collectively, more than 16,000 employees around the world are moving to develop solutions that help you optimise your processes. This is how SEW-EURODRIVE has evolved throughout its history to become the market leader in the industry of drive automation with a turnover of EUR 2.7 billion.



We provide movement.



The movement you need is created with various product solutions and drive systems. According to customer or industry needs, SEW-EURODRIVE offers individual solutions using our comprehensive modular system for building gearmotors and frequency inverters, servo drive systems, decentralised drive systems, and industrial gear units.

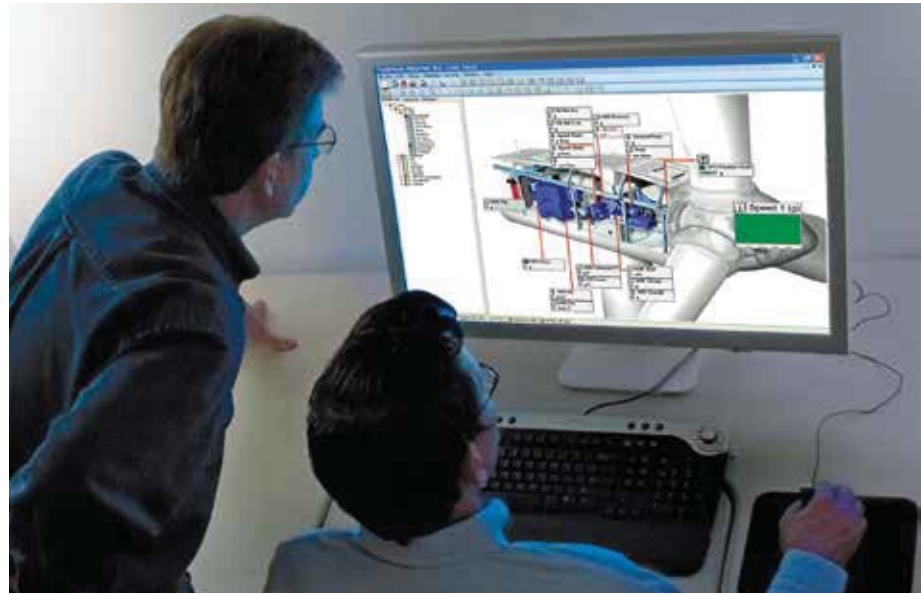
The individual drive system, custom to your tasks

If you want to be successful, you have to know the tasks and processes of your customers and industries. This is why SEW-EURODRIVE looks beyond the borders of drive engineering to find the solution perfect for you. With an oftentimes unconventional way of viewing and approaching things, we have been setting the trends and standards in drive engineering for years. In this way, “engineered and made by SEW” has become a seal of quality in the world of drive engineering.

The solution for your task tomorrow exists today at SEW-EURODRIVE. With our universal modular concept of gearmotors, control systems, software, service, and extensive accessories, the foundation is already in place to fulfill your requirements comprehensively and as quickly as possible. The uncompromising quality of our market-oriented products, all developed and constructed at our own plants, are the pillars of our commercial success.

“People don’t want products, they want solutions.” True to this motto, SEW-EURODRIVE not only develops and produces gearmotors in-house but also supplies the customised electronic solutions for these components. Only if the control systems are perfectly matched to the drives will there be an optimum flow. This setup gives developers, designers and planners of systems and projects the drive solutions from one source that let you efficiently control individual motion sequences or entire processes.

Customized Solutions by SKF: For a World of Reliable Rotation





Since the invention of the double-row self-aligning ball bearing in 1907, SKF has repeatedly extended the limits of what is technologically feasible. Today, the SKF Group comprises five competency platforms under one umbrella: bearings and bearing units, seals, lubrication systems, mechatronics, and services. The resulting synergies increase efficiency in more than 40 branches of industry.

The company, which is headquartered in Gothenburg, is present in more than 130 countries, and it cooperates with roughly 17,000 authorized distributors. The SKF Group has more than 46,000 employees around the globe. In Germany alone, SKF employs about 6,800 people, around 4,100 of them working in Schweinfurt, the location of the headquarters of SKF GmbH.

Much more than bearings

SKF has become a technology leader by focused amplifications around its traditional core business, combining vast engineering knowledge from adjacent fields of technology under one umbrella. This has made SKF a high-tech company, which has been offering to its customers for a long time already not only durable bearings, but also minimized-friction seals, the world's biggest portfolio of lubrication systems, high-performance mechatronics and state-of-the-art condition monitoring.

More than the sum of its parts

The company uses the know-how transfer among the various fields of technology quasi as a „motor for innovation“: in 2015 alone, the SKF Group has filed 461 patent applications. An increasing number of them are designed to spare the environment as well the wallet of the customers. By increasing the efficiency of the most differing applications, SKF is optimizing the tribological overall system of its solutions. Such innovations enable countless customers all over the world to significantly reduce their energy costs and avoid innumerable tons of CO₂ emissions.

As an example, extremely low-friction SKF main shaft bearing arrangements represent a considerable contribution to Rolls-Royce's "Trent XWB" aero engine, currently the world's most efficient large engine. In high-speed trains, a revolutionary centrifugal lip seal of SKF reduces energy consumption by dynamically switching between contacting and non-contacting sealing modes. Machine tools, using an optimized single-line minimum quantity lubrication system of SKF, considerably reduce lubricant consumption. And in welding robots, extremely compact electromechanical cylinders of SKF lead to efficiency increases as to precision, speed, and energy consumption.

More energy efficient future

Looking ahead, SKF currently invests about 40 million Euros to build the world's most powerful large size bearing test centre which will be put into operation in Schweinfurt mid 2017. By this, SKF enables countless more users from most different industries to optimize their applications for more energy-efficiency in the future.

Mechanical drive technology from Siemens:
The Siemens Division Process Industries and Drives (PD) is world-leading in the field of products and services for the process industry. It offers integrated technologies along the entire drive train. Grouped under the product names **FLENDER** and **Winergy** is a wide range of industrial gear units, turbo gear units, wind turbine gear units and couplings as well as diverse accessory and add-on parts. A global network of service and sales points complete the offering.



Global Best Seller – FLENDER mechanical power transmission



Partner of industry – worldwide

The gear units and couplings are used in many areas of raw material production and industry worldwide.

Hundred and twenty years of experience and hundreds of thousands of application cases are behind the product brands **FLENDER** and **Winergy** for wind turbine gear units. Today these high-quality components are manufactured to the same quality worldwide in factories in Germany, France, the USA, India and China.

All-purpose, high power-density, adaptable – FLENDER helical gear units

Helical, bevel-helical and planetary gear units were developed for operation in nearly all areas of mechanical drive technology. Highest possible efficiencies, rapid availability worldwide and an outstanding price-performance ratio have made the most comprehensive portfolio of series gear units to become best-sellers in the field of mechanical drive technology.

The basic portfolio offers a wide range of design variants over a torque range of from approx. 2 000 up to 5 500 000 Nm.

The basic portfolio makes short delivery times possible. Important add-on parts are already included in the basic range.

Reliable solutions for special applications

Each industry has its own requirements and needs specific solutions and expert guidance. Siemens has experience gained from decades of partnership with customers to rely on. The result is well-based, reliable solutions ideally adapted to all applications.

Couplings – always the right connection

Siemens offers a comprehensive portfolio of flexible, highly flexible, torsionally rigid and hydrodynamic couplings for a torque range of from 10 to 10 000 000 Nm for all drive requirements.



Aus Prinzip präziser

Aus Prinzip präziser.

Spieth has been developing, producing and marketing high-precision machine elements to well-known OEMs worldwide for more than 60 years. Expressions such as “Spieth Nut” and “Spieth Sleeve” have become established as generic terms in the engineering language. The renowned Spieth Principle is the foundation for this success.

An excerpt from our portfolio:

- Precision locknuts with the highest locking effect
- Shaft-hub connections with the best radial run-out accuracy
- Guide elements with precise play adjustment

Whether you want to increase the precision of your sub-assembly, reduce wear of connecting parts, minimize set-up times or maximize the safety of your application: Spieth components give you the advantages you want, at the utmost economic viability.

Our products are used in a very wide range of industries and applications. These include among others:

- Machine Tools
- Pumps and compressors
- Industrial gearboxes
- Textile machines
- Packaging machines
- Printing and paper machines

As well as our standard portfolio, we can offer our customers tailor-made products on request. Take advantage of our many years of experience, which allows us to find the ideal solution for practically every application.

We look forward to receiving your inquiry!





Innovative Drive Technology from Sumitomo Drive Technologies

For more than 85 years, the unique CYCLO drive principle has been synonymous with efficient and highly innovative drive solutions, reliability, long service life and high load capacity while offering the needed precision. These benefits are used in areas of application such as packing technology, medical technology, materials handling, mining, print technology, factory automation and many others. Apart from standard applications, those requiring highest degrees of precision can also be served with the help of special, zero or low backlash gears, including machine tools and handling technology.

Sumitomo (SHI) Cyclo Drive Germany GmbH, a subsidiary of Sumitomo Heavy Industries (SHI), Japan, with European headquarters located in Markt Indersdorf, provides services, directly or via its subsidiaries, in Belgium, France, Great Britain, Italy, Spain, Turkey, Sweden, the EMEA market as well as in India. The manufacturing facility at Markt Indersdorf was built specifically for the production of high-precision gears for use in the fields of robotics and automation, to provide

closer proximity and optimal delivery to European customers. At the production site of Hansen industrial transmissions in Edegem, Belgium, high-performance industrial gearboxes are produced for the mining industry, steel industry, power and process technology and cooling tower drives.

The brand Sumitomo Drive Technologies offers to customers a comprehensive range of electrical and mechanical drive technologies.

- Robust and low-maintenance gears for all drive technology requirements
- Zero backlash gearboxes for industrial automation, medical technology, and machine tools
- Centrifugal gear drives for process technology, environmental technology and food and beverage industry
- Very high reduction gears for telecommunication engineering and energy technology
- Gearboxes with extremely long service life for conveyor equipment
- Gearboxes with high overload reserves for the steel and iron industry, mining, and cooling towers



Industrial lubricants from TOTAL

TOTAL offers high-performance lubricants for on- and offshore wind power plants. Due to the special formulation, they enable an extended oil change interval, lighter cold starts and increased plant efficiency.

TOTAL – a multinational energy company

TOTAL is one of the world's leading mineral oil companies. As an international oil and gas producer and supplier, TOTAL employs approximately 100,000 employees in more than 130 countries. TOTAL Germany GmbH is part of the group and operates around 1,200 service stations, making it Germany's third largest service station network. The company's extensive activities include the sale of lubricants, heating oil, aviation fuel, liquid gas, bitumen and special products. Furthermore, TOTAL also operates Europe's most modern refinery, the TOTAL Raffinerie Mitteldeutschland GmbH.

Applied high-performance lubricants

TOTAL is one of the world's leading suppliers in the industrial sector and covers almost all areas of application for highly specialised lubricants,

grease and speciality products – from metal processing and food production to the operation of paper factories and even turbines. TOTAL works closely with well-known OEMs during the product development phase, and has already received OEM approvals for numerous products. TOTAL primarily operates in the chemical industry, the iron and steel industry, energy production, metal processing and plant construction, as well as the automotive and food industries.

Strong for the wind energy

TOTAL offers high-performance greases and oils for the wind power industry. You profit from extended oil exchange intervals and excellent protection of your plants.

With TOTAL as a partner you minimize your maintenance costs and avoid downtimes thanks to professional oil monitoring. The Carter SH 320 transmission oil from TOTAL is approved by the leading plant manufacturers such as Bosch Rexroth, ZF Wind Power, Winergy and Eickhoff.



VOSS Fluid production



VOSS Inhouse electro plating



24° tube coupling

Tube connecting systems with long-term corrosion protection

VOSS Fluid is a leading provider of hydraulic connecting technology and a longstanding partner to the international mechanical engineering industry. The company's tube couplings are used in wide range of applications. With sound competence in the development, manufacture and assembly of compression couplings, VOSS Fluid has achieved a future-proof level of quality, safe process design of the company's own electroplating technology and the specially developed VOSS coat. As a coupling expert with intelligent delivery systems, VOSS Fluid provides customers with an optimum supply chain.

Every chain is only as strong as its weakest link. From the engineer's standpoint this means: high-performance machines can only work at full power if all components are designed to work perfectly together. This tenet is adhered to by plant and equipment manufacturers around the world and which is why they rely on hydraulic connection technology from VOSS Fluid. VOSS technology guarantees a long service life and resistance to the high stresses of the numerous

applications in stationary and mobile hydraulics. VOSS Fluid is thus a reliable and innovative technology partner who improves the safety and efficiency of valuable manufactured goods.

The company is a pioneer, especially in the area of corrosion protection, with its VOSS coat development. Under real-life operating conditions, the surface treatment based on a zinc-nickel base layer is far superior to other chromium VI-free alternatives available on the market. Sustainability aspects play an important role in the VOSS Fluid electroplating plants that meet state-of-art energy and technical standards. In addition to its own strict standards for product quality, VOSS Fluid focuses on reliable production solutions and offers a wide range of pre-assembly devices and tools. The range of offerings is completed by extensive application competence featuring training on leak-proof connecting technology and bespoke assembly audits for customers. VOSS Fluid is a single source for a full service package, from project planning to logistics, thus creating the basis for a long-term cooperation.



VOSS

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Innovation driver for mechatronic drive technology

The WITTENSTEIN SE develops customer-tailored products, systems and solutions for highly dynamic motion, extremely precise positioning and intelligent networking in the field of mechatronic drive technology.

High-precision planetary gearheads, complete electromechanical drive systems and AC servo systems and motors, to name a few, are designed, produced and marketed by around 2,000 employees in every corner of the globe. The products sold by WITTENSTEIN's eight Business Units are typically used in robotic systems, machine tools, the packaging industry, materials handling and process engineering,

Formula One racing, paper and printing presses, medical technology and stage and lifting technology. Parallel to this, niche markets such as the aerospace industry, drive technology in human applications and offshore extraction of natural gas and oil under the ice sheet of the Norwegian Sea or nanotechnology have been systematically targeted. Acknowledged technological expertise and a tradition of innovativeness are the mainstays of WITTENSTEIN's success. With its fundamental orientation towards intelligent, mechatronic drive systems and a blend of micro and macro technologies, the company continues to develop its core know-how and competencies. WITTENSTEIN is inspiring for motion control and is a partner for efficient electromobility with its electrical gear systems. The company is a setter and promoter of trends in the development, production and marketing of components.



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We create the mobility of tomorrow





What many car owners do not know:

Most of the vehicles on German roads contain ZF technology. However, the range of application of ZF products is even more diverse. It extends from the automotive and commercial vehicle sector to usage in industry. ZF combines excellent expertise in mechanical engineering with the accelerating potential of modern digital technology.

ZF Friedrichshafen AG is a global leader in driveline and chassis technology as well as active and passive safety technology. The company acquired TRW Automotive in 2015, which was then integrated within the organizational structure as the Active & Passive Safety Technology Division. The combined company reported sales of € 29.2 billion in 2015 and now has a global workforce of around 135,000 with approximately 230 locations in some 40 countries. Therefore ZF is one of the largest automotive suppliers worldwide. ZF annually invests approximately five percent of its sales in Research & Development, ensuring continued success through the design and engineering of innovative technologies.

By combining mechanical engineering with the possibilities of modern digital technology, the company offers intelligent system solutions. Leading principle is the triad “See – Think – Act”: ZF proverbially enables its products to see, think and act, thus providing key technologies for autonomous driving.

The ZF Group is split into the six divisions Car Powertrain Technology, Car Chassis Technology, Commercial Vehicle Technology, Industrial Technology, E-Mobility, as well as Active & Passive Safety Technology. Industrial Technology is the division in which ZF bundles its activities for “Off-Road” applications – whether by sea, by land or in the air. It comprises the development and production of transmissions and axles for agricultural- and construction machinery as well as driveline technology for material handling systems, rail- and special vehicles. The division is also responsible for the worldwide business of marine propulsion systems, aviation technology as well as the development and production of gearboxes for wind turbines. Test systems for various kinds of applications in driveline and chassis technology, large industrial gearboxes and large mobile machines are also included in the division’s portfolio.

The headquarters of the division Industrial Technology is located in Passau. Employing more than 4,500 in the plants Patriching, Passau and Thyrnau, the ZF Group is one of the largest employers in Lower Bavaria. Overall, ZF Passau is responsible for about 10,500 employees at 21 locations around the world. Traditional values, quality, technology leadership and innovativeness have shaped ZF’s identity from the outset. Based on a long tradition in anticipating and shaping technological progress, ZF delivers adequate systems and technologies to make the future of mobility safer, cleaner and more efficient.



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