

# Eaton Cummins

RELEASES ENDURANT XD SERIES FOR ON-HIGHWAY APPLICATIONS

MATTHEW JASTER, SENIOR EDITOR

Eaton Cummins Automated Transmission Technologies recently released specifications for its new Endurant XD series and announced it will include Endurant XD and Endurant XD Pro models.

The Endurant XD series are purpose-built, high-performance automated transmissions designed for on-highway applications with high gross combined weight ratings, such as double and triple trailer trucks, and severe-duty on/off highway applications like dump and logging trucks.

"Purpose-built means designed from the ground up—from the gear architecture to the shifting to the actuation. It is all meant to be an automated transmission. There's no manual version, it's not human shiftable," said Ken Rocker, Endurant XD series product manager, Eaton Cummins Automated Transmission Technologies. "This opens up changes to improve the shift qualities as well as the introduction of a new ratio gearset."

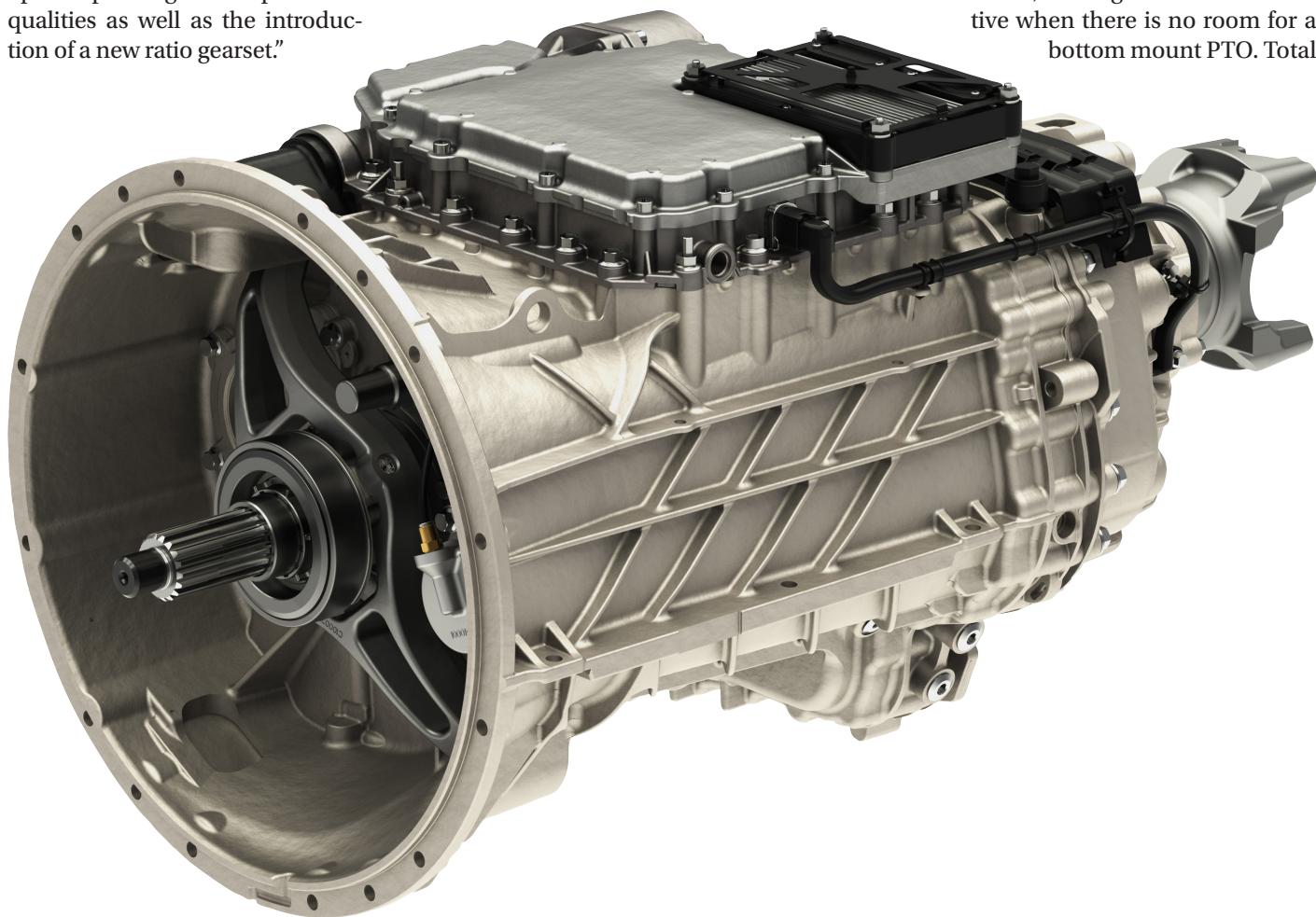
The Endurant XD series features a twin-countershaft design with helical gearing and large bearings optimized for higher engine torque. A new 18D ratio set with 20.5:1 overall ratio with small, even steps ensure smooth shifts and performance benefits in all driving conditions. It is packaged in a clean, contained design with internal wiring and sensors to minimize exposure and corrosion for improved reliability. Overall, its design is 225 pounds lighter than comparable UltraShift PLUS models.

"One of the major differences between this gearbox set—a three by three by two architecture—is that there's one less gear layer in this transmission compared to the legacy 18-speed models. There are less gears in this transmission, but we still achieve 18-speeds," Rocker said. "Some of the weight savings came from

fewer components and a large savings came from the all-aluminum enclosures as opposed to cast iron. We've also gone from a twin-plate clutch to a single-plate clutch, so additional weight was removed."

Twin countershaft technology is all about balancing the thrust and loading of the forces as you distribute the torque across the gear meshes, according to Rocker. "Splitting the torque in both directions keeps everything in balance and cancels out some of the thrust loadings you would typically have to account for in your bearing, gear and shaft design," he added.

A new, input shaft driven Power Takeoff (PTO) system delivers power to an 8-bolt bottom mount and 4-bolt rear mount that can operate independently of the transmission gear. The 4-bolt rear mount features an external pressurized lube port and a large center distance, making it an ideal alternative when there is no room for a bottom mount PTO. Total





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combined PTO capacity is 160 hp or 610 lb.-ft. of torque.

Fuel and maintenance are two of the largest expenses for a trucking operation.

One of the big improvements is that the clutch is self-adjusting, maintenance-free, greased for life, so there is no maintenance. The efficient design features a Precision Lubrication system for up to two percent better fuel economy than UltraShift PLUS. Additionally, smart features such as new internal oil

temperature and fluid pressure sensors help protect the transmission from damage.

"The new gear architecture layout improves fuel economy so now the most efficient gears are in the top half of the gearbox, above 20-25 mph, you'll be in more efficient gear paths," Rocker added.

Trucks operating below 110,000 pounds do not require a transmission cooler, reducing the risk of cooler leaks. Maintenance costs are minimized

thanks to long service intervals—up to 500,000 miles depending on vehicle application—and help keep the truck on the road and making money.

New for the Endurant XD series are Performance Goals, which combine transmission shift points and clutch calibrations with unique software. This allows operators to easily tailor transmission performance to the demands of the job.

"This used to be called shift calibration and they're made up of shift maps or shift points specific to the targeted activity (i.e., performance and economy) but they also contain clutch calibration characteristics (control, smooth or aggressive clutch closure rates) and the third piece is specific software algorithms that we use to adapt the shifting. We can monitor how quickly the transmission adapts and changes to the environment," Rocker said.

Endurant XD is rated for engines with a maximum torque rating of 1,650 to 1,850 lb.-ft. and is designed for on-highway applications up to 166,000 pounds Gross Combined Weight Rating (GCWR).

Endurant XD Pro utilizes Eaton's Extreme Duty clutches, which feature robust components designed for increased durability, improved noise, and vibration, in addition to higher thermal capacity for enhanced low-speed maneuverability.

Unique software features to the Endurant XD Pro include *Rock Free*, which helps avoid getting stuck in sand, mud, or snow by using the accelerator to rock the vehicle free, and the *Off-highway Performance Goal*, which is an optimized calibration for operation on natural rolling terrain and soft soil.

"Endurant XD Pro has the right mix of hardware and intelligence to give drivers more confidence in the most challenging applications such as construction, heavy haul, towing/recovery, and logging," Rocker said.

Production of the Endurant XD series begins in Q3 2022. Truck manufacturers are expected to announce availability of Endurant XD series at a later date.

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Schaeffler's TriFinity wheel bearing is a fully optimized, three-row, angular contact ball bearing that provides higher stiffness and longer service life by minimizing friction and mass.

"Generally, when we look at wheel bearings, we're looking for solutions that provide higher load carrying capacity," said Michael Eastman, Director of BU Wheel Modules for the Americas at Schaeffler. "We've been working on high-capacity density solutions for years. How can you provide more life to the bearing in a smaller package?"

This occurs through material selection, bearing design, etc. Over the last three years, Schaeffler took this concept and focused on friction reduction with an eye on the battery electric vehicle (BEV) market. The North American market is focused on larger electric vehicles, so the Schaeffler team thought it made sense to find a lower friction solution to the standard bearings produced today.

### A Closer Look at Wheel Bearings

"There are two different types of wheel bearings—ball bearing and tapered hub units. They are typically two row bearings. The tapered hub units have typically been used on trucks," Eastman said. "We wanted to produce an electric market solution for trucks and SUVs that was really able to bring the rolling resistance down. Along with these benefits, the TriFinity wheel bearing can improve camber stiffness and while meeting life requirements for the application as well."

The TriFinity wheel bearing can get friction down around 50 percent compared to a tapered hub unit. It can also provide a downsizing solution when a customer is designing a new BEV and the bearing needs a little more capacity.

"If you have a smaller package, your friction is going to be smaller because your seals and your rolling elements are all operating on a smaller diameter. So, we can get decent friction improvements there—somewhere between

eight and 20 percent with the downsizing solution," Eastman added.

While the concept of the TriFinity wheel bearing was created with BEVs in mind, it's also translatable to ICE vehicles as well.

"We've done some similar vehicle level testing in the past. If you take an existing tapered hub unit and replace it with the TriFinity wheel bearing on all four wheels, based on our data we'd expect a one to two percent improvement in fuel economy. It all depends on the motivation of the customer," Eastman said.

For monitoring purposes, wheel bearings typically use ABS encoders. The wheel speed encoders are integrated.

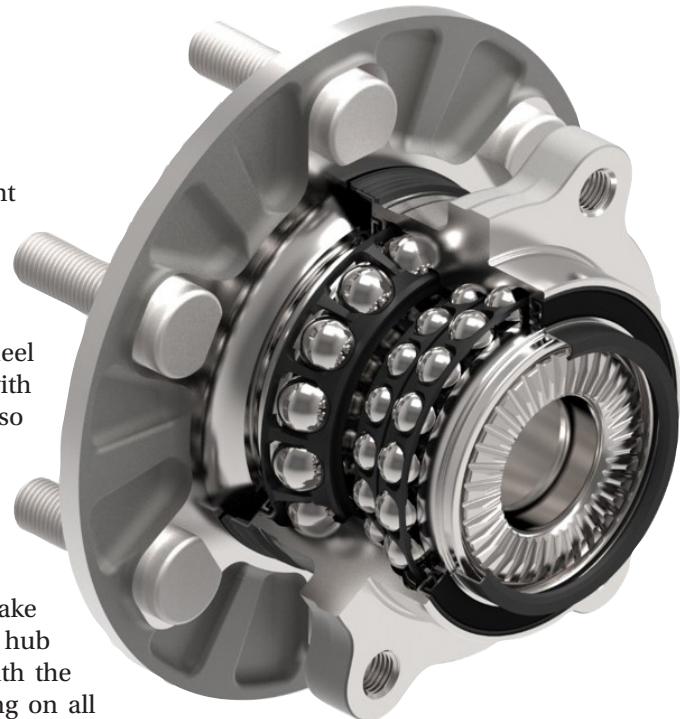
"Down the road for autonomous vehicles—Level 5, people mover applications—condition monitoring might be something we have to think about because the vehicle needs to know the operating conditions of the components and the wheel bearing is one of them," Eastman said. "Once these vehicles become more prevalent in the market, we'll look closer at these technologies."

### Additional Technology

Usually, forces are transferred between the drive shaft and wheel hub via a radial spline. To meet vehicle manufacturer's growing CO<sub>2</sub> reduction requirements and address NVH issues with the radial spline design, a new transfer variant was developed by Schaeffler known as face spline.

The face spline is positioned axially on the half-shaft and at the transmission-side end of the wheel hub. During wheel bearing production, the orbitally formed shoulder and face spline are made in a single step.

"When you look at the BEV market



two things come to mind: The vehicles are heavy and they have high torque," Eastman said. "Face spline gives us the ability to integrate the technology into the TriFinity wheel bearing and hit both of those marks. We can not only manage the loads but also addresses the needs on the torque side."

Friction benefits happen at the component level, but at the system level it translates into range extension and fuel economy improvements for ICE engines.

### Future Considerations

Schaeffler is looking at other improvements to reduce friction and increase life. Some of those areas involve seal development advancement and grease technology.

"Sensor integration is another focus area," Eastman said. "What type of sensor integration do we need? What type of condition monitoring systems do we need? We're collaborating with our colleagues to answer those questions."

The TriFinity wheel bearing will go into production toward the end of 2022 or early 2023. Visit the PTE website to learn more about this and other e-Mobility solutions.

[www.schaeffler.us](http://www.schaeffler.us)

# Moog

## PARTNERS WITH DOOSAN BOBCAT ON ALL-ELECTRIC COMPACT TRACK LOADER

Moog Inc. recently announced that the company is providing Doosan Bobcat with its intelligent machine electrification system to help Bobcat design and build the world's first all-electric compact track loader: the Bobcat T7X, which does not use hydraulic parts or oil. The T7X is a zero-emission and all-electric machine with the power and performance of a diesel hydraulic machine but without the noise, emissions, and hydraulic leaks.

Moog's intelligent machine electrification system consists of Moog's integrated software framework, an electric machine controller, lift and tilt electric cylinders, electric traction motors, and power electronics.

"Bobcat had a vision for an all-electric machine," said Joe Baldi, director of strategy and partnerships for Moog. "Our conversation began with Moog's all-electric actuators, but ultimately our talks led to the

intelligent machine electrification system. Working in partnership with Bobcat, we were able to bring that all-electric vision to life in six months."

Moog has a long history of converting

hydraulic systems to electric in industries including aerospace, defense, and industrial machinery as well as in applications such as simulators for air, sea, and land vehicles. Moog's



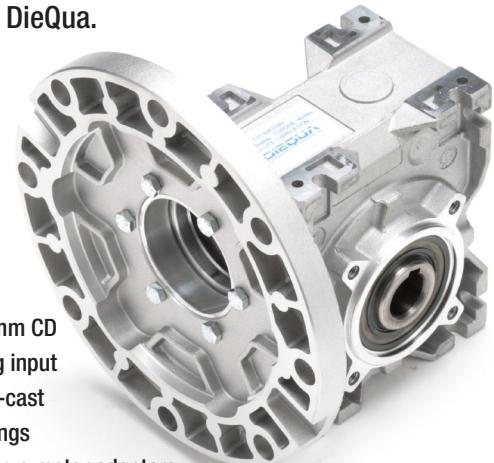
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intelligent machine electrification system helps the T7X control the motion of the tracks, as well as lift and tilt functions with enough efficiency to enable a zero-emission machine with significantly increased run time and reduced maintenance costs.

"To describe our contribution to the T7X in anatomical terms," added Baldi, "we supplied the part of the brain that controls motion; the nervous system helping to intelligently coordinate actions, power, and sensor information; and the muscles, which are the all-electric actuators and motors."

### Production-ready solution

On January 4, 2022, in Las Vegas at CES 2022, Doosan Bobcat announced that Sunbelt Rentals will invest in a fleet of the all-electric T7X compact track loaders. The all-electric machines will

be co-branded by Bobcat and Sunbelt and made available in 2022.

### Moog Construction

Moog Inc. has launched a new venture called Moog Construction. "Our focus is accelerating electrification, automation, and connectivity by enabling the world's safest, most sustainable, and most productive machines," said Joe Alfieri, vice president and general manager for Moog Construction.

Moog Construction is bringing the intelligent machine electrification system to market for customers looking to create zero-emission, connected, and more automated machines.

By integrating multiple subsystems including power management, motion control, connectivity, and automation, Moog enables customers

to develop their own differentiated offerings and bring their vision for next-generation machines to life, while decreasing development costs and the time to bring products to market.

"Our vision is to be the leading provider of electrification and automation solutions," said John Scannell, chairman and CEO of Moog Inc. "This effort brings differentiated technology that will enable the construction industry to move to a more productive, safe, and sustainable future. Moog's 70 years of experience supporting customers around the world means that we can draw on our existing infrastructure to manufacture, service, and support customers at scale."

[www.moog.com](http://www.moog.com)

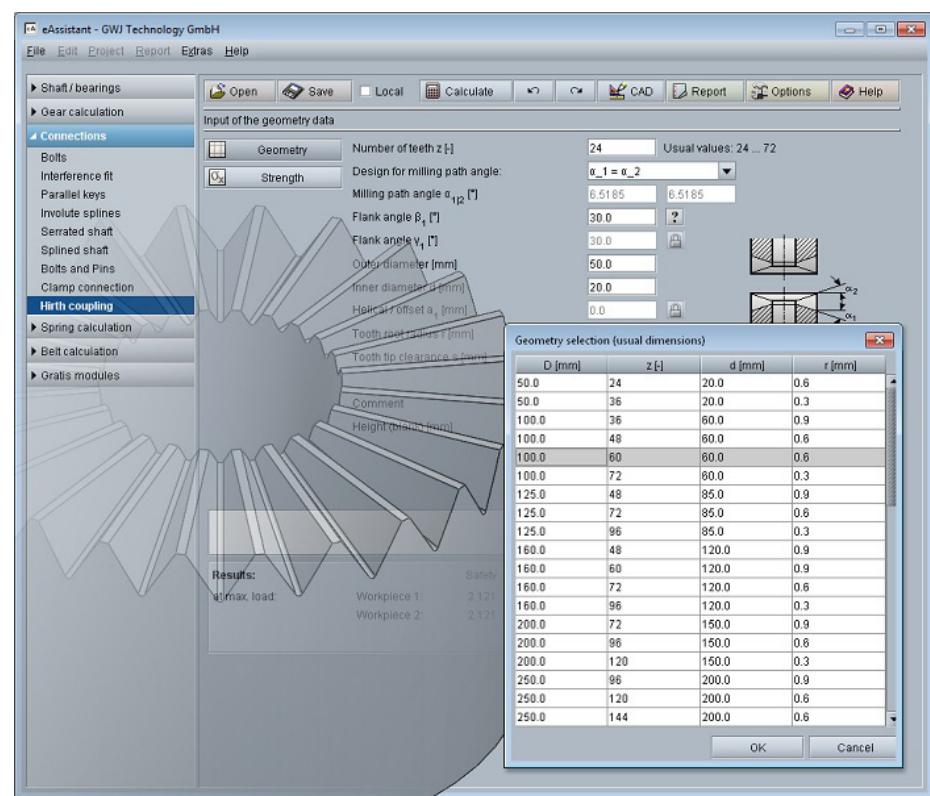
## GWJ Technology

### ADDS ONLINE CALCULATION FOR HIRTH COUPLINGS

GWJ Technology GmbH, calculation specialist from Braunschweig, has added a new module to its web-based calculation software eAssistant—this now enables the calculation of Hirth couplings.

The new module is part of the web-based calculation software eAssistant to design, recalculate and optimize classic machine elements such as shafts, bearings, gears, cylindrical and bevel gears, etc. The Hirth coupling (or Hirth serration), a shaft hub connection with tapered, symmetrical teeth, is a form-locking, self-centering, and easily detachable connection component.

Because of the high torque stability together with the positioning accuracy, the Hirth coupling is successfully used across many industries for various applications, for example to connect shafts, disks, rotors, wheels, and cranks together. This type of connection offers a number of significant



advantages: robustness, suitable for changing forces and it requires only minimal space due to the small size. Assembly and disassembly are quick and easy. During assembly, the components are self-centering. Thanks to modern machine tools and manufacturing processes, the connection can be manufactured cost-effectively by using grinding or milling operations.

With the input of the number of teeth, outer and inner diameter, flank

angle and tooth root radius, the new eAssistant module calculates the geometry of the Hirth coupling. Various special cases of the connection are also supported. In addition to the geometry, axial load, preload as well as the permissible surface pressure and the corresponding safeties are determined at maximum load. Results are displayed directly in the results overview of the calculation module. Common dimensions can be selected from an

integrated database. Here, diameters from 50 to 900 mm can be chosen each with a suitable number of teeth, inner diameter, and tooth root radius.

The permissible pressures are determined from material properties. Already existing materials can be easily selected from the integrated material database. Additionally, the user can enter individual materials for the calculation. After completion of the calculation, a detailed calculation report is



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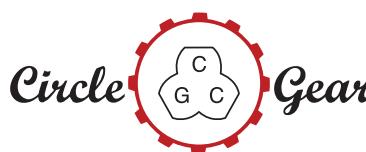
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## Dana

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Dana Incorporated has announced the introduction of three new planetary drives with wide ratio ranges, better power density, and modular designs that expand the company's Spicer Torque-Hub support for tracked and wheeled vehicles, as well as Brevini winch applications.

Available now, the new drives offer output torque ratings from 80 kNm to 130 kNm. The new planetary drives can be configured with Brevini hydraulic motors or Dana TM4 electric motors for a wide range of conventional and next-generation electrified machines, such as crawler cranes, piling rigs, drill rigs, track tool carriers, straddle carriers, and tracked undercarriages. They can also be packaged with hydraulic or electric motors for winches used in a variety of lifting applications, including construction cranes, offshore cranes, rotary drilling machinery, and shiplifts.

By sourcing these drives and associated components from Dana as a single point of contact, original-equipment manufacturers can simplify procurement, streamline integration and assembly, and improve speed to market.

As mobile and industrial

available to the user in HTML and PDF format. The output of the 3D model of the Hirth coupling is also possible directly in a 3D CAD system by using the eAssistant 3D CAD plugins.

[www.gwj.de](http://www.gwj.de)



applications grow in size to meet more demanding market requirements, planetary drives face increased torque requirements within existing design envelopes," said Jeroen Decleer, senior vice president, off-highway drive and motion sys-

**"The drives for mobile applications can manage input speeds up to 5,000 rpm and provide heavy-duty bearing load capacities as well as cartridge motor mounts with integrated parking brakes."**

tems for Dana Incorporated.

The introduction of the new planetary drives is part of a series-wide redesign that updates Dana's field-proven technologies with improved torque density, lower package weight, increased input speeds, and more design flexibility.

Dana's full line of planetary track drives now offers output torque ratings from 10 kNm to over 130 kNm, with ratios available from 26:1 up to 210:1. Large drives in the RCT series are engineered to operate reliably in

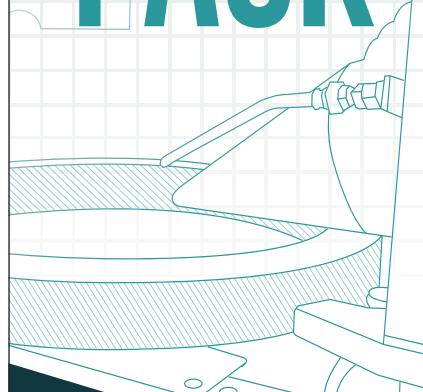
extreme conditions from minus-40 to 120 degrees Fahrenheit (minus-40 to 50 degrees Celsius).

The drives for mobile applications can manage input speeds up to 5,000 rpm and provide heavy-duty bearing load capacities as well as cartridge motor mounts with integrated parking brakes.

The winch drives accommodate electric and hydraulic motor inputs and supply exceptional radial load capacities with best-in-class torque ratings under standards established by the European Federation of Materials Handling (FEM). Supporting winch applications with line pulls up to 83 tons (75 tonnes), the drives can be customized for marine applications with a sealing system specifically engineered for harsh environments, and they meet safety certification standards for major international organizations governing marine applications.

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## DEVELOPS DUAL-PISTON GREASE GUN

SKF has developed a tool that simplifies the critical task of lubrication. The SKF Lincoln dual-piston lever-action grease gun (Model 1154) has a thumb-operated switch that allows it to toggle between high-volume and high-pressure. This makes it easier for technicians to quickly adjust the tool to match the equipment's lubrication requirements.

"Lubrication jobs are effortless with the uniquely versatile design of the 1154," says Keith Rohan, product manager at SKF. "It handles a variety of applications and speeds up working times."

The grease gun is perfect for farmers and construction workers, who need reliable, durable tools in rough working environments as well as users in vehicle repair garages.

For high-volume applications, users can benefit the more efficient design. The 1154 requires three times less strokes, compared to standard grease guns, administering the same amount.

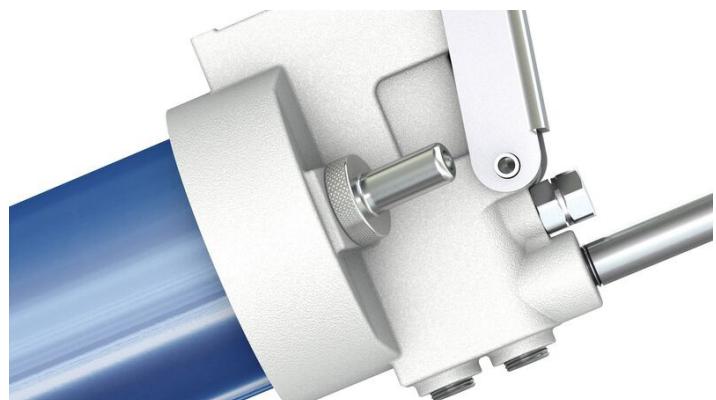
If high pressure is needed, such as when a fitting is blocked, it can be difficult for the operator to clear it but in the standard output, pressure position, the 1154 can successfully open the fitting without the operator having to apply excessive force.

The 1154 can manage all lubrication tasks very easily, because the technician can adjust the grease gun

to meet their needs with the press of a switch. A typical application would be a piece of farm equipment that has a variety of high-pressure and high-volume lubrication points.

The volume position allows efficient greasing of all lubrication points with fewer strokes. Large joints, bushings and bearings can be filled quickly. It is also excellent for lubricating large surface areas such as fifth wheels, chains and conveyors. The pressure position has a standard grease output of 34 strokes/oz and develops 10,000 psi for use whenever high-pressure requirements are needed—such as track adjusters, clogged fittings and high-tolerance locations.

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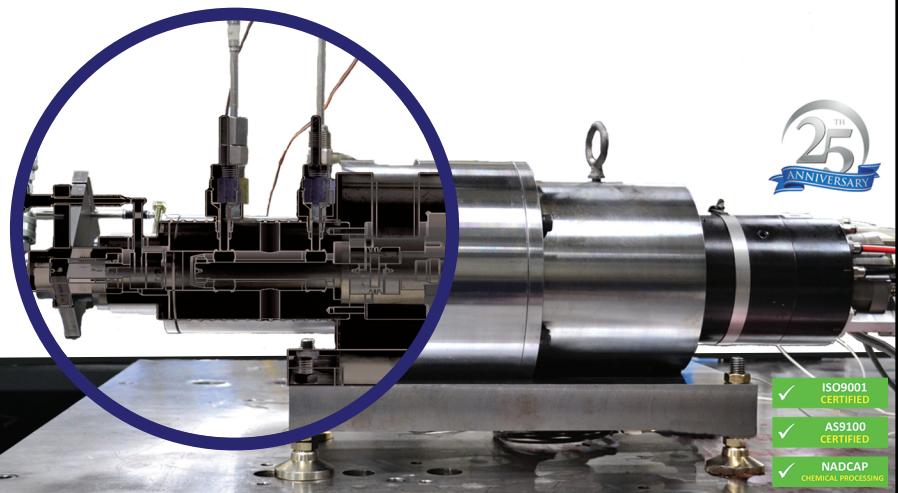
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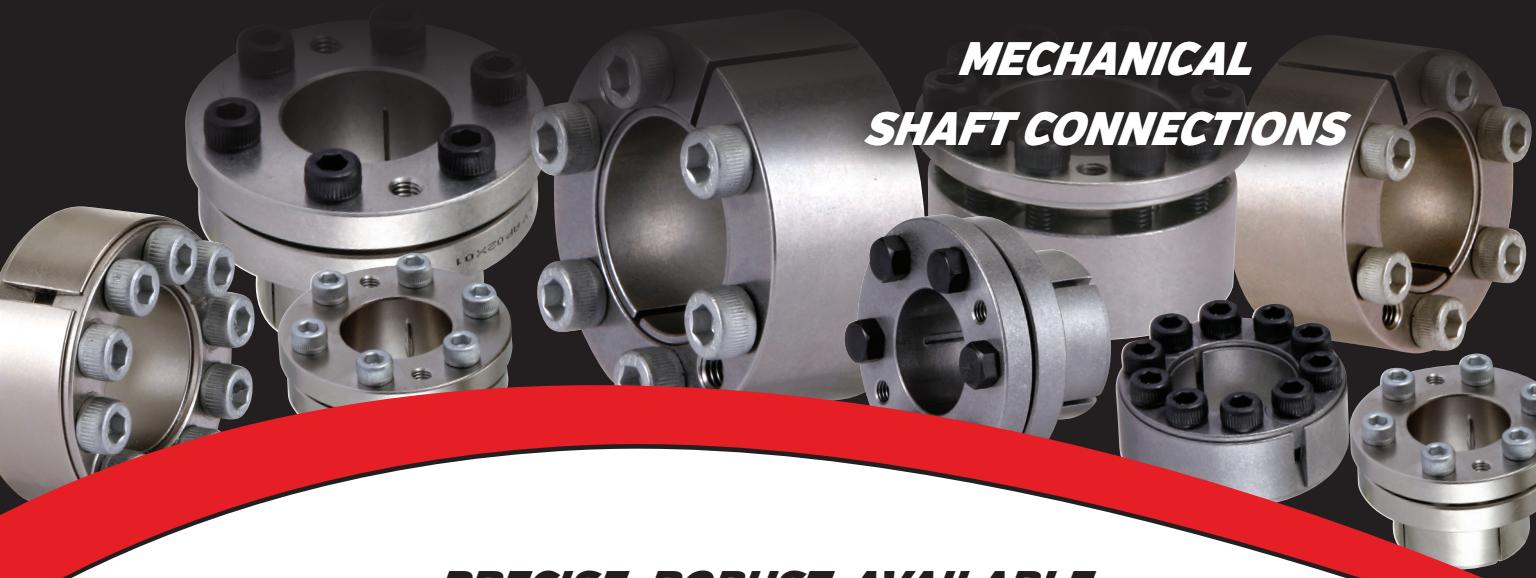
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per high Viscosity Index (VI) fluids are proven in systems up to 10,000 psi and in systems with ultra-fine filtration. To ensure performance and long life, Renewable Lubricants developed the stringent IsoGreen filtration standard which meets or exceeds the Rexroth pump guidelines for hydraulic fluids. Nontoxic, zinc-free formulations contain no heavy metals. In addition to

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Zero-Max Overload Safety Devices protect motor and drive systems from overload while offering options to withstand corrosive environments and necessary washdowns. These options provide protection from direct water spray, washdown chemicals, detergents, chemical exposure, and debris. These unique Overload Safety Devices are ideal for applications ranging from food processing, packaging, commercial dishwashers, industrial parts washers, and any applications

also offer easy re-engagement, allowing the system to be running again as quickly as possible.

Torq-Tender Overload Safety Devices include high-phosphorous nickel-plating, stainless-steel exterior, O-ring seals, lubrication options (food grade grease and/or dry lube coating) and more.

Standard H-TLC Overload Safety Devices include stainless steel exterior, stainless steel springs, food grade grease and more. Both Torq-Tender



with similar challenging operating conditions.

Providing both torque limiting and coupling functions in a compact design, these Zero-Max Overload Safety Devices can operate as a coupling and an overload safety device connecting two inline shafts in a power transmission system. Power Take-Off models are also available for use with chain or belt drives. These Overload Safety Devices protect motor and drive systems from excessive overloading and potentially expensive system jam ups, especially after factoring in for equipment repairs, product loss, and any downtime incurred resulting from a jam up. They

and H-TLC models are available in a variety of mounting configurations including use as a coupling model, or as a power take-off model for use with chain or belt drives.

Actuating Pin or Actuating Disc options are available for interfacing with a limit switch, proximity switch, or other sensing device to signal that an overload is occurring, or to shut down the drive motor when an overload occurs. This automated shut-down prevents excess wear on the machine's driveline components.

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# Bodine Electric

## OFFERS HOLLOW SHAFT GEARMOTORS

Bodine Electric Company recently introduced four new type 42R-HG/H hollow shaft gearmotors. These new geared motors combine Bodine's type 42R inverter-duty AC 3-phase motor with a new hollow shaft type HG/H gearbox. When used with an AC inverter (VFD) control, the type 42R motor delivers variable speed and maintenance free operation over a wide speed range. The new offset parallel shaft HG/H gearbox provides flexible mounting and high torque in a small package. Typical applications include conveyor systems, chip conveyors, patient mobility applications, food processing equipment, automated watering systems for greenhouses, and many other industrial automation applications.

Designed as a space-saving drive solution, the Bodine type HG/H hollow shaft gearbox is shorter in length but taller than comparable parallel shaft



gearheads. The offset design allows the gearmotors to deliver high torque for their size through a range of gear ratios. The large center distance between the gearbox and the motor enables these units to be fitted with dual drive shafts. The HG/H gearbox also features large hardened helical and spur gears and needle bearings to ensure quiet, long-lasting operation.

Bodine's HG/H hollow shaft geared motors optimize mounting space, simplify installation, and reduce the number of component parts. They can be connected directly to the driven load

eliminating expensive shaft couplings and mounting hardware that can be unsafe, bulky, and present alignment issues. These hollow shaft gearmotors offer left- or right-hand face mounts for maximum application flexibility.

The initial product launch includes four standard gearmotor models with gear ratios from 27:1 to 108:1 with speeds from 16 to 63 rpm. Rated torque ranges from 294 lb-in (33 Nm) to 1020 lb-in (115 Nm). Bodine type 42R-HG/H gearmotors are available with 230/460VAC Inverter-duty (3-phase) windings.

[www.bodine-electric.com](http://www.bodine-electric.com)

# Hagglunds

## FUSION DRIVE SYSTEM INTRODUCES PLUG AND PLAY OPTION

Hagglunds Fusion drive systems bring a new definition of compact to the already space-saving Hagglunds drive concept. An entire hydraulic direct drive system can now be mounted on the torque arm, making Hagglunds advantages even more attractive for wide range of applications.

For the first time, customers in mining, materials handling and other industries have a plug and play answer

to drive system needs. A Hagglunds Fusion drive system puts everything on the torque arm, from the hydraulic motor and pumps to the cabinet that houses them.

"Not only is there no gearbox or foundation, there are no alignments or even hydraulic pipes or hoses to consider. A Hagglunds Fusion drive system is as compact it gets," says Wolfram Ulrich, vice president of sales

for Hagglunds products and solutions."

For owners of equipment in lower power ranges, such as apron feeders, belt feeders, belt conveyors and infeed conveyors, the Hagglunds Fusion benefits are especially clear. Streamlined installation means easier access to Hagglunds strengths, which save money over time compared to electro-mechanical drives.

"These applications have much to gain from a Hagglunds hydraulic solution, due to their many starts, stops and reversals," says Ulrich. "Choosing Hagglunds gives them maximum torque from zero speed and built-in protection from torque peaks, which ensures high productivity and low cost of ownership. Now we add easier installation to the mix."

Ulrich concludes: "Hagglunds Fusion is compact and dependable power, fused with plug-and-play simplicity."

[www.boschrexroth-us.com/  
hagglunds](http://www.boschrexroth-us.com/hagglunds)

# Tolomatic

## RSH ACTUATORS MEET HYGIENIC STANDARDS FOR AUTOMATION MACHINERY



A new RSH electric hygienic rod-style actuator from Tolomatic delivers clean, continuous control to automation machinery. RSH actuators are designed to help improve repeatability, enhance quality, reduce contamination potential and increase flexibility of hygienic machine designs, particularly for the food, beverage, medical, healthcare and pharmaceutical industries.

The RSH is clean-in-place (CIP) compatible, allowing designers to achieve open machine designs, and rated IP69K to withstand high-pressure washdown. The front-face sealing O-ring ensures a hygienic design from head to toe. The polished all-316 stainless-steel, smooth exterior resists corrosion and eliminates the need for protective shielding, which simplifies and lowers the cost of machine design. Design engineers can leverage the

Tolomatic Your Motor Here database to select from a variety of stainless-steel motor manufacturers for a complete all stainless hygienic package.

The RSH is designed for forces up to 7,943 lbf (35 kN), speeds up to 20 in./sec (498 mm/sec) and stroke lengths up to 48 in. (1,200 mm). It is available in both ball screw and roller screw options. While ball screws are an economical option with medium life and force capabilities, roller screws (manufactured by Tolomatic) provide higher force capability, increased life and improved accuracy.

[www.electromate.com](http://www.electromate.com)

# Isotech

## LINEAR SHAVING AND BEARING RAILS IMPROVE PERFORMANCE

From tapping and shaft-stepping to sophisticated spindle shaft and linear bearing rail manufacturing, Isotech offers products that improve damage resistance, decrease surface roughness and can be utilized to repair older components.

Using advanced heat treatment technology, Isotech can improve the resistance of rotational and linear shafting devices. The company's quenching and tempering processes creates a uniformly hardened outer layer that resists damage commonly incurred over time. Isotech linear bearing rails ensure roughness is limited to no more than Ra0.4. Additional options include: Various coatings, including chroming and ceramics, as well as repair and resurfacing services for older components; a range of different materials, including high-carbon chromium bearing steel and Martensitic stainless steel; multiple product types, including SFW/SFWS/SN/SNS/SNT components and other high-precision

shafts. Isotech can also manufacture SNB/SNSB center-lined tapped shafts and SFW-PD/SFWS-PD pre-drilled inch shafts for shaft support rails.

[www.isotechinc.com](http://www.isotechinc.com)

