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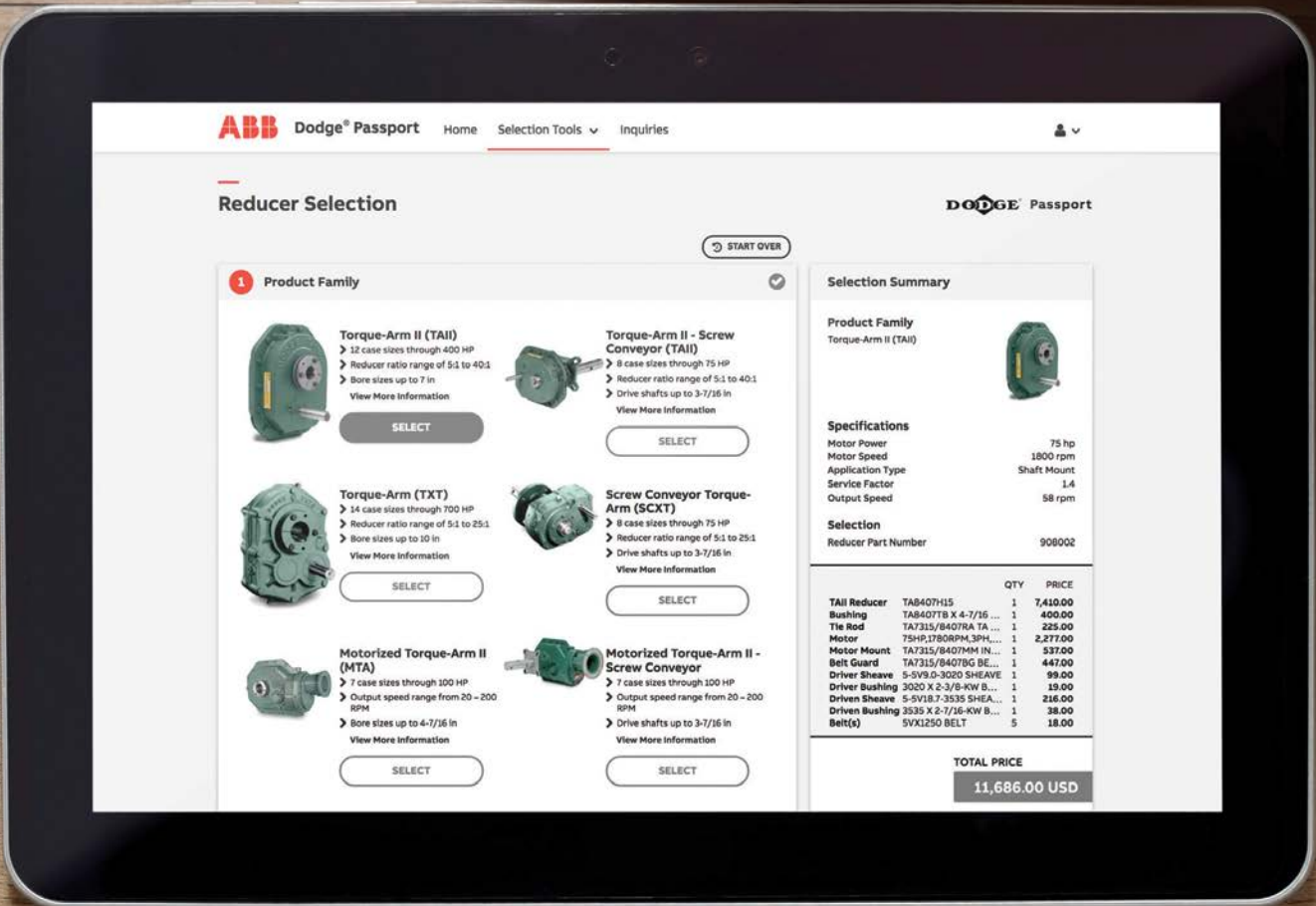


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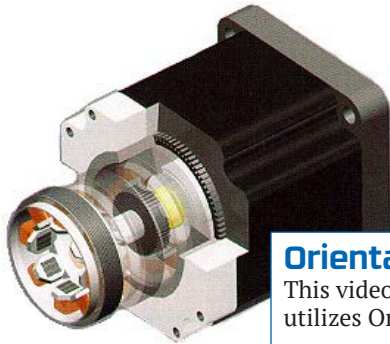


PTE Videos

Schaeffler Electric Mobility

With the acquisition of Elmotec Statomat GmbH, a manufacturer of production machinery for the construction of electric motors, Schaeffler is driving forward the implementation of its electric mobility strategy.

www.powertransmission.com/videos/Schaeffler-Expands-Electric-Mobility-Strategy-/



Oriental Motor Conveyor Application

This video highlights a belt conveyor application that utilizes Oriental Motor's Stepper Motor Unit RKII Series:

www.powertransmission.com/videos/Belt-Conveyor-with-Stepper-Motor-from-Oriental-Motor-/

PT Revolutions

Stop by our video library to watch the latest PT technology featured in our PT Revolutions Video Series including short interviews with Andantex and Diequa. (www.powertransmission.com/videos/)

www.powertransmission.com/videos/MiHow2-Series-How-to-Install-a-Sentinel-Bearing-Unit-with-NTN-/

Editor's Choice: SPS IPC Drives

SPS IPC Drives took place in November in Germany. This show covered the entire spectrum of smart and digital automation – from simple sensors to intelligent solutions, from what is feasible today to the vision of a comprehensively digitized industrial world. The focus was on practical solutions in areas like control technology, electric drive systems, HMI devices, industrial communication, software, mechanical infrastructure and sensor technology. Here were some of the technologies presented at the show:

www.powertransmission.com/blog/sps-ipc-drives-2018/



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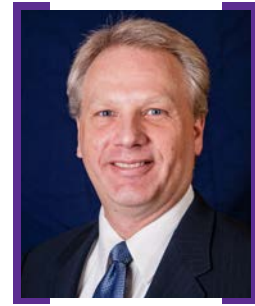
Your Search Starts Here

This issue, we're pleased to present our annual Buyers Guide. It's our comprehensive directory of suppliers of mechanical components, including gears, bearings, motors, couplings, clutches, brakes, gear drives and more. This directory represents our best effort to give you updated information about the companies who can provide you with the components you need to design, build and maintain better machinery.

But there's not enough room here to share everything with you. The printed buyers guide is a great resource, but it's just the beginning, a jumping-off point that we hope will lead you to our complete directory online at www.powertransmission.com. All of the categories you find listed here in our printed directory are broken down further on the website. So whether you need servo gearboxes, electromagnetic clutches or radial lip seals, you can find all the appropriate suppliers at www.powertransmission.com. You can also find complete contact information in the online guide. If you need an address, phone number or fax, you can get it there. Even better, many of the companies listed in the online Buyers Guide have provided in-depth information describing their companies' specialties and strengths.

Just as important, the online buyers guide is constantly evolving. Every day we're adding new companies to the site, updating contact information and expanding the listings.

Please use this printed directory, but don't stop there. Continue your search online at www.powertransmission.com. We're confident you'll find some excellent suppliers for the mechanical components you need. And we hope you'll also spend some time exploring the rest of the site, because what's true of the Buyers Guide is also true of most of our content. That is, there's always more information online—nearly 12 years of magazine content. If you find something you like in the magazine, you'll find plenty of related content on the website. Just type what you're looking for in the search box, and you'll find technical articles, features and news items related to your topic.



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There's a lot of valuable information on the website, and we're adding to it every day. The best way to stay on top of it all is by subscribing to our E-mail Newsletter and Product Alert. Signing up is easy. Just go to www.powertransmission.com/subscribe.htm to opt in to receive these e-mails. You can also renew your subscription to the magazine at the same time, and we'd appreciate it very much if you took the time to do so.

As always, we're interested in your feedback. You can let us know how we're doing anytime by sending an e-mail to wrs@powertransmission.com.

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Bosch Rexroth

EXAMINES THE FACTORY OF THE FUTURE

Imagine a packaging factory where you can change everything directly from the floor, roof and walls within a few days or even hours. Increasingly short production life cycles, smaller batch sizes, and individual product design and forms mark the requirements for future production, which have full flexibility, and are individual and scalable. Bosch Rexroth showcased this “Factory of the Future” during Pack Expo 2018.

Bosch Rexroth offers maximum flexibility when it comes to (re)configuring production equipment:

and reduced cabinet size and energy consumption. Ideal for all packaging, factory automation and motion logic applications, the intelligent IndraControl XM is easy to commission and features high-performance real-time data processing capabilities, and Rexroth’s Open Core interface allows the integration into a wide range of systems.

Rexroth’s connectivity modules allow end users to communicate with their equipment, production lines and manufacturing facilities. Data collection is done with SCD



greatly reduced set-up times allow for greater variety. As a logical consequence, decentralized automation designs using distributed intelligence and interoperability are necessary.

Rexroth’s Factory of the Future showcase is a multi-technology exhibit featuring intelligent, distributed drive and control components, connectivity modules, compact and versatile linear products, innovative chain conveyors and a wide selection of structural framing. All of which make it possible to expand machines and systems as necessary in a modular fashion.

This motor-integrated drive technology, IndraDrive Mi, reduces machine footprint of packaging and processing machines thanks to reduced components generating savings with up to 90 percent less wiring,

(Sense Connect Detect), a new, low-cost generation of sensors that are particularly easy to integrate. Bosch Rexroth showed how data from a certain number of SCD sensors can be collected, as well as analyzed and managed in the cloud. Products such as the Rexroth IoT Gateway Rack connect all areas of production from sensors to machine data in just a few steps and allow full shop floor transparency and monitoring of the overall production system. Next, Rexroth’s OpenCore Engineering builds the crucial bridge to the world of IT, enabling new levels of engineering flexibility.

For more information:

Bosch Rexroth
Phone: (800) 739-7684
www.boschrexroth-us.com

Interroll

EXPANDS PRODUCT PORTFOLIO

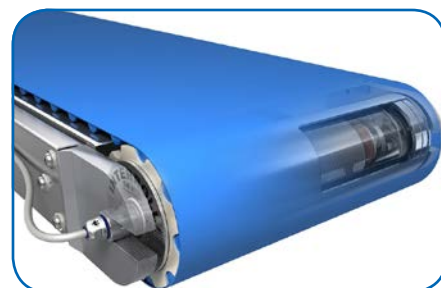
A new generation of drum motors, which Interroll is now expanding with more diameter options were on display at Pack Expo 2018. The DM0113 and the DM0138 offers an impressive range of benefits: Stronger shafts and ball bearings ensure a particularly long service life and the extremely stable design for the planetary gear allows high torques to be transferred with low levels of operating noise. All the drum motors in the new generation comply with the requirements of IP69K, the highest degree of hygiene protection, meaning that they are significantly quicker and easier to clean in comparison to traditional gear motors. Local manufacturing ensures that delivery times of the new drum motors will be kept at a minimum.

Interroll is also invested into new polyurethane coating equipment for producing Interroll Premium Hygienic shells for driving homogeneous belts in Wilmington, USA. This solution is unique in the market.

A further highlight at Pack Expo 2018 was a Modular Conveyor Platform (MCP) Loop display. The MCP is ideally suited to demonstrate the ease of use and flexibility of automatic order-picking systems.

For more information:

Interroll Corporation
Phone: (910) 799-1100
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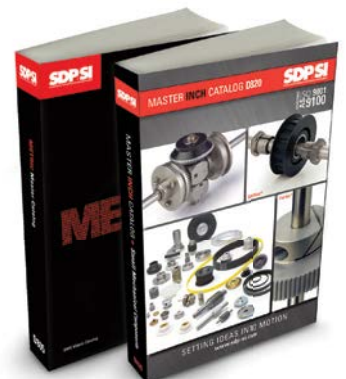
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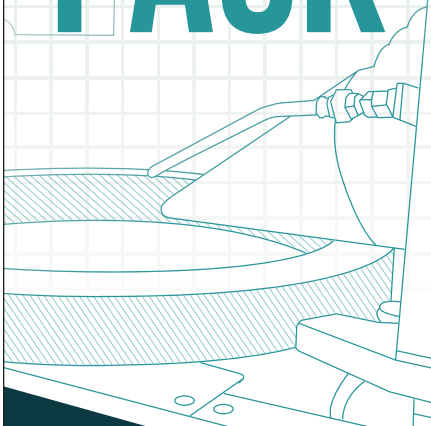
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ABM

RELEASES PARALLEL SHAFT GEAR

The new FGA 172/173 parallel shaft gear from ABM Greiffenberger meets the stringent demands imposed on materials handling facilities in intralogistics. The drive is compact, works very efficiently and has impressively long operating times.

The parallel shaft gear can continuously transmit torques of up to 170 Nm. It is especially suitable for use in materials handling technology, e.g. as a drive in chain conveyors, conveyor belts, rotary tables and vertical conveyors. The FGA 172/173 features high-quality angled teeth which enable reliable and energy-efficient operation as well as low noise levels. ABM makes the teeth and the light but robust aluminum housing in its in-house production facilities. The new version in the parallel shaft gear series also has a multitude of fastening options. This gives users great installation flexibility. The gearbox can be mounted laterally or with various flanges or can be used as an add-on gear with torque support. In materials handling facilities the drive can be mounted underneath



the conveyor belt for space-saving purposes. The FGA 172/173 can be easily combined with three-phase asynchronous motors as well as with SINOCHRON

Motors from ABM Greiffenberger. The 172/173 version features a very high efficiency, can handle excessive loads and is extremely powerful. The parallel shaft gear is available with two or three stages. It can be used not only for materials handling logistics, but also as a crane travel drive because small gear reductions with the two-stage design can be realized. ABM design engineers have accommodated both designs in their own housings. The drive thus is very compact especially the overall length has been optimized. The new version closes the gap between the FGA 103 and the FGA 283 introduced by ABM in 2014.

For more information:

ABM Drives Inc.
Phone: (513) 576-1300
www.abm-drives.com

Forest City Gear

ADDS METAL ALLOY ANALYSIS TO GEAR INSPECTION CAPABILITIES

Forest City Gear can now perform fast, comprehensive analysis and verification of metal alloys for quality assurance and control using its new Thermo Scientific Niton XRF Analyzer.

The Niton XRF Analyzer enables Forest City Gear to quickly and easily verify that the metal alloys used in barstock and/or near net shape blanks received from outside suppliers meet specifications before gears are produced. It can also be used to confirm that the chemical composition of metal alloys after heat treat meets requirements. The

Analyzer can even be used to verify the plating thickness over metal to ensure that plating performed by outside vendors conforms to specification.

The lightweight, handheld and



purpose-built construction of the Niton Analyzer makes it ideal for application in a wide range of environments, from shop floor to even outdoors.

For more information:

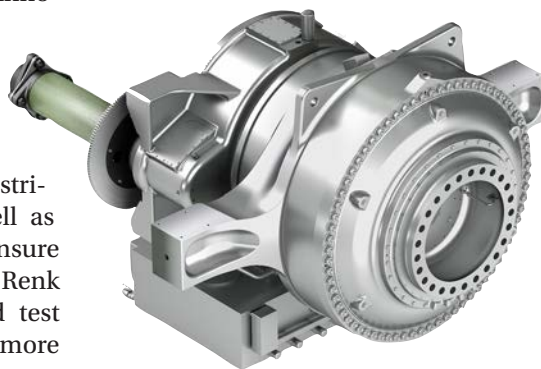
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www.forestcitygear.com

Renk AG

OFFERS INTELLIGENT GEARBOX AND COUPLING SOLUTIONS FOR WIND TURBINES

At WindEnergy 2018 in Hamburg, Renk AG presented two product innovations with the EQ-Gear gearbox and the EQ-Flex couplings. The gearbox with the unique slide bearing technology allows for tremendous power density due to the ideal load distribution. Special materials as well as innovative coating procedures ensure optimal operation. In addition, Renk presented the VIB-Monitor and test systems for wind turbines. For more

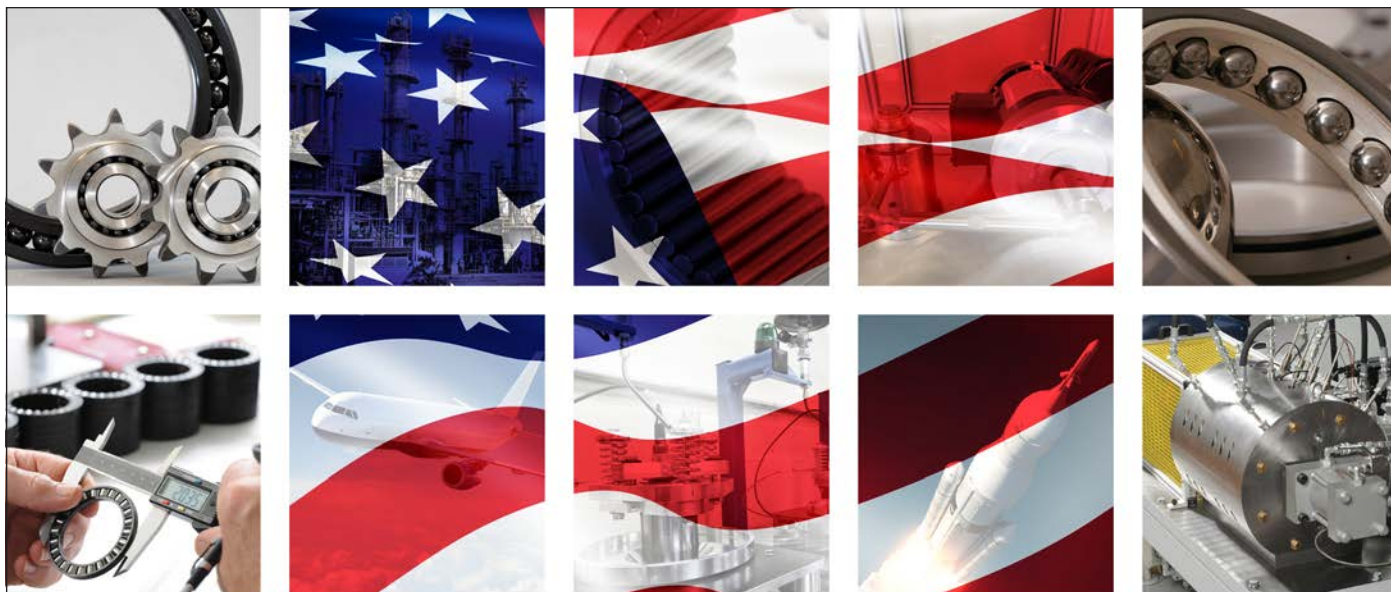
than 30 years, Renk has been offering complete solutions in the form of gearboxes, couplings, slide bearings and test bench technology for wind power. The intelligent planetary bearing system of the new EQ-Gear gearbox thus ensures almost uniform load distribution in all operating conditions. As a manufacturer of gearboxes and slide bearings, decades of experience in mastering extreme forces allow Renk to establish wear-resistant slide bearings as a sustainable alternative to conventional rolling bearings. There is no service life restriction thanks to the optimal design. At the same time, the



modular design allows for economical solutions for virtually any application.

EQ-Gear: Variable use for all platform configurations

The EQ-Gear is suitable both for low and medium-speed platform configurations in coaxial design as well as for the high-speed drive train with an axially-offset generator connection. Especially in the coaxial platform configuration, the lines required for pitch control can easily be guided through the gearbox between the input and output shaft. The unique wireless temperature monitoring is ensured by the remote monitoring of slide bearings. The optimal load distribution between the planetary stages is self-adjusting. Optionally, the entire system, including the electrical connection, can be tested and validated in the test bench. The gearboxes are certified according to IEC and GL guidelines.



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EQ-Flex: For reliable torque transmission between the gearbox and generator

The torque limiter of the new EQ-Flex coupling ensures the torque limitation in the event of overload. This increases the system availability and the operators benefit from the freedom from maintenance and wear stability. The patented slip system ensures a variable and stable slip torque during operation. It is possible to adjust the slip

torque without disassembling the coupling in the drive train or to re-calibrate in the test bench. The layered structure on the specially shaped discs compensates axial, radial or angled offsets between drive and work machines without generating large restoring forces. The torque is measured continuously.

For more information:

Renk AG
Phone: +49 821 5700-279
www.renk-ag.com

Voith

FLEXIBLE COUPLINGS UTILIZED FOR OEM TEST CELLS

Voith is proud to offer a tailored, highly flexible D2300 coupling for a major engine Original Equipment Manufacturer (OEM)'s test cells. The introduction of the coupling significantly streamlines the testing process for the OEM.

"We are excited about the success of the first installations for this OEM's midrange engine test cells," said Kyle Kluttz, vice president, new business sales — Americas, Voith. "This solution will streamline the testing process for a wide range of their engines and the result will be a more efficient, economical, and practical process."

The Voith D2300 coupling features high torsional flexibility, which makes it possible to reproduce test cycles more precisely in supercritical operations to achieve accurate results. Development test rigs, continuous-running test rigs, and end-of-line test rigs operate safely and reliably with this coupling at speeds up to 10,000 revolutions per minute (rpm). The coupling shifts a system's critical resonance frequencies below the operational speed range and dampens undesirable alternating torques. This protects all system components from damaging vibrations, increasing the lifetime and availability of the entire test rig.

Designed to be modular, the Voith coupling also easily integrates into a wide range of engine test rigs. The connections can be adapted to almost all types of engines and dynos, saving costs for adaptation expenses and allowing for the development of an improved design with a shorter lever arm. Less stress is placed on all of the connected units when moving through the resonance speed (engine start) and in other speed ranges, extending the service life of all of the test rig driveline components. Higher availability and lower life cycle costs for the system also contribute to cost savings and process efficiency.

Introduced in 2015, the Voith D2300 coupling prototype was first installed at the major engine OEM's facility in India. Its success led to a request to install the coupling at the OEM's facility in Brazil. Since then, the OEM continues to install the Voith solution across its global fleet of test cells to streamline the mid-range engine testing processes.

For more information:

Voith
Phone: (717) 792-7099
www.voith.com



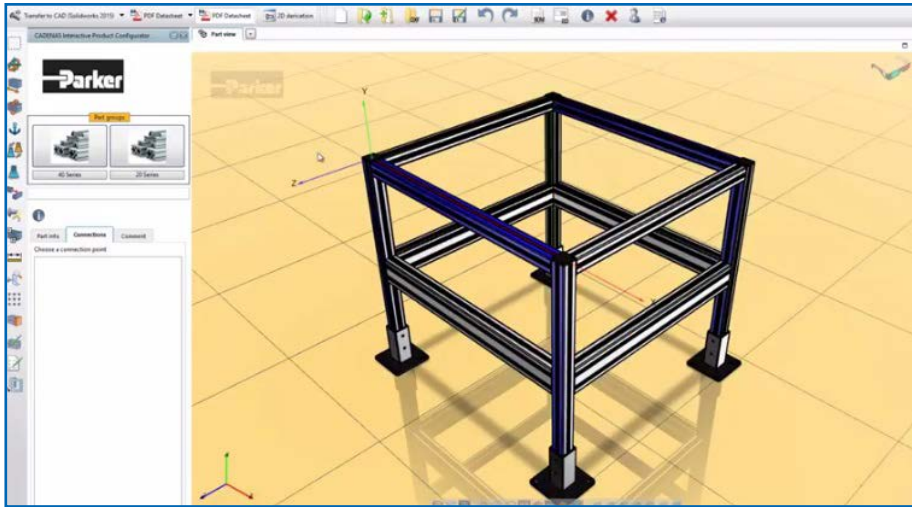
Parker

LAUNCHES FREE T-SLOT ALUMINUM DESIGN ARCHITECT TOOL

Electromechanical and Drives Division North America is pleased to announce the release of the Parker T-Slot Aluminum Design Architect, which enables users of any skill level to quickly and easily design products from Parker T-slot aluminum framing components.

The software takes the challenging task of designing products from T-slot aluminum and makes it as simple as building with snap-together blocks. Available as a free download on the Parker website, the software has been lauded by Parker design centers, professional

users, and DIYers for its simple, easy-to-use interface, on-the-fly BOM generation, and instant quote capabilities. Parker's T-slot aluminum framing is the material of choice for assembling an unlimited variety of bases, frames, linear slide systems, safety guarding, enclosures, worktables, material handling systems, and other structures. The modular T-slot aluminum profile system offers so much flexibility and cost savings in engineering, fabrication, and assembly that it has become the preferred material for a multitude of applications. Formerly, to design a product with T-slot aluminum, engineers would create the various profiles, connectors, fasteners and accessories within their CAD system. They would then create their design by manipulating each component. Upon completion, they would manually create a bill-of-materials and send to Parker for a quote. If the user did not have CAD



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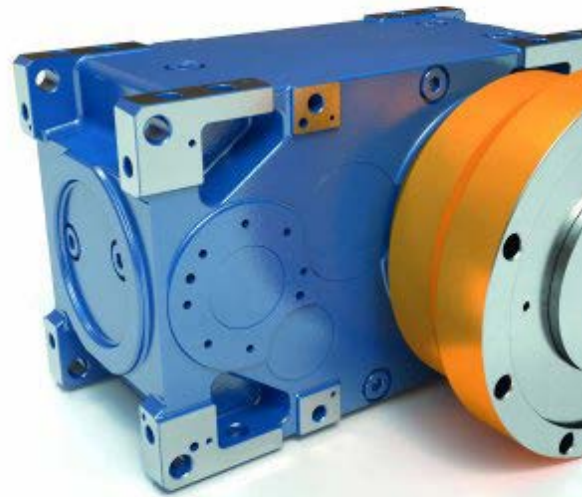
access they would often send Parker a “napkin sketch,” for the Parker engineering team to interpret, design and quote. This would often require three to five iterations, taking significant time and effort for the customer and the Parker team. “It’s so easy, anyone can do it,” says Mario Mitchell, Parker’s T-Slot Aluminum Framing product manager. “The entire process has been streamlined and simplified with the end-user in mind. This simple, standalone system requires no CAD access or previous engineering experience; they download and start creating in minutes. Designs will be more accurate the first time and iterate much faster. One of my favorite features is how all of the fasteners and connectors are automatically generated for the design and everything is added to the BOM. When they are done designing, the user can email the BOM to us and we can get a price quote right back to them.” While no CAD access or experience is required to use the tool, there

are advanced features and outputs that will appeal to professional engineers and systems integrators, including .stp files and native CAD output to Dassault SolidWorks, Autodesk Inventor, and PTC CREO. “This tool isn’t just for the home user,” adds Jay Hopper, COO of CADENAS PARTSolutions. “There are some powerful features that will really appeal to pro users. For engineers who are integrating their Parker T-slot aluminum assembly into a larger design, they can instantly export projects from the T-slot aluminum design architect to their CAD application. If they’re looking to share the design with a purchasing department, they can instantly generate a 3D PDF cut sheet, with all of the details for their specific design. Anyone who has ever used T-slot aluminum profiles is going to love this tool.”

For more information:
Parker Hannifin
Phone: (800) 333-4932
www.parker.com/ips

Nord

MAXXDRIVE SUITABLE FOR HEAVY-DUTY APPLICATIONS



Robust, high load capacity and durable—industrial gear units by Nord Drivesystems are suitable for many heavy duty applications. The “extruder flange” option is now also available for rated torques between 15 kNm and 80 kNm.

MaxxDrive industrial gear units are characterized by high power density, quiet operation, and top reliability. Large rolling bearings ensure extremely high axial and radial load capacities and a long service life. The technological heavyweight drives also offer a modular, flexible design as well as varied mounting options. This makes the robust helical and bevel gear units in one-piece.

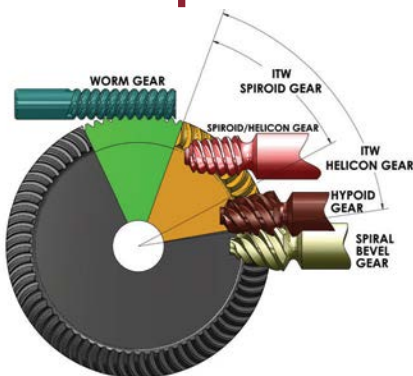
Unicase housings are suitable for a great number of heavy duty applications. On the basis of the industrial gear units, Nord plans complete drive systems for heavy duty operation with motors and drive electronics, for tasks including conveyor technology, pumps and agitators.

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In addition, Nord has supplemented sizes 5 to 11 (rated torques from 15 to 80 kNm) of its modular series

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Thomson Industries, Inc. has launched an upgraded RediMount option, a pre-engineered, modular adapter kit for seamlessly installing motors or gears in less than five minutes. The improved option is now the default for Thomson linear motion systems and precision linear actuators, and its capabilities are factored into optimal sizing recommendations generated through the company’s Linear MOTIONEERING product sizing and selection tool, accessible at the website below.

According to Niklas Sjostrom, product line manager EMEA & Asia at Thomson, “Lead time is minimized significantly as the motor or gear and systems can now be shipped with RediMount pre-installed. Whereas design engineers previously spent valuable time searching for the optimal motor flange kit and installing the individual components upon receipt,



now they can order our upgraded solution, significantly reducing lead time and having only the simple task of bolting on their motor upon receipt.”

RediMount accommodates a wide range of motor types and sizes or gears, which can be mounted to linear motion systems and actuators faster and with less effort than ever before. “RediMount also includes updated smart part numbers with a specific motor ID, which reflect the motor or gear manufacturer and type,” added Sjostrom. “For engineers with old product numbers, we developed a translator, which converts the old product number to a new one including motor ID.”

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Controlflex couplings have a compact balanced design, are electrically isolating, and have high misalignment capabilities, making them an ideal fit for encoders or light duty power transmission applications. Equipment designers in industries such as packaging, semiconductor, solar, medical, and automation benefit from the wide range of sizes and performance characteristics offered by these couplings.

Controlflex couplings are comprised of two anodized aluminum hubs joined by pins to a Delrin insert called the frog. Hubs are manufactured in standard widths for general purpose applications and thin widths for compact installations. The Delrin frog allows for a balance of rigidity to maintain position and flexibility for high misalignment capabilities. It is an efficient torque transmitting element with light bearing loads.

Controlflex couplings are manufactured in single and double frog styles, allowing for system design flexibility. Single frog couplings have high misalignment capabilities and fit in space restricted applications. Double frog styles offer higher torque and torsional stiffness capabilities. All styles have a balanced design for reduced vibration at speeds up to 25,000 rpm.

Controlflex couplings are available in clamp screw designs with or without keyways in inch, metric, and inch to metric bore sizes ranging from 1/8 inch (3 mm) to 1 1/2 inches (40 mm). Hardware meets or exceeds DIN 912 12.9 standards for maximum torque capabilities.

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The ABCs of Linear Motion Rolling Guides

Improving System Performance One Application at a Time

Matthew Jaster, Senior Editor

According to the Encyclopedia Britannica (Yes, it still exists), Newton's first law (also known as the principle of inertia) is defined as a body with no net force acting on it will either remain at rest or continue to move with uniform speed in a straight line, according to its initial condition of motion. In fact, in classical Newtonian mechanics, there is no important distinction between rest and uniform motion in a straight line; they may be regarded as the same state of motion seen by different observers, one moving at the same velocity as the particle, the other moving at constant velocity with respect to the particle. Somewhere in this paragraph of scientific innuendo, we find the basic principle of linear motion which is simply motion that occurs in one spatial dimension. Therefore, linear motion rolling guides are simply positioning systems for high-precision, low friction machine motion. When it comes to designing these products, engineers have plenty of options. PTE re-

cently caught up with IKO, Rollon and THK to breakdown the basics in linear motion rolling guides.

IKO International moves towards miniaturization

As the trend moves toward the availability of smaller and smaller track rails, IKO International prides itself on having a product library of multiple sizes, styles and configurations.

"The industry is moving toward miniaturization," said John Longo, general manager at IKO. "We offer linear guides as small as 1 mm track rail diameter in ball type and 10 mm diameter in roller type. Our C-Lube series starts at 3 mm diameter for ball type and 10 mm for roller type."

The four main features of IKO International's linear motion rolling guides are C-Lube technology, interchangeability, multiple slide unit lengths and materials for harsh environments. Longo said that C-Lube continuously supplies lubricating oil directly to the slide unit's rolling elements



IKO's products have been used in a variety of applications including robotic surgery, medical analysis equipment, automation and life sciences.

and carries it through to the loading area to provide long-term, maintenance-free operation without slide resistance. Interchangeability lets users change out single components without purchasing a new assembly, and they can choose from different accuracy classes, tailor preload settings to their application and prepare for different scenarios.

“Customers can choose from up to four slide unit lengths, depending on the series, with sizes ranging from just 1 mm wide to large versions that provide high rigidity and load capacity. We offer carbon and stainless steel material construction, so our linear rolling guides can be deployed in tough environments. Customers can also specify steel end plates for use in high-temperature or vacuum conditions,” Longo added.

Many of IKO International’s linear guides come with C-Lube technology— a capillary system within the circulation path of the slide unit’s rolling elements. As the rollers within the linear guide circulate, lubricating oil is continuously distributed to the loading area along the track rail. It can extend the re-lubrication interval to several years versus several months.

“As a result, C-Lube guides provide long-term maintenance-free operation. Because C-Lube does not make contact with the track, the guide delivers smooth motion without an increase in the slide unit’s length, cost or its rolling resistance and with minimal elastic deformation under load,” Longo said.

The advantages of using linear rolling guides are many,



The four main features of IKO International’s linear motion rolling guides are C-Lube technology, interchangeability, multiple slide unit lengths and materials for harsh environments.

according to Longo. Mainly, this would be considered versus a ball bushing construction. In this regard, the linear rolling guide offers better accuracy, capacity and life for similar or slightly higher pricing. For any applications requiring moderate or better accuracy, linear guides have been replacing ball bushing assemblies for decades for the aforementioned reasons.

And what are the key factors in determining what product will work best for a particular application?

“Consider the operating environment. Do you need



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stainless steel or other construction? If the guide will be used in homes or offices, look for guides made from non-flammable or self-extinguishing materials. If you will be handling a heavy load, look for guides whose slides have cylindrical rollers that have a larger contact area with the rail versus slides with ball bearings. If you require greater design freedom, look for guides with interchangeable parts in which the slide units and track rails can be combined, added or freely exchanged," Longo said.

IKO's products have been used in a variety of applications including robotic surgery, medical analysis equipment, automation and life sciences. "Our miniature linear guides are designed to fit ever-shrinking medical equipment, and many of our guides provide low, uniform sliding resistance over their travel distances to deliver smooth, noise-free motion when deployed near patients," he added.

"NASA's Jet Propulsion Laboratory (JPL) used our LWL miniature motion rolling guide in Mars rover Curiosity's Mastcam—a camera system that captures pictures of the landscape and stitches them together to create panoramic views for navigation and to be sent back to Earth for analysis. JPL selected our LWL miniature motion rolling guide to provide continuously smooth motion for Curiosity's focusing mechanism, made possible by the guide's optimized ball recirculating and ball retaining features. The guides were customized to operate smoothly in temperatures as low as -130°C. Modifications include corrosion-resistant stainless steel materials and end plates along with packaging suitable

for vacuum and cleanroom environments. JPL requires systems and components to be able to operate on their own via remote control for the entire mission. After launching in 2011, Curiosity's two-year mission was extended indefinitely, and it is still operational today!" Longo said.

In the future, rolling guide changes might include reducing mass or adding other coatings. IKO has already achieved miniaturization down to a 1 mm rail width for up to four different slide unit lengths, depending on the series being used as previously mentioned. How much smaller these components get will depend greatly on the applications they will be required to operate.



Rollon Puts an Emphasis on Design

The more things change the more they stay the same. This can also be applied to rolling guides.

"Over the last 15 years the evolution of the high precision linear guides has not really changed," said Scott Spangler, distribution manager at Rollon Corporation. "The load capacity has been maximized due to ball conformity, cleaner steel, and envelope size. Sealing has been optimized

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The cost of effective use of linear guides starts in the design stage. As Lean Design takes on a larger role within the entire design cycle it becomes imperative that engineers design a cost effective machine to the requirements of their customer.

and aside from adding additional seal accessories, we have just about maximized the amount of debris that can enter the bearing. Relubrication has been optimized to the point where the bearing will fail of other means before running out of lube. All of these factors theoretically increase the life of the bearing, but unfortunately most bearings don't fail because of fatigue, they fail because of misalignment. Until Lean Engineers push the fact that a high precision bearing in a medium precision application will cost the customer tons of money downhill, the compliant linear bearing will not be the "new technology" linear guide."

Rollon provides customers with a compliant linear guide (the Compact Rail), in the range of 10x more compliant than the standard profile rail guide. This compliancy allows the machine builder to reduce cost in machining, assembly time and overall machine design. The feature of the guide allows for misalignment of 4 mm along the linear axis while retaining a stiff and accurate running system.

"The rotary bearings within the carriage are lubed for life. The rolling elements are much larger than the balls in a profile rail guide. So they are much less sensitive to any debris that finds its way to the raceways," Spangler added.

When dealing with automation type applications, the load is typically light (<200 pounds) and accuracies above 200 microns. "There is no reason to use a high accuracy profile rail guide that handles 5,000 pounds and ground to microns of accuracy. If you do, you now need to mount the rails within 25-50 microns of each other. This requires machining of the mounting surfaces, shimming during assembly, and a very rigid mounting structure. All of this costs the machine builder thousands of dollars and is totally unnecessary. The cost of effective use of linear guides starts in the design stage. As Lean Design takes on a larger role within the entire design cycle it becomes imperative that engineers design a cost effective machine to the requirements of their customer. To keep machine costs low, maintenance at minimum and field failures out of the picture, the market must turn away from the profile rail guide and look at more compliant linear guides such as the Compact Rail," Spangler said.

Rollon's guides have been utilized in a variety of areas including machine tools (part loaders, tool changers, machine doors), logistics (automated warehousing, transfer

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systems, automated storage and retrieval systems), factory automation (packaging, assembly, sorting, pick and place, palletizing) and medical applications (scanning equipment, specimen testing, hazardous handling).

In the future, due to new materials and coatings, Spangler says that these rolling guides will find themselves in more food handling and washdown applications.

THK Invests in Future Linear Motion Growth

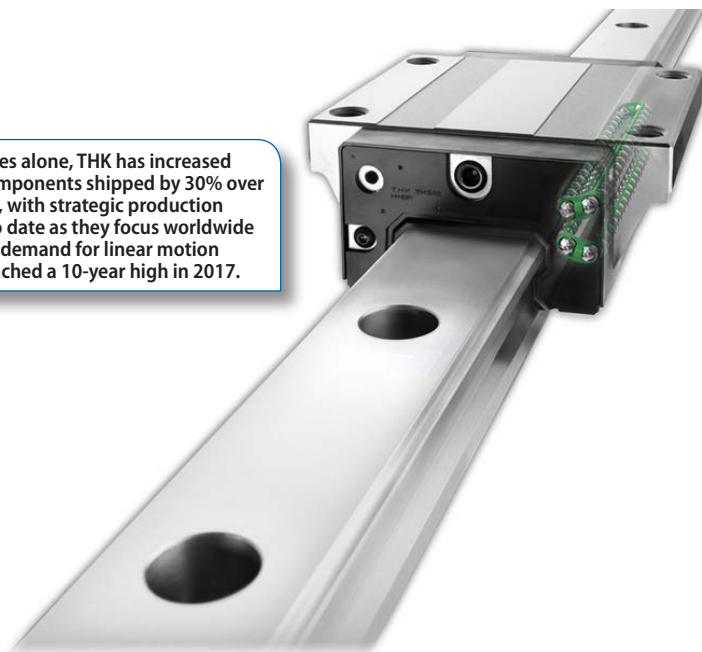
THK is taking major steps to meet the growing worldwide demand for linear motion products. In fact, THK has recently invested over a half-billion dollars in new brick and mortar facilities that will increase floor space for their global manufacturing operations to just under 10.5 million square feet. In the United States alone, THK has increased the number of components shipped by 30% over the last two years, with strategic production increases made to date as they focus worldwide to keep up with a demand for linear motion products that reached a 10-year high in 2017.

Orders for linear motion guides, components that enable machine tools to perform precise positioning operations in industries that include aerospace, machine tool, packaging and medical, increased by 31.6 percent in 2017. This figure far surpassed the industry forecast of 8 percent and late in the year supplies began to tighten as demand for these vital manufacturing components exceeded production capacity. THK, the company that first commercialized linear motion technology in 1972, took a strategic look at how to work expeditiously to fill existing orders and to positively address the long-term need to expand manufacturing to satisfy customer orders.

Committed to investing in the future, THK is expanding production with a capital investment of over a half-billion dollars at manufacturing facilities in Yamagata, Japan, and in Vietnam and adding a 366,000 square foot facility in India. This will increase THK production by an additional 30 percent once all expansions are fully in place. To enable increased production while maintaining a high standard of precision and accuracy associated with their products, THK is also automating processes at existing facilities, including at their U.S. manufacturing plant in Ohio. To assist in meeting customer demand for linear motion products, THK has further invested in research and development of its industry-leading LM components as well as in human resources. The company has grown from around 9,000 employees in 2014 to over 13,000 in 2017.

According to Statistics MRC, the Global Linear Motion Systems Market is expected to grow significantly through 2026. Factors for this growth include rising revenue from replacement activities, a high demand for linear motion systems in the automotive industry and the rapid industrialization in emerging countries. However, lack of effective product differentiation is one of the major factors hampering the market growth.

In the United States alone, THK has increased the number of components shipped by 30% over the last two years, with strategic production increases made to date as they focus worldwide to keep up with a demand for linear motion products that reached a 10-year high in 2017.



Linear motion systems consist of linear rail, rail tables, guides, and actuators, sliders, which help the manufacturing facility to continuously transfer products in a conveyor belt, or push it across for packaging. By application, linear motion systems find significance across different applications in material handling such as palletizing, packaging, pick and place, sorting, and the transportation of goods. The deployment of linear motion systems in this application delivers agility and seamless processing, thereby reducing maintenance requirements.

By geography, Asia Pacific is expected to grow at a significant rate due to rise in industrialization in the emerging countries like China, India, Taiwan and South Korea. Further, the demand for linear motion systems is supported by the development in automation solutions and robotics in this region. These emerging technologies will determine how successful rolling guide applications will be in the future. **PTE**

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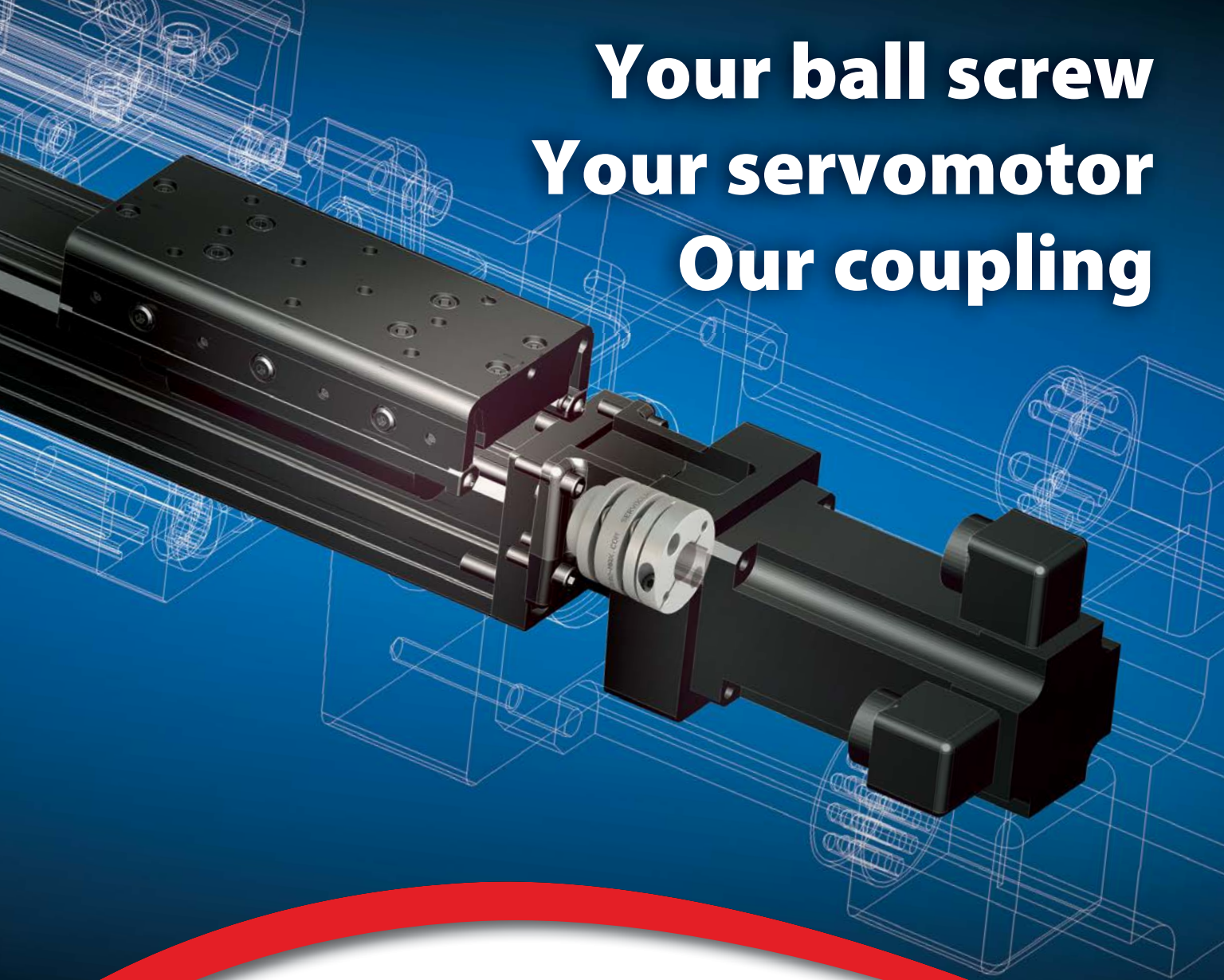
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How to Deal With Growing Pains

Wind turbines are getting bigger than ever, and the manufacturing infrastructure that facilitates their construction needs to start growing with them.

Alex Cannella, Associate Editor

Wind turbines have grown steadily in size.

Not even two decades ago, they were only a sixth the size of what they are now, and they've been accelerating in growth ever since.

"When I started in the wind market in 2001, most turbines were 1.5 to 2MW," Doug Lucas, advanced engineering technologist at Timken, remembers. "Some turbine builders were working on 3MW and 4MW designs. As the market grew from the early 2000s to 2010, the conversation changed to 5 and 6MW turbines. Then, in 2015, Vestas announced their 8 M@ turbine...and now we're seeing others go up to 12MW."

That big 12 MW turbine is one of GE's most recent innovations from the past year, the Haliade-X, first of its class. The thing is, in a word, intense. It's tall as a skyscraper, standing 260 meters tall with 107-meter long blades, and not only is it the biggest wind turbine you'll find out there, it's also one of the most efficient, with a 63 percent capacity factor. Just one turbine can power thousands of homes.

The demand for the 12MW turbine is, in fact, so intense that component manufacturers for the wind power industry can only just keep up. Even leading manufacturers in the field like Timken are hitting the limit of what they can do currently.

The loads placed on the bearing is a factor of concern, but just making a bearing big enough to work with these turbines is a complicated undertaking. Currently, many of the biggest wind turbines require bearings over two meters in diameter, something that according to Lucas, only a very select few manufacturers can even make, Timken among them. However, the industry isn't stopping there. They already want to go bigger.

Lucas cited one manufacturer that's already looking ahead and trying to

design turbines so large that they would require bearings over four meters, double the size of what's already the cutting edge of what the bearing industry can handle. The sheer scale is mind-bogglingly massive, something that almost nobody in the industry has ever had to deal with.

"We're on a size range of bearings that people have never reached before," Lucas said.

According to Lucas, a major challenge to upsizing these bearings is that the supply chain is pushing their upper size limits. In particular, heat treatment is a primary concern, as the size required for a furnace to be able to treat such massive bearings would be financially prohibitive. Pieces as large as what Timken would need are rare, so it's understandable that not many heat treaters would have a furnace set aside capable of handling them.

However, heat treatment is a must for these bearings to handle the intense loads they do, so even if we can make bearings that large, finding somewhere to heat treat them is a bit of a predicament, and turnaround time skyrockets.

"Once you get up over two meters in size, there are very few heat treat manufacturers or bearing manufacturers around the world that have the size of heat treatment furnaces needed," Lucas said.

The key operating word here is "currently," however. So how is Timken, along with other bearing manufacturers, keeping up with demand for increasingly massive bearings to power towering wind turbines?

Some general tactics involve changing over from spherical bearings to cylindrical or taper bearings and side-stepping the issue of size by making two bearings to achieve the same effect.



Turbines are racing to get bigger and bigger every year, and it's hitting the upper limits of what some component manufacturers are used to.

“As we start seeing turbines grow upwards into the range of 12MW and beyond, we’re actually seeing that more and more companies are starting to use two single-row pre-loaded tapered roller bearings,” Lucas said. “And as those bearings move further apart, we’ve actually been able to keep the bearing outside diameter down to a range that’s more manufacturable.”

Along the way, Timken’s found that the cylindrical taper bearings just work better in general for wind turbine applications. Spherical roller bearings, according to Lucas, are excellent at carrying radial loads, but they’re less equipped for thrust and overturning moment loads, both of which they must handle when used as wind turbine main shaft bearings.

“Using tapered bearings on larger megawatt turbines has advantages, because that type of bearing is designed to handle those loads,” Lucas said.

The other half of the issue is the supply side, and Timken has been handling this by switching their heat

treatment method. Previously, Timken used case carburizing for their high performance bearing needs, but for the massive bearings they’re making for high-end wind turbines, they are using induction hardening. In the process, they’ve drastically shortened the time it takes to heat treat a bearing from up to a month to just a handful of hours,

“We’ve developed the induction hardening process to overcome those challenges from manufacturing and the supply chain to be able to provide a high-quality product in a timeframe

“We're on a size range of bearings that people have never reached before.”

Doug Lucas,

advanced engineering technologist, Timken

that will meet our customer’s requirements,” Lucas said.

Timken has also started developing custom cage designs for their largest bearings. Many of Timken’s bearings have stamped steel cages. Here again, size has outstripped infrastructure. Most stamping machines just aren’t big enough to handle the cage size required for these massive bearings, and between that and tooling expenses, Timken has run up against a “limitation” to design in ultra-large stamped steel cages. As a result, the company developed innovative custom cage designs to overcome this challenge.

However, Lucas is confident that component manufacturers, and the infrastructure behind them, will find a way to keep up. They always have before, ever since wind turbines made the jump to multi megawatt almost two decades ago, and they’ll do so again in the future.

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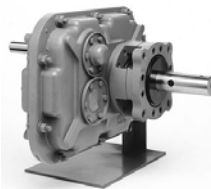
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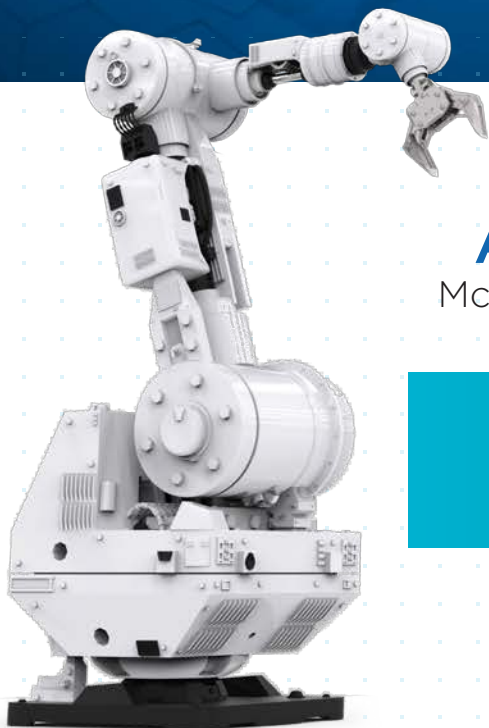
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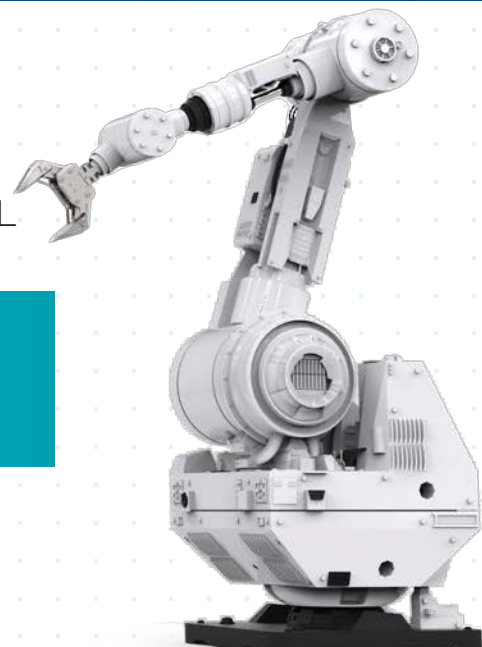
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2018 PTE Buyers Guide

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The 2018 *Power Transmission Engineering* Buyers Guide was compiled to provide you with a handy resource containing the contact information for significant suppliers of power transmission components.

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How to Get Listed in the Buyers Guide

Although every effort has been made to ensure that this Buyers Guide is as comprehensive, complete and accurate as possible, some companies may have been inadvertently omitted. If you'd like to add your company to the directory, we welcome you. Please visit www.powertransmission.com/getlisted.php to fill out a short form with your company information and Buyers Guide categories. These listings will appear online at www.powertransmission.com, and those listed online will automatically appear in next year's printed Buyers Guide.

Handy Online Resources

The *Power Transmission Engineering* Buyers Guide – The listings printed here are just the basics. Visit our online buyers guide for the most comprehensive directory of suppliers of gears, bearings, motors, clutches, couplings, gear drives and other mechanical power transmission components, broken down into sub-category by type of product manufactured:

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The **Gear Industry Buyers Guide** – If you manufacture gears or need information on suppliers of machine tools, tooling and services for gear manufacturers, please visit the buyers guide on *Gear Technology's* website:

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www.ascentgear.com

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www.ato.com

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Bearing Engineering
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www.coremo.ocmea.it

Cross + Morse
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Fax: (765) 772-4001
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www.pgdrive.com

P.T. International Corp. (PTI)
www.ptintl.com

Performance Gear Systems, Inc.
www.performance-gear.com

Perry Technology Corporation
www.perrygear.com

PIC Design
www.pic-design.com

Plastock - Putnam Precision Molding, Inc.
www.plastockonline.com

Popular Mechanical Works
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Portescap
www.portescap.com

Power Electric
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Pragati Transmission Pvt Ltd
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Precipart
www.precipart.com

Precision Pump and Gear Works
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Precision Technologies Group (PTG) Ltd.
www.ptgltd.com

PSL of America
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PST Group (Precision Screw Thread)
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PTD Outlet: Power Transmission Distributors
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www.pulleys.com

Pulsgetriebe GmbH & Co. KG
www.pulsgetriebe.com

QTC Metric Gears
www.qtcgears.com

Quality Bearings & Components
www.qbcbearings.com

Rave Gears LLC
www.ravegears.com

RBI Bearing Inc.
www.rbibearing.com

Regal Power Transmission Solutions
www.regalpts.com

Reliance Gear Corporation
www.reliancegear.com

Renold
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Riley Gear Corporation
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Ringball Corporation
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Ritbearing Corp.
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Siti Spa Riduttori
www.sitiriduttori.it

SKF USA Inc.
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Snow Nabstedt Power Transmissions Inc
www.snpt.biz

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Taiwan Precision Gear Corp.
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Team Industries
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www.tienyigear.com.tw

Tirex Transmission
www.tirextransmission.com

Toledo Gearmotor
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Trojon Gear Inc.
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United Gear Works
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VCST LP
www.vcst.be

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www.dynexhydraulics.com

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Orttech
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Parker Hannifin SSD Drives Div.
www.parker.com/ssdusa

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www.atlantadrives.com

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BDI - Bearing Distributors Inc.
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Bearings and Industrial Supply Company, inc.
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Bearing Service Company
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Bibby Transmissions
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BK Power Systems - An Integrated Corrosion Co.
www.bkpowersystems.com

Checkfluid
www.checkfluid.com

Core Supply LLC
www.coresupplyllc.com

Cortec Corporation
www.cortecvci.com

Dalton Bearing Service, Inc.
www.daltonbearing.com

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www.daubertcromwell.com

Elkem Silicones
silicones.elkem.com

Extreme Industrial Lubricants
www.extremelubricants.com

Filter Pumper / Hydraulic Problems, Inc.
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iselinc.com

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Lovejoy, Inc.
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The Lubricant Store
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MGT - Magnetic Gearing & Turbine Corp.
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Power Transmission Engineering

Thermal Analysis and Optimization of Gearboxes by Simulation

Björn Bauer, Ralf Hambrecht, Andreas Kube and Simon Becka

Introduction

With the increasing mechanical power capacity of gearboxes, the thermal power limit tends to become the limiting factor. To achieve a balanced system, the gear unit needs extra cooling. Using a fan that is mounted to a fast rotating shaft is a common solution. For this solution an optimal design is investigated. Due to the complexity of a gearbox's heat balance, analytical calculation methods are too inaccurate for precise evaluations of changes to the cooling system. The goal of this work is to present an optimal cooling concept — with fan and air guiding cover — by using a numerical approach.

Thermal Balance as Dimensioning Criterion

Converting torque and revolution speed in spur and bevel gear units causes energy losses within the moving machine parts. Without an external cooling device, a specific operation temperature is required to achieve an energy balance, which is influenced by factors illustrated in Figure 1. Inside the gearbox the heat is transported by the oil, which is distributed by the rotating parts — like gears. Without external cooling, the major part of the heat is dissipated by convection and radiation.

The transmittable power of a gearbox grows to the power of three related to its dimension — as do its losses. In contrast, the surface grows only to the power of two. This

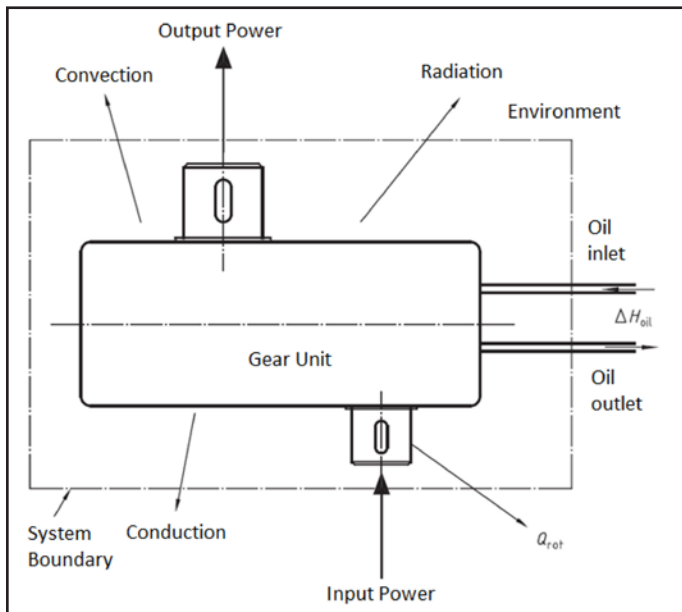


Figure 1 Influences on the thermal behavior of gearboxes (Ref 1).

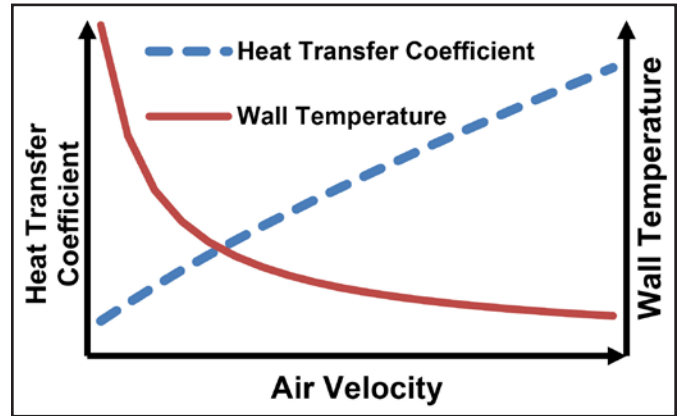


Figure 2 Comparison of mechanical and thermal power rating.

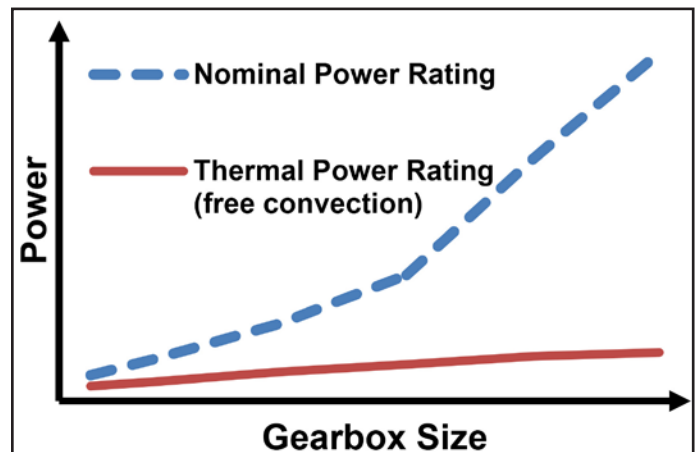


Figure 3 Influence of air velocity on heat transfer coefficient.

misalignment limits the power (Fig. 3). In addition to the size effect, the ongoing development of gearboxes is affected by a continuous increase of power density. New and better materials, enhanced manufacturing technologies, and numerical design methods like shape optimizations lead to a higher utilization of available space. The energy balance can only be maintained if the temperature rises or the cooling capacity of the surface is used more efficiently. Increasing the oil temperature is limited due to lifetime reduction effects of the lubricant and restrictions on surface temperature limits. Therefore it gets more and more probable that, at the end, it is not the mechanical requirements that determine the selected size of a gearbox and therefore the price, but rather the thermal power limit.

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Optimization of Surface Cooling

The air velocity near the surface has a high influence on the heat transfer coefficient (Ref. 3). This relationship and its effect on the temperature of the passed wall are shown (Fig. 2). To raise the air velocity of surface-cooled gearboxes, using fans is a common solution. Mounted to the fast rotating input shaft, a high-volume flow rate is generated to pass the surface; sometimes, cooling fins are added to enlarge the surface area.

Figure 4 shows a Flender B3SH gearbox with fan and air-guiding cover. The cover aligns the airflow to the gearbox housing, which improves the thermal power limit significantly. Figure 5 shows a comparison of power limits for different cooling options.

Forced convection helps minimize the gap between mechanical and thermal power limits. But especially for larger gearboxes, this cooling effect is not sufficient—even when using housings with fins. A more effective solution is required.

Analytical Approach to Calculate Gearbox Temperatures

Today's common method for calculating gearbox temperatures is described (Ref. 1). To begin, the losses of the machine elements are calculated. Then the heat outflow is regarded, separated in two steps: 1) the heat transfer from the oil to the housing material, subdivided in areas with and without direct oil contact; and 2) calculate the heat flow from the housing to the environment, considering areas with and without fins, losses by radiation, and also heat conduction to the basement and other parts that are connected to the shafts.



Figure 4 Gearbox with radial fan and short air guiding cover.

This analytic approach is exact—as long as the boundary conditions are ideal. But in reality the surface temperature is not homogeneously distributed, and the air flow is neither laminar nor steady. One reason for the inhomogeneity is the way the thermal energy passes to reach each surface point. The transport of the energy starts at a heat source; contains a distribution through the oil; goes via wetting of the inside surface of the housing over to the housing material; and then passes an individual distance to reach an outside surface location. For any surface point, an individual heat flow develops (Fig. 7).

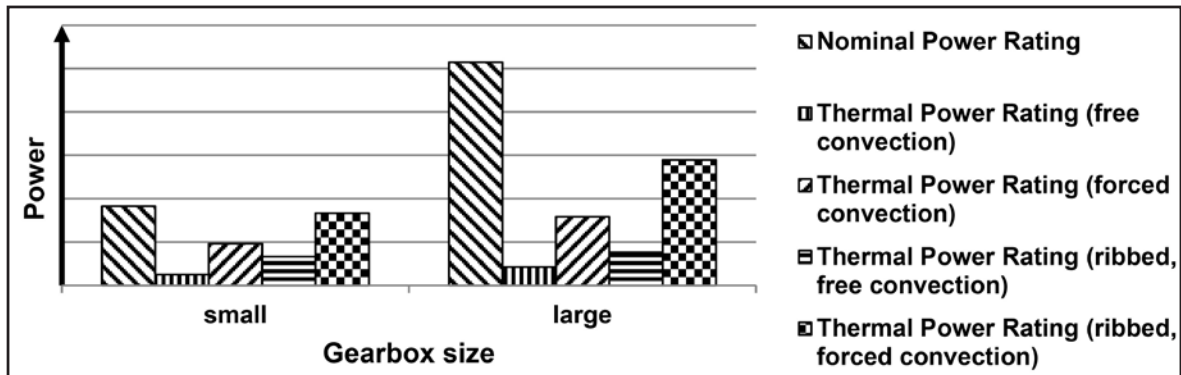


Figure 5 Influence of forced convection on thermal capacity.

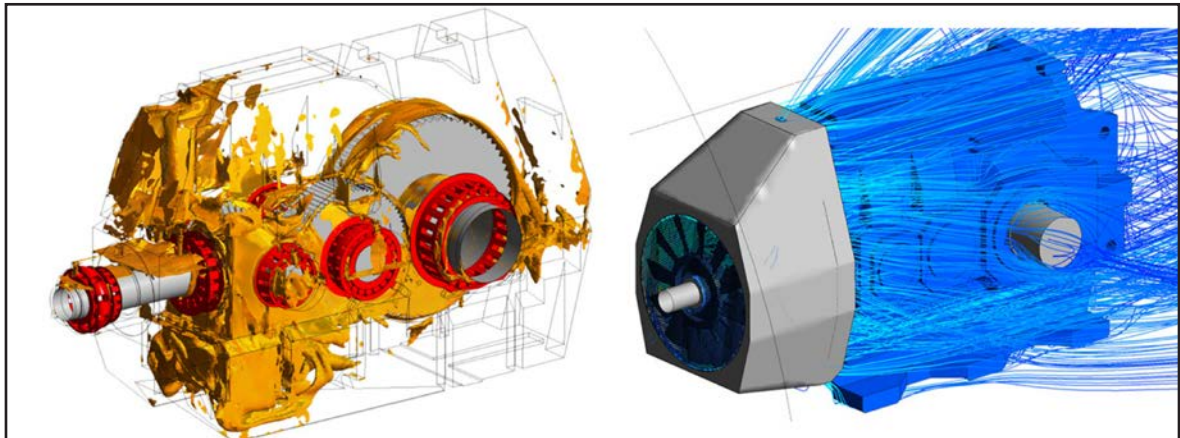


Figure 6 Simulation of oil distribution (left) and airflow (right) around a Siemens Flender gearbox with standard air guide hood.

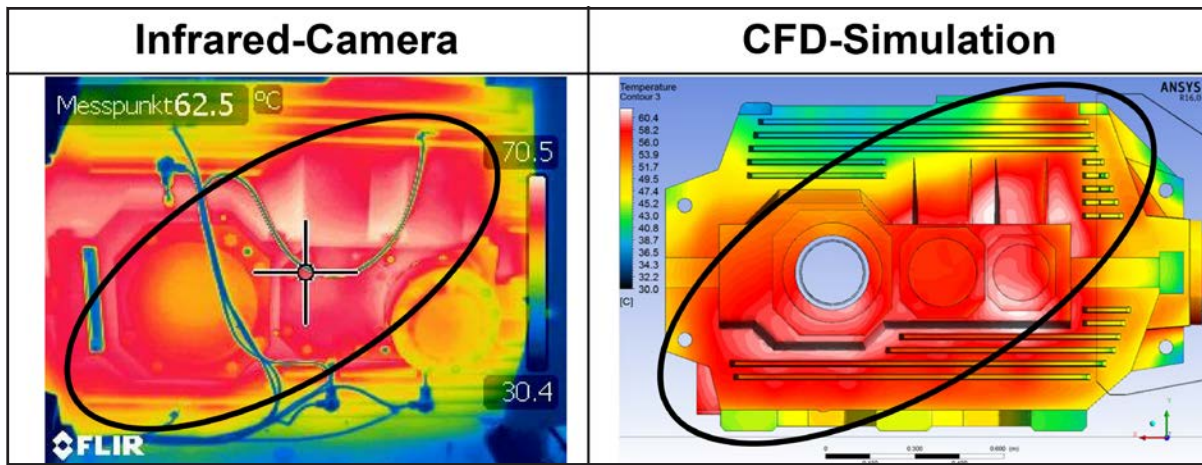


Figure 7 Comparison between infrared camera and a CFD simulation.

Furthermore, the terms to calculate the losses of the machine elements are only good as estimations. An example is the calculation of gear mesh losses according to Mauz (Ref.2); that approach is valid up to modulus 5, but for an industrial gearbox this is not sufficient. Often, bigger gears are used and thus the calculation is rendered inaccurate.

Bottom line, this approach is insufficient to predict the thermal behavior of a changed gearbox design.

Numerical Approach to Calculate Gearbox Temperatures

The state-of-the-art numerical approach is computational fluid dynamics (CFD). This method is capable of closing the gap between calculated and measured gearbox temperatures. With CFD it is possible to simulate the oil flow inside the gearbox (Fig.6, left) and the airflow around it (Fig.6, right). This makes it possible to consider all influences that are important for the heat distribution; e.g. — the local wetting of the inside surface, the rotational speed and direction of moved parts, and the immersion depth of the gears' wheels.

At the outside surface the exact streaming conditions are simulated and allow considering models of different fan types, covers, and flow-disturbing details of the surface topology.

The heat flow via conduction to connected machine parts, or to the basement, play a minor role within global balance. More important when seeking the correct absolute temperature level is the precision of the efficiency factor of the gearbox. The analytic terms provide a good estimation of the relation of the different losses to each other, but the absolute level has poor precision. To calibrate the CFD simulation, it is possible to simply scale these losses so that the simulated absolute temperature level fits a measurement. This is advantageous if one wants to precisely predict the absolute temperature (or thermal power limit) of a gear unit with a changed cooling design. But simply finding the optimal design is not sufficient. Mainly, three things are required: 1) the mechanical losses in good proportion to each other at the correct locations; 2) the correct oil flow and resulting distribution; and 3) the correct airflow around the gearbox. Figure 7 illustrates the resulting, simulated heat distribution over the gearbox surface and compares it to an infrared camera picture. The comparison shows that the position of the hotspots, the

distribution, and absolute temperature values are nearly exact — with an acceptable maximum error of 3 kelvin.

Computation Time

The required computation power to perform CFD is enormous compared to analytical calculations. For example, the transient simulation of 5 seconds real time of a medium-sized gearbox in appropriate accuracy concerning grid resolution and time step size, takes about seven days of computation on a well-equipped desktop form computer with two 3 GHz multi-core CPUs, 128 GB memory and solid state hard disks. Bigger gearboxes are hardly computable at all on desktop computers because the number of nodes in the 3-D model grows proportionally with the volumetric size of the gearbox.

For such problems Siemens offers a service to use a world-wide-distributed computer cluster infrastructure. This solution makes it possible to simulate even the biggest gearboxes in best resolution and accuracy. The computation period reduces to a fraction, so that complete work on one test case, including pre- and post-processing, can be done in hours and days, instead of days and weeks.

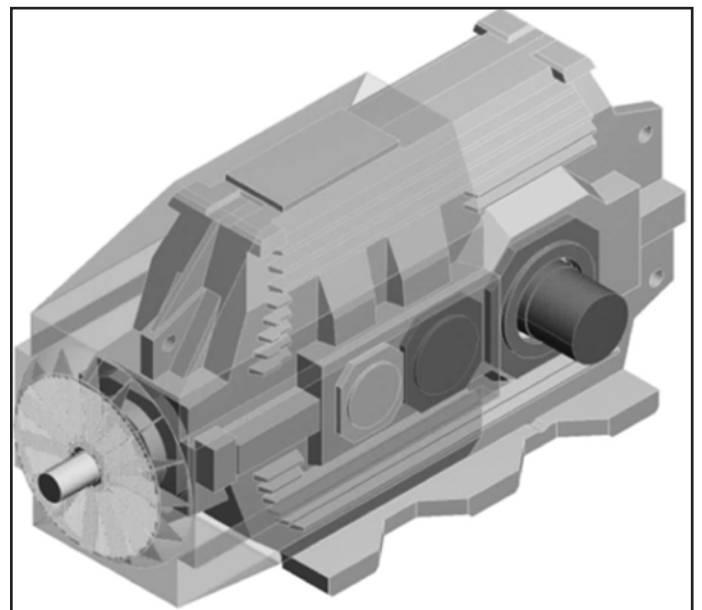


Figure 8 3-D model of optimized radial fan with long cover.

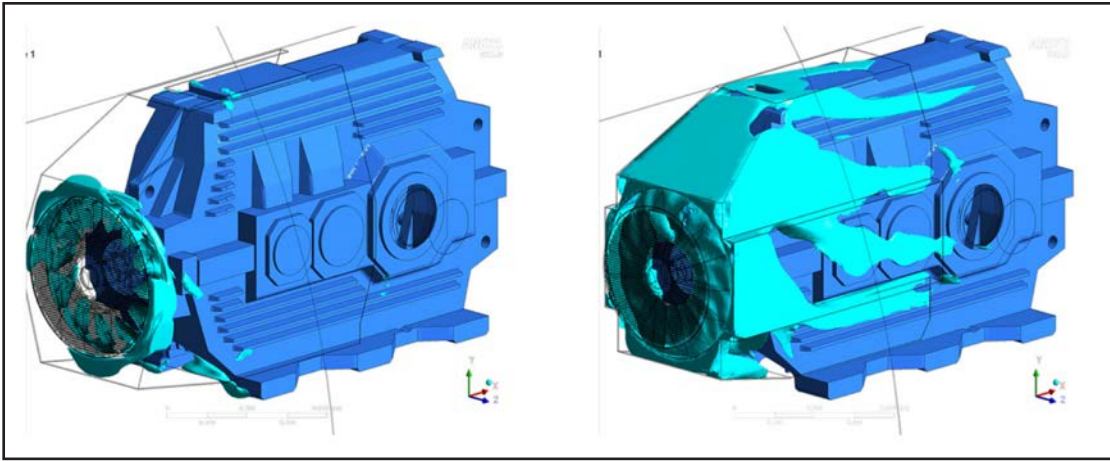


Figure 9 Concept 1 flow conditions for axial fan (left) and radial fan (right); the illustrated ISO surfaces show areas with air velocities higher than 15 m/s.

Optimization of the Thermal Power Limit

To optimize the heat balance of a gearbox, there are basically two possibilities. First, reduce the power losses inside the gearbox. Second, enhance the heat dissipation rate. The target of our CFD simulation is to show the consequences of changes to the airflow for the gearbox temperature; from this the optimal cooling solution shall be derived. Three things are possible to be modified, i.e. — the gearbox surface, the fan, and the cover. To modify the surface, which means to modify the gearbox housing, requires great effort and therefore only the second choice. Modifying fan and cover is much easier and faster to accomplish. To determine whether this approach is sufficient, two cover variants are investigated.

Concept 1: Long cover + radial fan. The first approach is to extend the cover (Fig. 8). The intention is to achieve higher air velocities directly at the gearbox surface — over a maximized area. The length of the cover and the flow cross-section has been modified in several iterations to find an optimum and to keep it simple. The longer cover leads to a higher resistance against the flow, and using the common axial fan failed to provide a better cooling effect; in order to compensate, an optimized radial fan has been utilized. Though radial fans produce higher pressure, axial fans normally have advantages because of their higher volume flow rate — but not in this case. Figure 9 shows air velocities for both fan types. A

welcome secondary effect is that the radial fan is independent of its rotational direction, which makes use of the gear unit more flexible. The simulation shows an expected reduction of the gearbox temperature of 5 kelvin over the complete torque range (Fig. 12).

Concept 2: reversed flow direction. The produced airflow of a fan always has a rotational speed component. This air rotation results in regions with an accumulation of air due to barriers around the gearbox in circular direction. An optimal airflow, straight along the gearbox side, cannot be achieved this way. To avoid disadvantage, the direction of the airflow

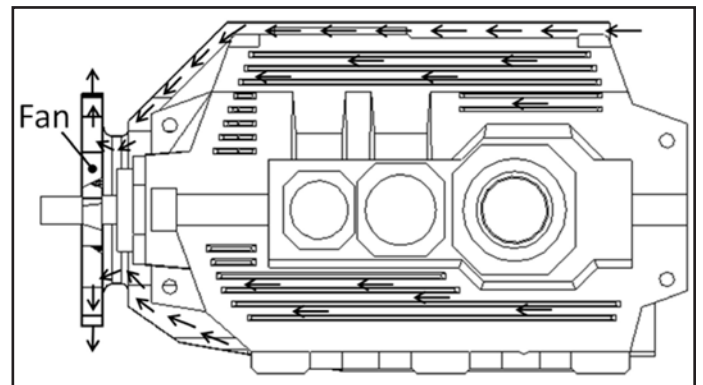


Figure 10 Schematic of concept 2.

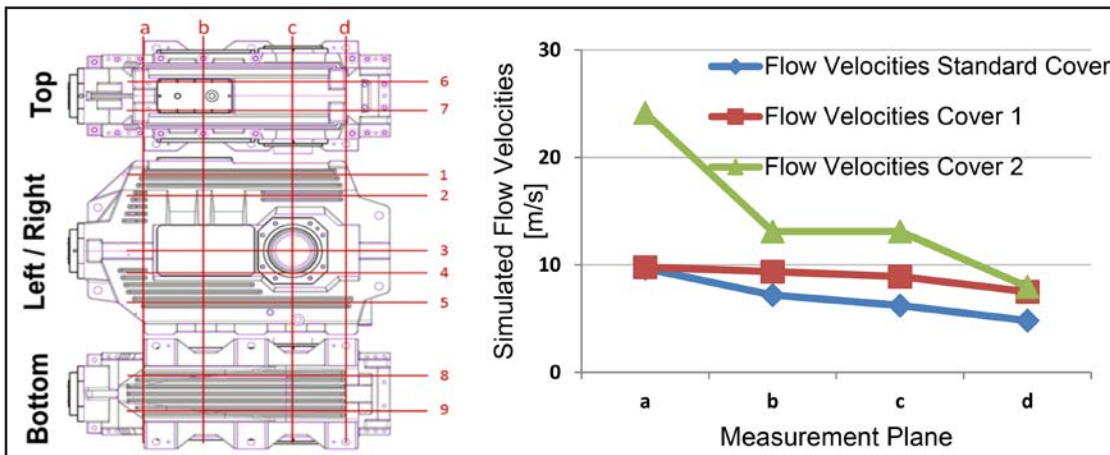


Figure 11 Increased flow velocities of different covers.

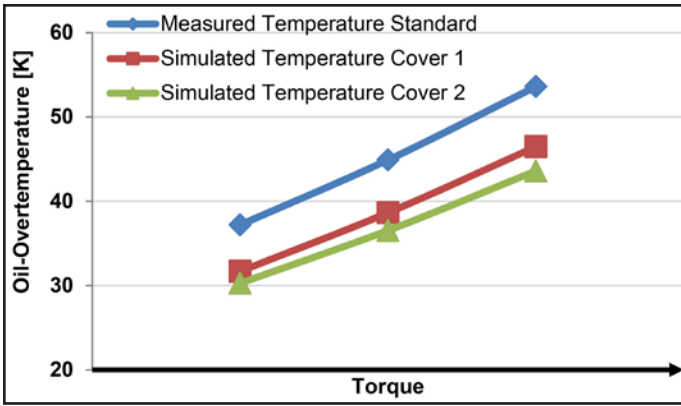


Figure 12 Simulated temperature for concept 1 and concept 2.

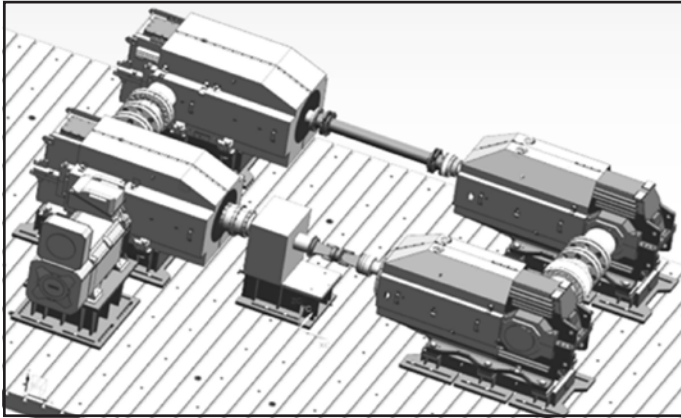


Figure 13 Test bench.

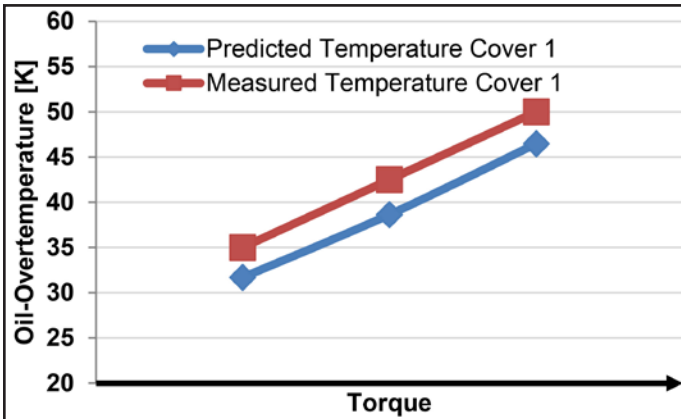


Figure 14 Comparison between prediction and measurement—concept 1.

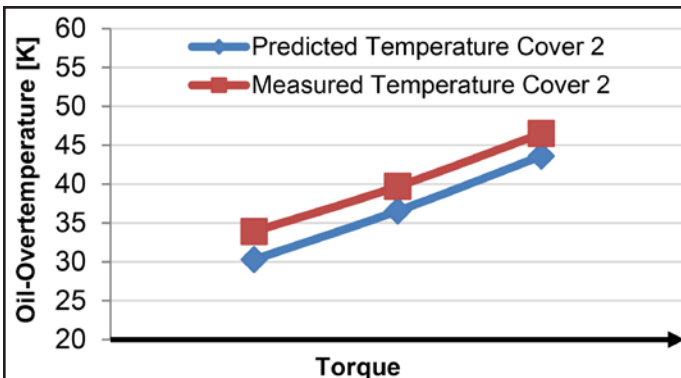


Figure 15 Comparison between prediction and measurement—concept 2.

can be reversed (Fig. 10).

This air-suctioning concept implicates higher demands on the guidance of the air. The cover has to overlap the housing over the complete length. Only directly beneath the cover is the airflow effective, as it relates to the desired cooling effect. A narrow gap between cover and housing surface results in a high pressure drop, but also leads to a good and homogenous flow.

The resulting air velocities are shown (Fig. 11). In (Fig. 11, left) the measurement points are marked. In the length direction, the gearbox is divided into four sections — a, b, c, and d.

In each section 14 measurement points have been defined (1-5 left and right; 6-7 on top; 8-9 under bottom). Not every point was reachable for the anemometer, but most of the simulated velocities have been successfully validated for the standard cover and long cover.

Figure 11 shows the simulated, averaged air velocities along the gearbox. The highest velocities are, in all cases, near to the fan directly in front of the gearbox. At this location there is also the highest heat production, due to the fast-rotating input shaft. Concept 2 shows an air velocity in this region that is more than two times higher compared to standard solution and concept 1. The over-all averaged velocity for the standard solution is 7 m/s; for the concept 1 it is 9 m/s; and for concept 2 it is 14.5 m/s.

The resulting, simulated oil-overtemperatures (compared to the environment) are shown (Fig. 12). Concept 2 reduces the oil temperature by 7 kelvin. The expected reduction is relatively small compared to concept 1; the explanation for it can be found in Figure 2. The major cooling effect is already reached with velocities from concept 1.

To validate the predicted enhancements of the simulations, prototypes of the designed solutions have been built and tested on a test bench.

Validation of Simulation Results

The test bench. A test bench has been set up in a square, containing two pairs of back-to-back connected gearboxes loaded with a controlled, hydraulic torque motor (Fig. 13). Torque sensors were placed at the input and output shaft of the test gearbox in order to facilitate detecting the input torque as well as the power losses. An intermediate shaft of a non-test-gearbox was used to drive the system. Several sensors had been placed to determine the temperature of the environment, oil, and bearings. Additionally, air velocities have been measured and infrared pictures taken.

Test Results

Figures 14 and 15 show the expected oil over-temperature (related to environment) from the simulation and the measured values from the test bench.

The simulated values were derived from a calibrated CFD simulation. The remaining error of constant 3 kelvin is acceptable and can be explained by inaccuracy of the simulation model and uncertainty of the measurement.

Comparison of Improvements

A comparison of the predicted and the measured oil temperatures shows two things. The simulation results are reliable

and the elaborated cooling concepts are very effective. Gearboxes with the new cooling concepts maintain significantly lower temperatures under the same operating conditions. Figure 16 shows the measured temperatures of the new cooling concepts in comparison to the conventional, standard solution. The standard solution, with its shorter cover and axial fan, reaches the highest temperatures. Cooling concept 1, with longer cover and optimized radial fan, lowers the temperature by 3.5 K. Concept 2, with long, tight-fitting cover and air-suctioning radial fan, lowers the temperature by 7 K compared to standard solution.

The corresponding effect on the thermal power limit is shown (Fig. 17); the thermal capacity is shown for three typical operation speeds, with the standard thermal power limit as 100% reference. The new cooling options result in considerably higher thermal capacities. Concept 1 is up to 20% better than the standard solution; even better, concept 2 up to 33%.

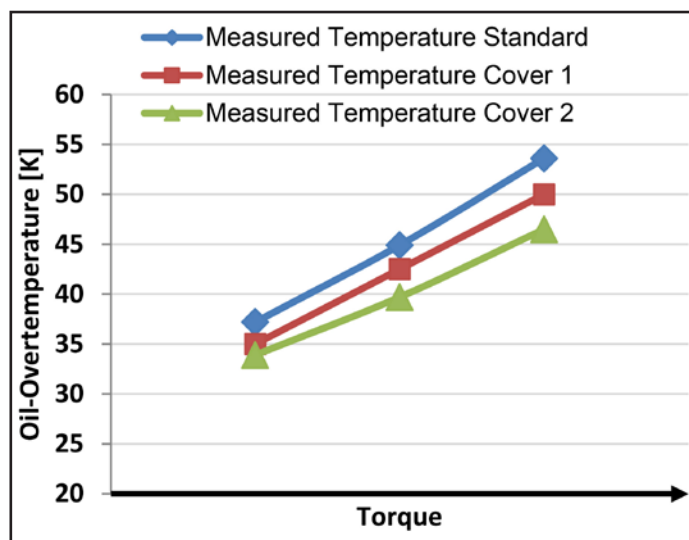


Figure 16 Comparison between temperatures with different covers.

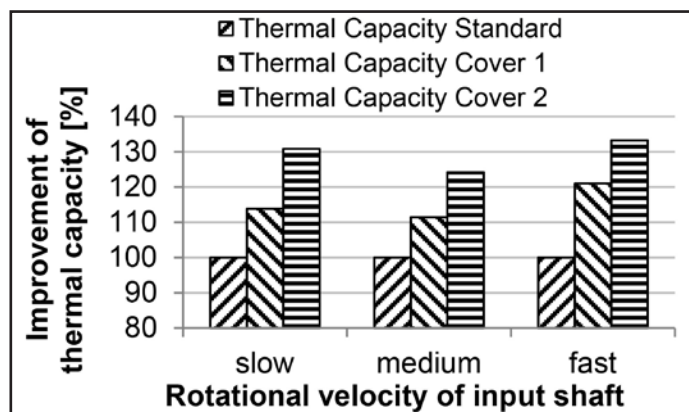


Figure 17 Improvements in thermal capacity.



For more information.

Questions or comments regarding this paper?
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Conclusion

The studies on hand have shown that it is possible to simulate the complex, thermal behavior of a gear unit with good accuracy and enables improvement of heat dissipation. Basically two different approaches have been investigated. Longer covers and more effective fans are the focus here. These simple but purposeful changes to the designs of the fans and the air guiding covers lead to significantly higher thermal power limits — up to 33% in the investigated example. These power limits have been validated on a test bench where the reliability of the computational fluid dynamics simulation technique has been reliably demonstrated. CFD is a powerful tool enabling prediction of a gearbox's temperature under consideration of the oil distribution inside and the airflow around the gearbox. Improvements demonstrated here for one type of gearbox can be transferred to several products. At Siemens Mechanical Drives, new and revised products are already profiting from the use of CFD. **PTE**

References

1. N.N., Gears — Thermal Capacity; Part 2: Thermal Load-Carrying Capacity; ISO Copyright Office Case Postale 56; CH-1211 Geneva 20.
2. Mauz, W. "Hydraulische Verluste von Stirnradgetrieben bei Umfangsgeschwindigkeiten bis 60 m/s," Diss. Universität Stuttgart, 1987.
3. Verein Deutscher Ingenieure: VDI-Wärmeatlas; 10. Auflage; Springer-Verlag, Berlin, 2010.

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Integrated Hybrid Servo Motors vs. Standard Integrated Servo Motors: How Do They Stack Up?

Donald Labriola, P.E.

Different motor types favor different application areas. No single style has advantages in all application spaces. Direct drive applications favor hybrid servos while high-speed, geared down applications tend to favor the conventional servo motors. Misapplication of a conventional servo into a direct drive application may result in just one-third of the expected efficiency and provide only 40% of the continuous power at a typical application speed. This leads to 160% to 450% more heat being dissipated by the conventional integrated servo motor, as compared to a similarly sized NEMA 23-frame (4 inches long) integrated hybrid servo motor.

Integrated servo motors fall into a couple of main camps, i.e. — traditional low-pole-count AC brushless, and hybrid servo, which use high-pole-count AC brushless motors. The latter may also be used open-loop as step motors. The integrated hybrid servo motors — as used in this comparison — are operated as true servo motors using vector drives. These comparisons do not hold for step-loss, prevention mode step motor drives — even though the same style of motor may be in use. This closed-loop vs. open-loop performance difference is also true of low-pole-count motors in that a given motor generally performs significantly better when using a full servo control than when that same motor is operated open loop using a variable speed drive.

Fundamental Motor Differences

Hybrid servo motors are based on high-pole-count (typically 100-pole) motors — typically called “step motors” in open-loop operation. Traditional servo motors normally use lower-pole-count (typically 4-16-pole) motors. Given the other motor factors being the same, the torque constant (Nm/A) for a motor increases with the number of poles, and the speed goes down by the same ratio. The torque constant (if losses are accounted separately) equals the voltage constant when expressed as volts/radian/sec. In this example comparison, “A” brand integrated servo motor lists the voltage constant as 6.6v/1,000 rpm, which corresponds to .06 v/radian/sec, thus equaling .06 Nm/A, and a winding resistance of 1.1 ohm. The QCI integrated hybrid servo has a measured voltage constant of .227 v/radian/sec, and a winding resistance of .66 ohms. This means that this conventional servo requires more than 3.5 times as much current to produce the same torque at the shaft as does the hybrid servo. Power loss

is calculated in the copper windings by P_{loss} equals I^2R . This corresponds to more than 20 times the power dissipated, just to hold the same torque when the motors are stopped. Thus a high-torque constant is very beneficial at low to medium speeds; however, the high torque constant also causes a higher motor back-EMF for a given speed, which reduces the voltage available to the drive current into the motor at higher speeds. This condition limits the top speed of the motor. These differences make the hybrid servo motor very useful for many direct drive applications, but limits their use in very high-speed applications, where the lower-pole-count motor wins out.

Comparing Torque Curves

The torque curves are shown (Fig.1) for the two motor types. As you can see, the hybrid servo has more continuous torque — up to approximately 2,000 rpm — and more continuous torque than the “A” motor has peak torque — up until approximately 1,500 rpm. These are important speeds for *direct drive* applications, i.e. — with the motor directly driving the load without a gearhead. A typical lead screw, i.e. — quarter-inch, 24-inches-long, both ends secured with a single bearing — has a critical speed approximately 1,600 rpm, while extending the leadscrew to 36 inches drops the critical speed to just over 700 rpm. A typical direct drive belt drive (1" diameter pulley = 3.14"/revolution) moves at 52-inches-per-second while rotating at 1,000 rpm.

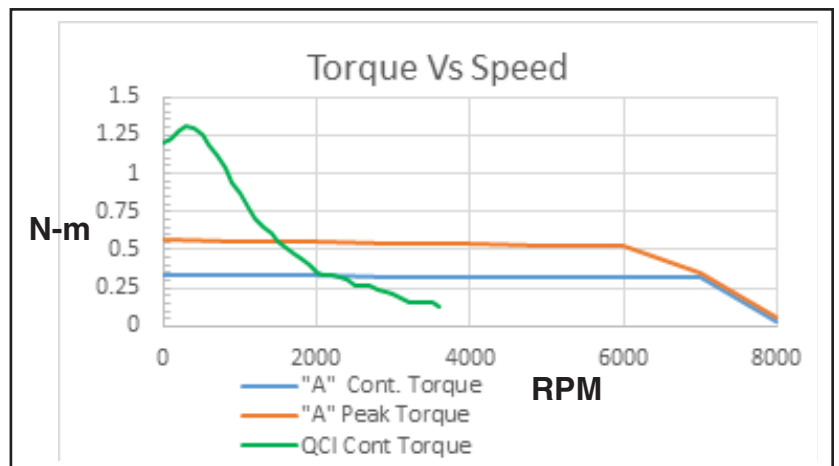


Figure 1 Torque vs. speed comparison. (All graphics, photos courtesy QuickSilver Controls, Inc.)

Output Power Available

Figure 2 shows that the hybrid servo has approximately constant power from 700 rpm up to nearly 1,500 rpm, which again nicely covers the direct drive requirements. This means that the speed can be chosen within this speed range and will still be fully utilizing the motor capabilities. The conventional servo data shows power out through 7,000 rpm, but has been truncated to fit the graph. While the continuous power of the “A” motor does extend up to 226W at higher speeds, the continuous power at 1,000 rpm is just 35W compared to 90W for the QCI-X23C-3 hybrid servo. Therefore, determining the preferred motor type definitely depends upon how the motor is being applied!

Motor Efficiency vs. Speed

The motor efficiency for the QCI hybrid servo was directly measured (Fig. 2), while the efficiency for the traditional servo was approximated, based on the torque and the I^2R losses and estimated speed-related losses, as well as the input current of 6.6A at 48v producing .33Nm at 6,500 rpm (226W out, 318W in, some 92W waste heat). With the continuous torque curve stated as based on an 85C case temperature, the power being dissipated by the motor has been taken as approximately continuous across the speed range for these calculations. What is readily apparent is that the hybrid servo motor and controller are significantly more efficient than the conventional servo motor — up to about 3,200 rpm. At 1,000 rpm, mid-range for many direct drive applications, the hybrid servo is some 225% as efficient than the continuous operation of the conventional servo motor, and some 300% as efficient

when comparing against the peak torque curve of the conventional low-pole-count motor (which is still only producing about 64% of the hybrid servo torque). Again, there is a wide speed range of high-efficiency operation for the hybrid servo motor. *Note:* the curve has been somewhat truncated to show the direct drive range of speeds; the “A” system eventually reaches an efficiency of 71% at the nominal continuous power point of 6,500 rpm. While this may be useful for applications that actually need this speed, it is not accessible for most direct drive applications.

Although both motor types have an efficiency of zero at zero speed, the hybrid servo system takes only some 20W to hold a 1.2 Nm load when stopped, compared to an estimated 90W needed to hold the conventional servo at .31 Nm, and an estimated 250W for the peak holding torque of .56Nm when stopped! This difference is very important in gluing fixtures, grippers, vertical loads, clamps, and similar loads which spend a significant portion of their time stopped with torque present.

Typical Direct Drive Applications

Many direct drive applications require motor speed between 250 rpm to 2,000 rpm; for example, piston direct displacement pumps for precision delivery are usually in the 250 to 500 rpm range. Belt drives, as shown earlier, are 200-1,000 rpm. Lead screws typically range from 500 to 1,500 rpm for a wide range of applications, but the speed is not only limited by the critical speed (first resonance) of the lead screw, but also by the lead nut speed rating, which can often limit the speed of even short lead screws.

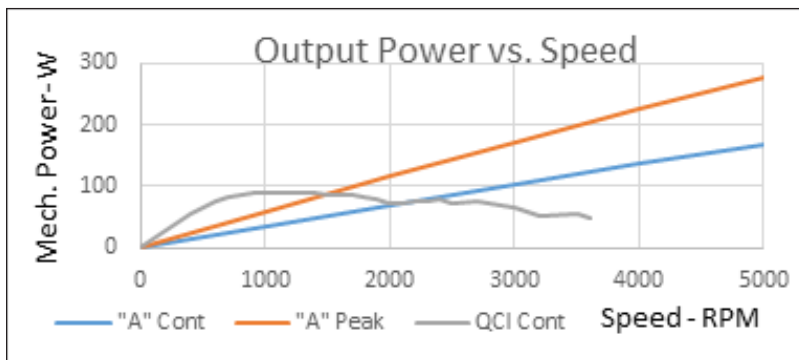


Figure 2 Output power vs. speed comparison.

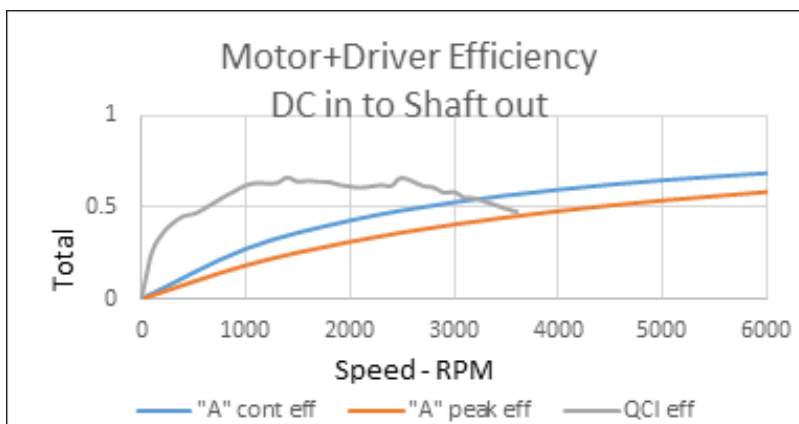


Figure 3 Motor/driver efficiency.



Figure 4 Size 23 integrated hybrid servo motor.

So How Are These Hybrid Servos Less Expensive?

The motors used for the hybrid servos are based on the step motors — produced at a rate of many millions of motors per month. The designs use a significantly smaller amount of magnetic materials, and the usually single magnet (with a long 3-stack motor having 3 magnets) is axially aligned with the rotor, making for easy installation that does not require careful alignment and grinding. Although the pole count is high, the single magnet is shared between all of the rotor poles by a clever homopolar

design. These motors are also internal permanent magnet motors (IPMs), which is a technology just starting to be used for higher-end servos and high-efficiency motors. The use of the IPM design allows for field-weakening methods to be used that allow the peak power and efficiency speed ranges to be extended. The field-weakening methods also allow the ultimate motor speed—albeit at a reduced torque—to be extended beyond that which would normally stall the motor due to the back EMF exceeding the drive voltage. Due to the higher pole count, the commutation frequency for these motors is significantly higher than for the low-pole-count motors, but the speed increase in digital signal processors (DSPs) has made this less of a problem.

Summary

The high continuous torque provided by the high-pole-count motor allows the motor to actually reach its maximum power capability in many direct drive applications without needing a gear head to match the motor speed to the application speed. This means you can actually use the rated power at the needed speed. Using a higher-speed-rated motor in a typical direct drive application means buying a 200W motor and driver and then only being able to get 30W or 40W into your application, or adding a gear-head, which—with its added size and cost and reduced reliability—really changes the comparison! As shown, proper matching of the motor speed characteristics to the load requirements significantly reduces power usage and the resulting wasted heat. This result may be counterintuitive when considering a traditional servo is thought to have high efficiency, but this high efficiency is only available in the narrow range near its optimal operating speed, i.e.—the efficiency is much lower when operating below that speed. Also remember—for positioning applications, the holding power requirements may actually dominate the total heating!

The hybrid servo motor very effectively services a sizable range of direct drive applications—with lower cost, smaller size, and a higher efficiency than is accessible with conventional servo motors. (*Acknowledgements: The author wishes to thank the QuickSilver Controls Engineering department for providing the various photos and performance plots used in this article.*)

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Why Pole-Count Matters: Magnetic Gearing

For a given rotor diameter, the number of magnetic poles on the rotor directly affects the torque available, the top speed available, and the power needed to hold a load. Higher pole counts lead to higher torque, lower top speed, and a higher motor quality factor:

$$Kq = \frac{T}{\sqrt{P}} = \frac{Nm}{\sqrt{Watts}} \dots$$

The effect is as if a hypothetical gearhead had been inserted—and is called “magnetic gearing” in the literature.

How it works. For the same rotor dimensions and gap flux, for a given speed, the rate of change of gap flux varies directly with the number of poles, as the frequency of the variation varies directly with the number of poles. Given the same winding window, for a given drive current rating, the number of turns is almost constant (although some designs do allow for a slightly larger fill factor, thus a few more turns). The result is that the back-EMF * drive current increases approximately linearly with the number of poles. As the back-EMF constant in V/radian/sec equals the torque constant in Nm/A, the continuous torque thus increases with the number of poles. In Figure 4, the higher rate of change of flux with angle is apparent for the higher pole count rotor—even though the magnitude of flux for both motors is equal. For a given number of turns on the stator pole, the back-EMF generated is:

$$V = -N \times \frac{\partial \Phi}{\partial t} \text{ (number of turns times the rate of change of flux with time)}$$

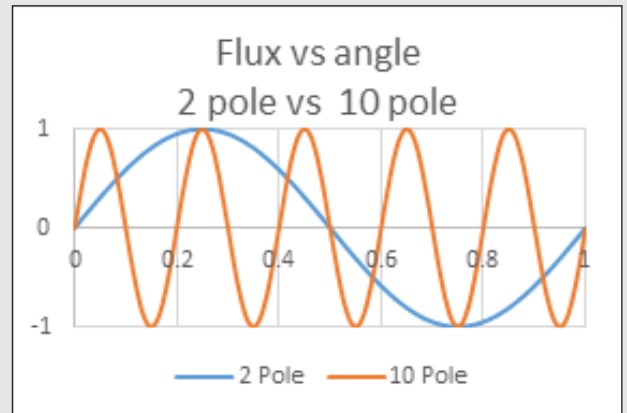


Figure 4 Flux vs. angle comparison (Courtesy QuickSilver Controls, Inc.)

Tradeoff: Although the increase in torque is helpful, the increase back-EMF reduces the speed needed to generate enough voltage to oppose a given power supply level. Thus the higher torque capability must be traded against the maximum speed for a given power supply voltage.

The back-EMF constant of the motor in volts/radian/sec is numerically equal to the torque constant in Newton*meter/amp if the motor moving losses are separately accounted. For the same winding configuration, doubling the back-EMF doubles the torque constant, and only requires that half of the current hold the same load. With the resistive losses being $P=I^2R$, doubling the torque constant only requires only one fourth of the power to hold a given torque load. Tripling the torque constant brings the power needed to that same load down to $\frac{1}{9}$ the power — all else being the same.

Thus, low-speed high-torque applications can be effectively handled without a gearhead by increasing the pole count of the motor. The high pole count motor is effectively “magnetically geared” down. One size does NOT fit all: selecting the appropriate motor for the application can optimize the performance and minimize the price.

Similarly, very high-speed, low-torque applications are best handled with lower-pole-count motors to keep from having excessive back-EMF, which would otherwise exceed a given power supply voltage.

Don Labriola

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January 14–16—A3 Business Forum 2019 Orlando, Florida. The Association for Advancing Automation (A3) Business Forum is the world's leading annual networking event for robotics, vision & imaging, motion control, and motor professionals. Over 600 global automation leaders attended the 2018 show. A broad range of companies participate including Amazon, Ametek, GM, Fanuc, ATI, Gudel and more. The event includes keynote and breakout sessions on the human exploration of Mars, a global economic outlook, automation market update, trends in robotics, responsible artificial intelligence and others to be announced. Networking opportunities include a golf scramble, a wellness walk, and a first timer's reception. For more information, visit www.a3automate.org/a3-business-forum/.

January 22–25—World of Concrete 2019 Las Vegas, Nevada. Original equipment manufacturers from around the world and exclusive U.S. distributors of equipment, tools, products and services for the commercial construction, concrete and masonry industries attend World of Concrete. The show attracts approximately 1,500 exhibitors and occupies more than 700,000 net square feet of indoor and outdoor exhibit space. World of Concrete is the premier event for the commercial construction trades. Education tracks include engineering, safety and risk management, general business, business and project management and concrete 101. Interactive workshops include trainer training, construction boot camp, sales and more. For more information, visit www.worldofconcrete.com.

February 12–14—IPPE 2019 Atlanta, Georgia. The International Production & Processing Expo is the world's largest annual poultry, meat and feed industry event of its kind. A wide range of international decision-makers attend this annual event to network and become informed on the latest technological developments and issues facing the industry. The 2019 show will expand to all three halls of the Georgia World Congress Center. It will bring more than 1,200 exhibitors and 30,000 attendees to Atlanta to discuss innovations in production and processing. Note that the date has been moved to accommodate the Super Bowl coming to Atlanta in 2019. For more information, visit www.ippexpo.org.

February 26–28—Houstex 2019 George R. Brown Convention Center, Houston, Texas. Houstex 2019 examines everything from additive manufacturing to robotics, machining centers to welding, and dozens of technologies in between. With more than 58,000 square feet of exhibit space, Houstex 2019 will showcase products of all types, Lunch & Learns to Brew & Views, Keynotes to Knowledge Bars, attendees will hear about hot topics and best practices they can put to use immediately. Explore aisle after aisle of the latest manufacturing products, software and services. This event is brought to you by SME and AMT. Industries represented include aerospace, automotive, industrial, medical, oil and gas, plastics and more. For more information, visit houstexonline.com/.

March 2–9—IEEE Aerospace Conference 2019 Big Sky, Montana. The international IEEE Aerospace Conference, with AIAA and PHM Society as technical cosponsors, is organized to promote interdisciplinary understanding of aerospace systems, their underlying science and technology, and their application to government and commercial endeavors. The annual, week-long conference, set in a stimulating and thought-provoking environment, is designed for aerospace experts, academics, military personnel, and industry leaders. The 2019 conference is the 40th in the conference series. Conference topics include aerospace systems, military, civilian or commercial aerospace endeavors, government policies and aerospace engineering and management. For more information, visit www.aeroconf.org.

March 5–6—AWEA Wind Power on Capitol Hill 2019 Washington Court Hotel, Washington, DC. AWEA Wind Power on Capitol Hill is a rare opportunity for AWEA members and others who want to help advance wind energy to participate in advocacy training and then put that training to work to educate legislators and their staff on the wind industry's top policy initiatives at both the state and federal level. Has wind power helped improve your livelihood or community? If you are an AWEA member, a supplier for wind projects, a leaseholder, or community member consider participation in this event. For more information, visit www.awea.org.

March 6–9—The Mfg Meeting 2019 Tucson, Arizona. Hosted by two major manufacturing trade associations, AMT—The Association For Manufacturing Technology and National Tooling and Machining Association (NTMA), The MFG Meeting brings together the complete manufacturing chain for a unique conference experience. This event provides unparalleled opportunities to network with industry leaders and the agenda topics are designed to address key business challenges and provide actionable solutions. The event is intended for senior leadership, executives, vice presidents, senior sales directors, manufacturing technology's builders, distributors and end users. Learn about the future challenges and opportunities facing the American manufacturing industry, discover new ideas and participate in interactive discussions. For more information, visit www.amtonline.org.

JW Winco

OPENS NEW BRANCH IN MEXICO

JW Winco, Inc., A Ganter Company, has announced it has opened a new branch in Mexico at Parque industrial Makro, Bodega 10, Santa Catarina, N.L. 66359. The new branch in Mexico, which has more than 1,200 square feet of office space and over 10,000 square feet of warehouse space, is newly built and features a modern design. “We will be stocking over 4,000 parts initially to improve our service to our customers in Mexico,” said Carlos Cantu, the office’s general manager. “The building features great logistics that will enable us to provide quick delivery to our customers throughout Mexico. The branch will pro-



vide our clients with local support and technical training and, of course we will continuously add new products to fulfill our client’s needs when it comes to a wide selection of metal and plastic standard machine components.” JW Winco has made various improvements to its Spanish website that includes updating the navigation to show sub-groups, the Spanish website has 3D CAD and online buying, and is viewable at the website below. (www.jwwinco.mx)

Altra Industrial Motion

COMPLETES COMBINATION WITH FORTIVE’S AUTOMATION AND SPECIALTY PLATFORM

Altra Industrial Motion Corp. has announced the completion of Altra’s combination with four operating companies from Fortive’s Automation & Specialty platform (“Fortive A&S”), including market leading brands **Kollmorgen**, **Thomson**, **Portescap** and **Jacobs Vehicle Systems**.



With the combination complete, Altra is positioned to drive growth and value creation through its industry leading positions in the precision motion control market, a stronger position at the higher end of the technology spectrum,

increased exposure to higher growth, higher margin end-markets and an enhanced financial profile. The company’s vast combined product portfolio will provide expanded single-source convenience and value to customers in a wide range of industries including, medical, robotics, aerospace, electronics, metals, food & beverage, material handling, transportation, off-highway, mining, oil & gas, metals and factory automation.

“We are pleased to complete this combination and move forward as a premier industrial company with leading positions across key markets,” said Carl Christenson, chairman and chief executive officer of Altra. “In addition to our foundational power transmission businesses, we can now provide our customers with a broader suite of products and solutions, including sophisticated precision motors, drives and controls; engineered linear motion systems; miniature motors; and a leading portfolio of braking technologies. We are excited about the opportunities we see to drive innovation and deliver enhanced value for customers and stockholders alike.” (www.altraindustrialmotion.com)

Motion Industries

ACQUIRES HYDRAULIC SUPPLY COMPANY

Motion Industries, Inc., a wholly owned subsidiary of Genuine Parts Company, announced that it has acquired Hydraulic Supply Company (HSC). Execution of the transaction was completed on October 1, 2018.



Jim Inglis, HSC CEO, said, “I’m grateful to see our company able to continue growing as a division of Motion Industries — a great cultural fit and shared values. I’m extremely thankful for all that the Hydraulic Supply Company team members have done for me, my family and for each other over the last 71 years. I know that under Motion Industries leadership it’s going to continue to be a fun and exciting future.”

HSC president John Serra added, “When we began to explore selling HSC, culture was always at the very top of our concerns. Spending time with Motion’s executive team quickly resolved those concerns. Coupling that with Motion’s vision to see HSC operate as a vertical business unit within Motion’s existing footprint, assured both Jim Inglis and me that we didn’t need to look any further.”

Founded in 1947, HSC is a full service distributor, offering customers a wide selection from over 8,000 hydraulic, pneumatic, and industrial products. Its team of experienced

technicians provide a wide variety of services including hydraulic repair, hose assembly and kitting, tube bending and flaring, and manual valve assembly. In addition, HSC has a strong reputation in the market for being a solutions provider for customers in a wide range of industries, from agriculture to mining to transportation.

“We are pleased to welcome HSC to the Motion team,” said Kevin Storer, executive vice president U.S. operations and president of Motion Mexico. “The addition of HSC further expands our reach and commitment to Motion’s customers in the fluid conveyance channel.”

Tony Cefalu, Motion Industries senior vice president conveyance solutions group, shops and service centers, said, “Hydraulic Supply Company’s culture, team and geographic coverage are a wonderful fit for Motion Industries. We are excited to work with John Serra to grow and expand the footprint of the company that Jim Inglis and his father built. HSC will operate as a vertical division within Motion’s Conveyance Solutions Group.”

Headquartered near Miami, Florida, HSC serves customers throughout and beyond its 30 location footprint, mainly in the Southeast U.S. HSC also conducts international sales through its office in Monterrey, Mexico. (motionindustries.com)

Festo

ACQUIRES FABCO-AIR

Festo recently announced the acquisition of Fabco-Air, Gainesville, Fla., a manufacturer of pneumatic automation components. The acquisition is the latest in a series of investments to support sales growth in North America.

Fabco-Air’s NPT pneumatic cylinders are applied by Original Equipment Manufacturers (OEMs) on new machinery and systems as well as replacement components in the Maintenance, Repair, and Operations (MRO) market. Like Festo, Fabco-Air provides custom solutions that bring machines and systems to market faster with less engineering required by equipment manufacturers. Fabco-Air, which



recently celebrated its 60th anniversary, will continue to operate independently and will remain in Gainesville. Festo and Fabco-Air implementation teams are working together on sales channel and product catalog integration strategies.

“This new association with Festo provides Fabco-Air with the resources to grow larger and faster than otherwise possible,” said Scot LaMar, Fabco-Air general manager. “Importantly for our employees and customers, Festo has a similar culture that comes from being a family owned business. It was a key consideration in the decision to join the Festo team.”

“Festo customers and sales channel partners are excited to have the expanded product range available for their applications,” said Michael Zakrzewski, vice president of marketing management—North America. “The acquisition of Fabco-Air quickly broadens our product line, creating opportunities to fulfill more customer requirements with a strong focus on customer satisfaction.” (www.festo.us)

SDP/SI

ADDS 3D PRINTING SERVICE

Stock Drive Products/Sterling Instrument (SDP/SI), recently acquired the 3D Systems ProJet MJP 2500 Plus 3D printer. A high-quality printer, the 3D Systems ProJet MJP 2500 Plus uses a liquid polymer that has a variety of material properties and can create parts in three different colors, black, white, and translucent.



The new ProJet printer is utilized for orders of individual components, such as a gear or pulley, to more complex drive assemblies. Primarily used for prototypes and low volume production, this machine has the ability to produce high-accuracy components similar to those made with injection molding.

“Using the material jetting process, the polymer is dispensed in 32 μ /layers (less than a human hair) with an accuracy of +/-0.001per inch or better and then UV cured,” said Mike Yandolino, senior sales engineer. This enables the creation of highly accurate drive components, allowing the engineer to assess the design for form, fit, and function before moving into high-volume production.

Yandolino continued: “Although a new process for us, we have completed a number of projects with outstanding results. Being able to deliver a component or assembly into

the engineers hand for design review quickly and at a cost savings is a tremendous benefit, resulting in better designs and manufacturability.”

In addition to 3D printing prototypes, SDP/SI manufacturers high-quality machined parts, molded components, and precision gearing for a wide variety of product applications in medical, aerospace, defense, robotics, and commercial industries. (www.sdp-si.com)

United Stars

ACQUIRES PRECISION GEARS

United Stars, Inc. has announced it has acquired Precision Gears, Inc., a nearly 100-year old producer of custom gears for agriculture, food equipment, power transmission and industrial applications, based in Pewaukee, Wisconsin. The transaction represents another in a long series of similar acquisitions for United Stars over the past three decades, with each of its subsidiaries serving a range of end markets and their blue-chip OEM and Tier 1 customers with precision engineered metal products at the highest quality levels.

“Precision Gears is an excellent addition to the United Stars family in a number of ways,” comments Richard Van Lanen, president/COO of United Stars, Inc. “Not only does it extend our gear manufacturing capabilities and applications footprint, it also offers great synergies with our other businesses for certain key customers and end markets. Above all else, Precision Gears is known for their outstanding quality and overall customer centric approach, which makes them a perfect fit with the rest of our portfolio. We are very excited about their future potential and look forward to leveraging United Stars extensive corporate resources to help fuel their growth.”

Precision Gears becomes United Stars 3rd gear manufacturer, joining United Gear & Assembly (Hudson, WI) acquired in 1996 and Gear Tec (Willoughby, OH) acquired in 2007. Similar to UGA and Gear Tec, United Stars plans to further extend and enhance Precision Gears capabilities through select gear manufacturing equipment investments which complement its skilled workforce.

United Stars will continue to seek out and acquire other leading small to mid-size manufacturers like Precision Gears and develop its portfolio of value-based, engineered product solutions for its fast expanding global customer base. (www.ustars.com)

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Power Transmission Engineering

Power Transmission Engineering's Statement of Ownership, Management, and Circulation



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15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	15,067	14,411
b. Legitimate Paid and/or Requested Distribution (By mail and outside the mail)		
(1) Outside County Paid/Requested Mail Subscriptions stated on PS Form 3541 (include direct written request from recipient, telemarketing, and internet requests from recipient, paid subscriptions including nominal rate subscriptions, employer requests, advertiser's proof copies, and exchange copies.)	6,080	5,667
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c. Total Paid and/or Requested Circulation (Sum of 15b (1), (2), (3), and (4))	6,358	5,924
d. Non-requested Distribution (By mail and outside the mail)		
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f. Total Distribution (Sum of 15c and e)	14,737	14,081
g. Copies not Distributed (See Instructions to Publishers #4, (page #3))	330	330
h. Total (Sum of 15f and g)	15,067	14,411
i. Percent Paid and/or Requested Circulation (15c divided by 15f times 100)	43.1%	42.1%

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16. Electronic Copy Circulation

	Average No. Copies Each Issue During Previous 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Requested and Paid Electronic Copies	3,101	3,004
b. Total Requested and Paid Print Copies (Line 15c) + Requested/Paid Electronic Copies (Line 16a)	9,459	8,928
c. Total Requested Copy Distribution (Line 15f) + Requested/Paid Electronic Copies (Line 16a)	17,838	17,085
d. Percent Paid and/or Requested Circulation (Both Print & Electronic Copies) (16b divided by 16c × 100)	53.0%	52.3%

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17. Publication of Statement of Ownership for a Requester Publication is required and will be printed in the December 2018 issue of this publication.

18. Signature and Title of Editor, Publisher, Business Manager, or Owner: Michael Goldstein, Publisher & Editor-in-Chief
 Date: 9/30/18

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Introducing the Ball Screw

The Swiss Army Knife of PT Components

Matthew Jaster, Senior Editor

The ball screw drive is an assembly that converts rotary motion to linear motion (or vice versa). It consists of a ball screw and a ball nut packaged as an assembly with recirculating ball bearings. According to Thomson, the interface between the ball screw and the nut is made by ball bearings which roll in matching ball forms. With rolling elements, the ball screw drive has a very low friction coefficient and is typically greater than 90 percent efficient. The forces transmitted are distributed over a large number of ball bearings, giving a low relative load per ball comparatively.

But did you know that it's a jack-of-all-trades in the mechanical power transmission market? They can carry a tune, assist in commercial aircraft/space travel and help doctors on the operating table. They keep machine tools running on the shop floor and help turn solar panels toward the sun. It's rather interesting how such a little thing can provide so many different purposes in manufacturing applications.

Name That Tune: Ball Screw Addition

The NSK Ball Screw Music Player is a magical power transmission jukebox of sorts that can play a variety of songs. Every ball is grinded differently in the NSK Ball Screw Music Player. By utilizing six different rotational speeds, the ball screws create a musical scale that can perform a variety of musical numbers including "Amazing Grace," which was playing during my visit to the NSK booth during IMTS 2018 in Chicago. By applying unique micro-fabrication to the surface of a ball screw, the music player can create any kind of melody.

"We always like to showcase our products and technologies in different and unique ways," said Paulo Bragoni, application engineer, linear and mechatronic products at NSK Precision America. "It's a fun way to show off our grinding techniques and gives attendees something interesting to see at our trade show booths."

Aviation Actuation

Steinmeyer develops solutions for many applications in the aerospace industry. Whether it's braking systems, flap applications, or air-conditioning and door actuators, it's a safe bet you'll find a customized ball screw somewhere on a commercial airliner. Titanium ball screws are also used in space travel applications for the control of fins on missiles and unmanned air vehicles.



It's Alive! (And Beneficial on the Operating Table)

Ball screws seem to also have an outstanding record for meeting the stringent requirements of medical and laboratory equipment. You'll find ball screws in the pump for a blood separation device used in cardiac surgery, a dialysis machine and even in an automated system that analyzes lab samples. In short, ball screws convert most of a motor's torque into thrust and can handle higher dynamic loads even with their reduced size. The ball screw can handle the load, speed, acceleration, and accuracy requirements needed for high-tech medical equipment and help save lives in the process.

Unnecessary Machine Maintenance

NSK Ball Screws have also been utilized in a variety of machine tool applications where a double seal structure combines high dustproof performance with grease retention performance. This contributes to longer machine tool life, less maintenance and a reduction in the environmental impact. But one of the most important aspects of a ball screw in a machine tool application is that it helps to maintain low vibration and noise.

Locating the Sun

Thanks to the ball screws ability to move high loads with incredible accuracy, it's no surprise that you'll find them in solar arrays that track the sun. By using a high-efficiency ball screw/ball nut combination, a solar energy system can bypass hydraulic fluids and minimize environmental risks such as wind, rain and snow to minimize maintenance and service intervals.

Have an interesting application for ball screws? We'd like to hear about it. Send your story to mjaster@powertransmission.com. Thanks to NSK, Steinmeyer, THK and Thomson Industries for providing information for this article. **PTE**



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