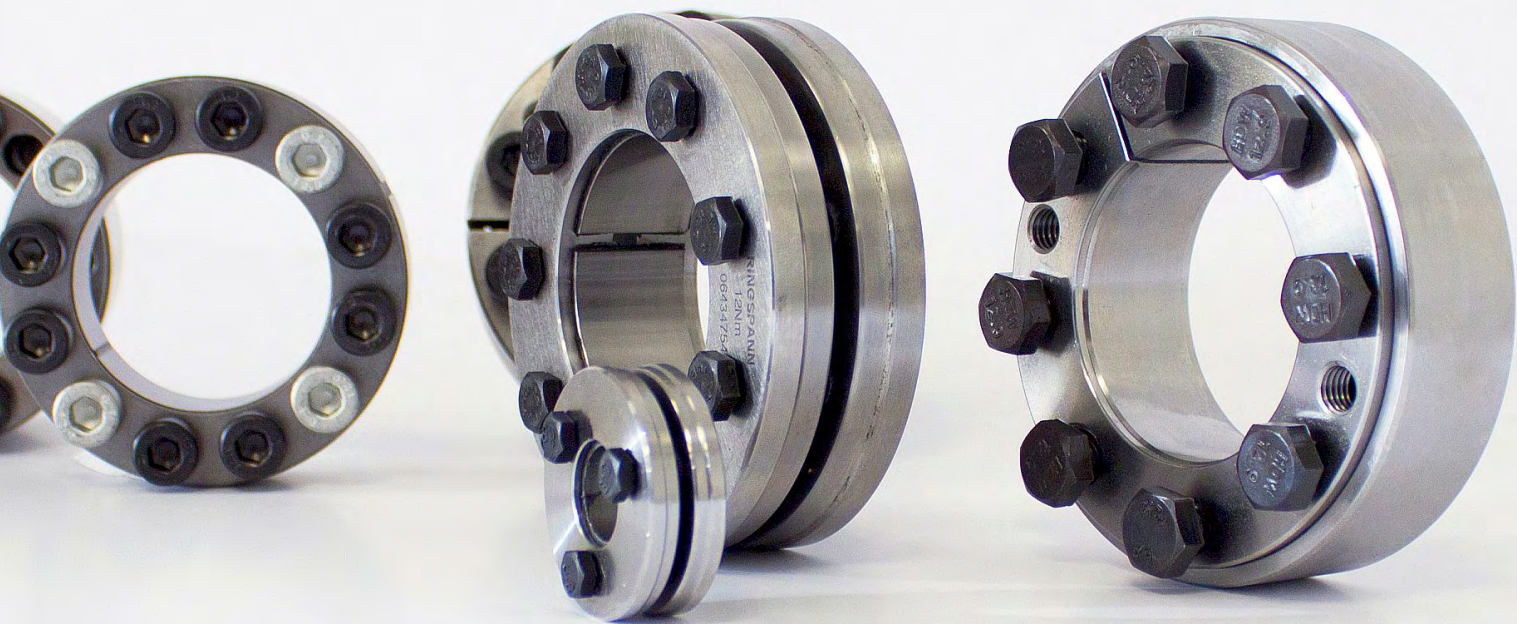


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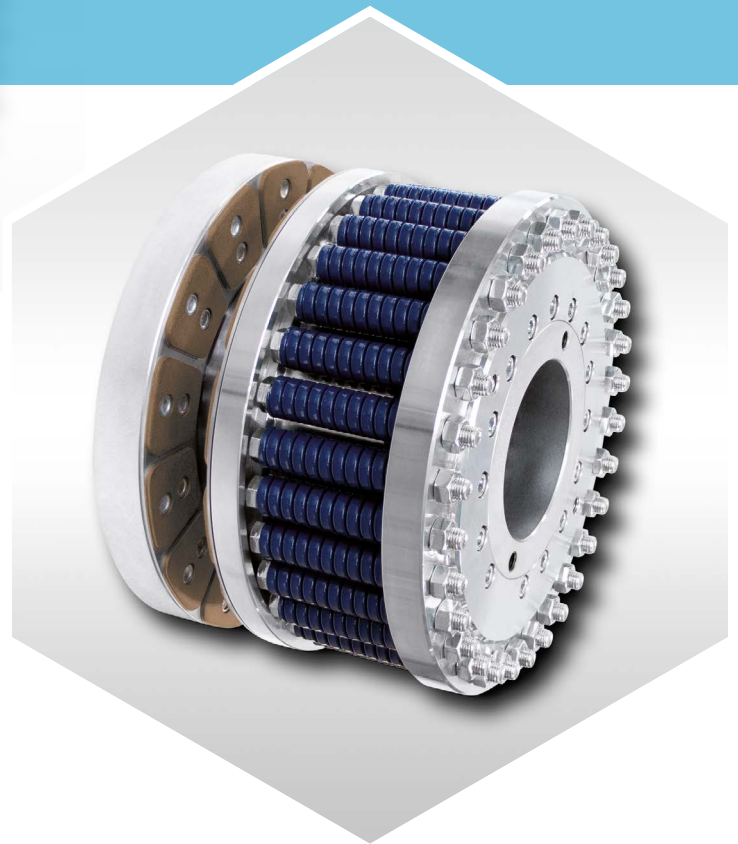
# Customer-specific expanded range of services

Highly efficient belt and direct drives ensure the powerful rotation of cutting shafts and blade strips in Lindner Recyclingtech's stationary waste shredders. To prevent sudden overloads from getting through to the drive elements, the designers of the Austrian plant manufacturer have been relying on the friction torque limiters in RINGSPANN's RSHD series for many years now. Recently, the two companies have intensified their cooperation to such an extent that ready-to-install system units consisting of a friction torque limiter and a V-belt pulley are increasingly being used in the shredder assembly – pre-assembled and already set to the correct torque.

Waste shredders from Lindner Recyclingtech are proving their worth in the shredding lines of waste disposal and processing companies all over the world. Since the company was founded in 1948, it has been part of its quality promise to use only high-quality and durable units and components for the manufacture of its machines. This also means that the procurement department trusts in selected suppliers who adhere to the company's own quality and innovation standards. In the field of drive technology, the German company RINGSPANN and its subsidiary RINGSPANN Austria are therefore among the preferred suppliers. For several years now, they have been making a fundamental contribution to the overload protection of the drive trains of a number of the Austrian manufacturer's stationary shredders with the friction torque limiters from the RSHD series. "We are currently equipping numerous universal shredders, secondary shredders and our new Atlas series primary shredders with these heavy-duty friction torque limiters from RINGSPANN. With a high degree of reliability, we not only reduce the risk of damage and failure of the belt and gear drives used



**Markus Berger**  
Managing Director of  
RINGSPANN Austria



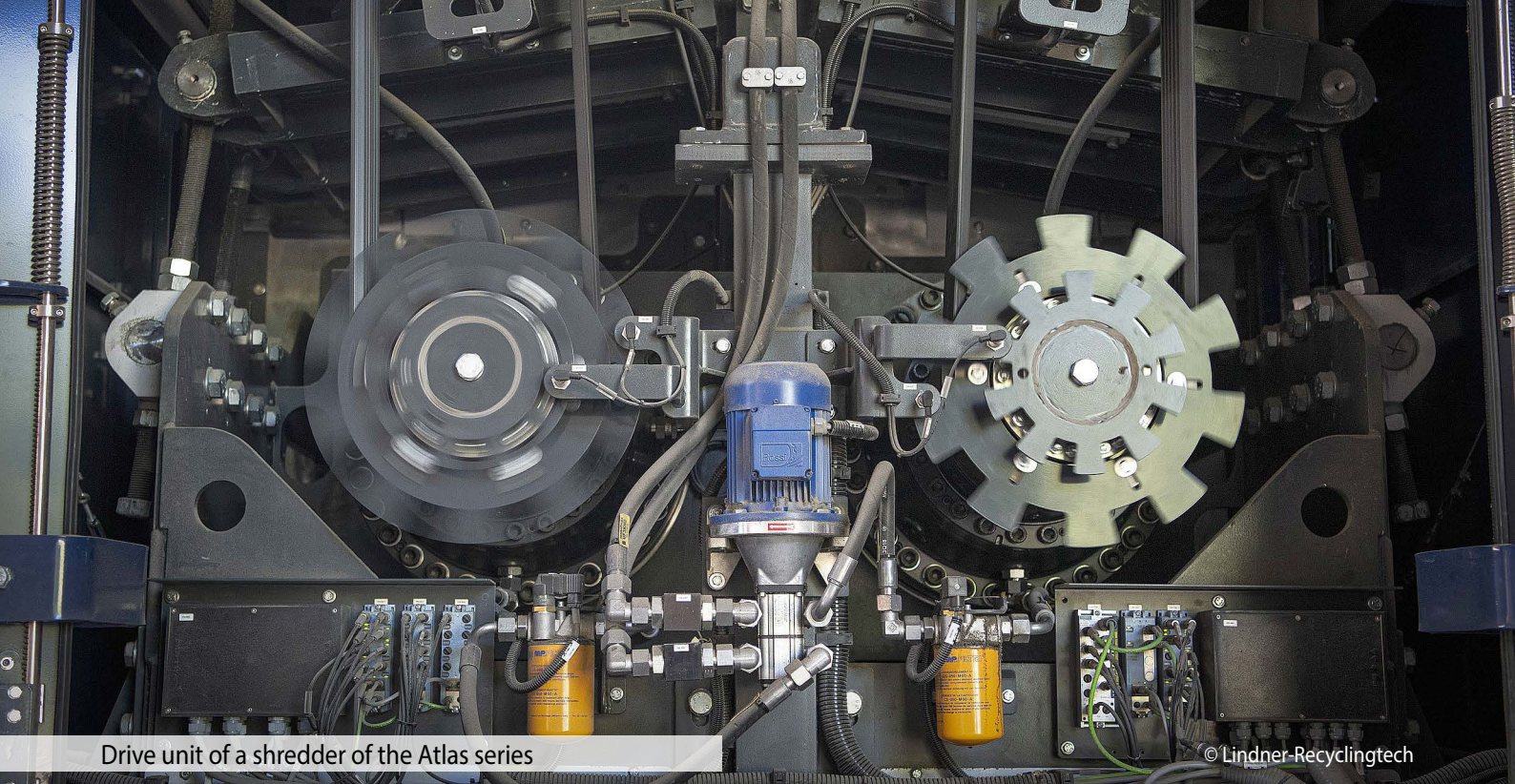
here, but we also minimise the costs required for their maintenance. Both aspects correspond to our dual objective of maximising the operational reliability and availability of our shredders on the one hand, and reducing our customers' MRO costs on the other," explains Peter Weingartner, Chief Technology Officer at Lindner.

## Premium class overload protection

The heavy-duty friction torque limiters in RINGSPANN's RSHD series are in the high-performance category of overload clutches and are currently setting international standards in the market segment of friction torque limiters. They are only equipped with first-class components and convince with a high degree of dry-running stability at high operating temperatures. Their hubs, spring carriers and pressure rings are made of structural steel, heat-treatable steel and spheroidal cast iron, and all external surfaces have an anti-corrosion coating.

The design of the RSHDs, following the RIMOSTAT® principle of the Bad Homburg manufacturer, offers the decisive advantage that not the disc springs but the ISO helical springs generate the contact pressure on the friction linings. And with a linear, flat characteristic curve, which is why even





Drive unit of a shredder of the Atlas series

© Lindner-Recyclingtech

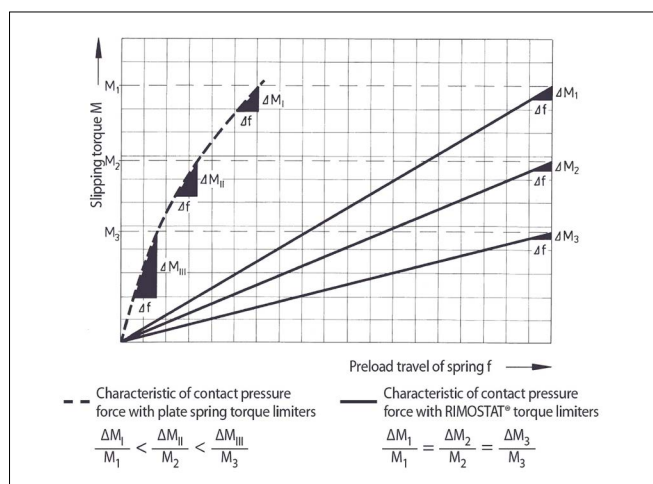
wear to the friction lining has hardly any effect on a drop in the slipping torque - the most important parameter of a torque limiter. As the RSHDs from RINGSPANN also have high-performance friction linings made of a nickel-free sintered material, their design advantages can be exploited well into the upper heavy-duty range. Markus Berger, Managing Director of RINGSPANN Austria, emphasises: "With our RSHDs, we offer plant and machine manufacturers a premium-class overload protection system that can significantly strengthen the competitiveness of their heavy-duty units. It is proven in many areas, for example in the drive systems of construction and agricultural machinery, conveyor belt systems, power plants or even shredding mills."

Markus Berger has been supporting Lindner's mechanical engineers in their development and optimisation work for some time now. He has become deeply familiar with the subject of shredding technology and actively supports the

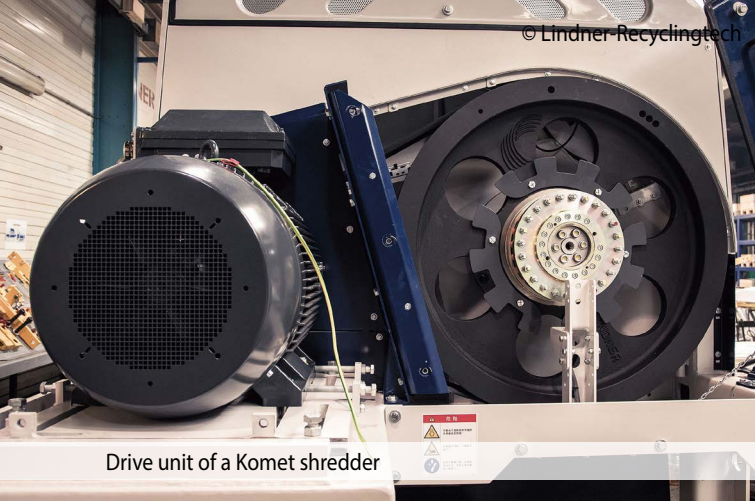
Austrian manufacturer in the accurate selection of the right friction torque limiters for the various drive systems of the pre-shredders, universal shredders and secondary shredders. At present, there are primarily three versions of RINGSPANN's RSHD series that are used in the V-belt and direct drives of the shredders: The two basic models RSHD 400 and RSHD 500 with maximum slipping torques of 24,000 Nm and 50,000 Nm, and the RSHD 310, a custom size realising slipping torques of up to 10,000 Nm. RINGSPANN offers the heavy-duty torque limiter in six standard types. The smallest RSHD has a diameter of 205 mm and covers slipping torques of 600 to 3,000 Nm at speeds of up to 2,700 min<sup>-1</sup>. The largest version, on the other hand, has a diameter of 600 mm and can be used for slipping torques ranging from 10,000 to 68,000 Nm at speeds of up to 1,000 min<sup>-1</sup>.

### Trustworthy pre-assembly

Since these torque limiters are designed according to RINGSPANN's RIMOSTAT® principle, the user has the option with all sizes to adjust the required slipping torque quite simply by activating or deactivating complete springs. This means he does not have to adjust each individual spring preload and therefore saves a lot of time. The shredder specialists at Lindner, however, no longer need to worry about this at all. This is because they now receive most heavy-duty friction torque limiters in special versions with factory preset torques. Peter Weingartner explains: "This additional service is part of the extended catalogue of services that RINGSPANN currently covers for us. It is an expression of our extremely trusting partnership that has developed over the last few years - and sometimes touches upon important process stages of our engineering."







Drive unit of a Komet shredder



RSHD with a pre-set slipping torque and V-belt pulley

This nod to engineering is a specific reference to the direct relationship between the torque of the torque limiter and the installation situation: Precisely pre-setting the torque is only feasible in a meaningful way for RINGSPANN technicians if they know the physical and kinematic prerequisites of the constructive environment and the attachment part. It was with this in mind that the Carinthian machine manufacturer decided to accept a suggestion from its German supplier, which has since turned out to be an ideal win-win solution: The routine provision of pre-assembled system units consisting of V-belt pulleys and RSHD friction torque limiters with slipping torques already correctly preset. RINGSPANN delivers these complete assemblies as required to Lindner's assembly department, where they are docked onto the drive systems of the respective shredders. "In terms of process technology, we benefit from this in two ways. Firstly, because we considerably reduce our costs of adjusting the torque of the torque limiters; and secondly, because we save ourselves the internal assembly of the belt pulleys onto the torque limiters of the drives", explains Peter Weingartner.

## From component to system

By assuming responsibility for the assemblies and the associated engineering services, RINGSPANN has in this case completed the transition from component supplier to system supplier. In addition to the geographical proximity of the Austrian subsidiary to the customer, it is in particular the high level of consulting competence and flexibility in the implementation of special requests that have proven to be the driving forces along the way. For Markus Berger, the Lindner example shows once again "that RINGSPANN can convince not only through the high quality of its drive technology components but also through the transfer of technology and engineering expertise, thus strengthening the competitiveness of its customers with additional benefits." Many of these added value factors are already firmly anchored in the RINGSPANN portfolio. In the case of the torque limiter series RSHD alone, the company offers - entirely in line with its one-stop shop strategy - a large number of additional

customer-centred services: From the realisation of custom designs, to the provision of comprehensive smart solutions (e.g. torque limiter plus flexible coupling), to the aforementioned pre-assembly of drive technology assemblies.

## Collaboration potential

Whether shredders, construction machines or conveyor systems - overload damage to the drive units can quickly turn into a costly nuisance. Repairs or too short maintenance intervals can quickly devour large sums of money. The cost-saving contribution of heavy-duty friction torque limiters such as the RSHD from RINGSPANN should therefore not be overestimated. Furthermore, the example of close collaboration between the German one-stop supplier and its customer in Austria demonstrates: as soon as the supplier is in a position to cover additional engineering or assembly services, further possibilities for process optimisation quickly emerge for the machine manufacturer beyond the technological advantages. <<

## How RSHD friction torque limiters work

The RIMOSTAT® RSHD heavy-duty torque limiter from RINGSPANN is a friction torque limiter. If the slipping torque previously set on the RSHD is reached during operation of the drive system, the drive element - such as a V-belt pulley - slips in a defined manner to relieve the components of the drive train. During this process, the input and output continue to rotate relative to each other, transmitting the set slipping torque; this process is accompanied by high energy consumption. Re-engagement is not necessary and, thanks to the RIMOSTAT® principle, no readjustment due to friction lining wear is required.





# SHRINK DISCS ON STEEP GROWTH COURSE



**The companies in the RINGSPANN Group have achieved a new record in incoming orders in the Shaft-Hub-Connections product division in 2021. As the management of the Group has now announced, incoming orders are about 50 percent above the figures for previous years. The increasing international demand for RINGSPANN Shrink Discs from well-known gearbox and plant manufacturers proved to be of particular importance for this growth. In order to further consolidate its successful course on the global market for Shaft-Hub-Connections, the Group is currently investing heavily in the production capacities of its production sites in South Africa, China and Europe.**

"Our order intake in 2021 in the Shaft-Hub-Connections business unit is around 50 percent higher than the order volumes of 2019 and 2020. As a result of this strong growth, our order books in this product division are currently well filled," reports RINGSPANN Product Manager Marvin Raquet.

There are two main reasons why the company is not only exceeding its own expectations with this pleasing development, but is also likely to be far above the current industry level: on the one hand, it is a result of the Group's one-stop-shop strategy, which has been driven forward with great commitment in recent years, within the framework of which RINGSPANN is positioning itself as a global manufacturer of premium-class Shaft-Hub-Connections, among other things. On the other hand, this reflects the increasing trust of well-known global players in the Group's product quality and technology know-how. As Marvin Raquet explains, "The above-average demand for our Shaft-Hub-Connections is largely generated by series business with large gearbox manufacturers, automation companies and plant manufacturers. On the basis of our international presence, and now with five foreign production plants, we are ideally positioned here both as a supplier and as a development partner for our customers."



## NEW SHRINK DISCS AS A SUCCESSFUL PRODUCT

At the product level, the good business with two- and three-part Shrink Discs from the RINGSPANN portfolio is proving to be the driving factor behind the strong growth in incoming orders. Shrink Discs are external clamping connections for the backlash-free attachment of hollow shafts or hubs to shafts, without which hardly any drive train can be realized in plant and mechanical engineering. "Within our extensive Shrink Discs selection, the new RLK 603 S series in particular is currently enjoying brisk demand. These three-part Shaft-Hub-Connections are designed for hollow shafts and hubs with outer diameters from 14 mm to 190 mm and torques from 18 Nm to 156,100 Nm. They score points as versatile universalists and convince with the highest torque capacities," says Marvin Raquet.

### LOSS-FREE POWER TRANSMISSION

In order for a drive shaft to transmit its rotating force without loss, it needs a secure and fixed connection to the hub or shaft of the machine element to be moved. RINGSPANN offers an extensive range of friction-locking Shaft-Hub-Connections that – depending on the version – can transmit both torques and axial forces. The current product catalogue provides a complete overview of the current portfolio of two- and three-part Shrink Discs and Cone Clamping Elements, as well as Star Discs, Star Spring Washers and Clamping Systems for Torque Motors.

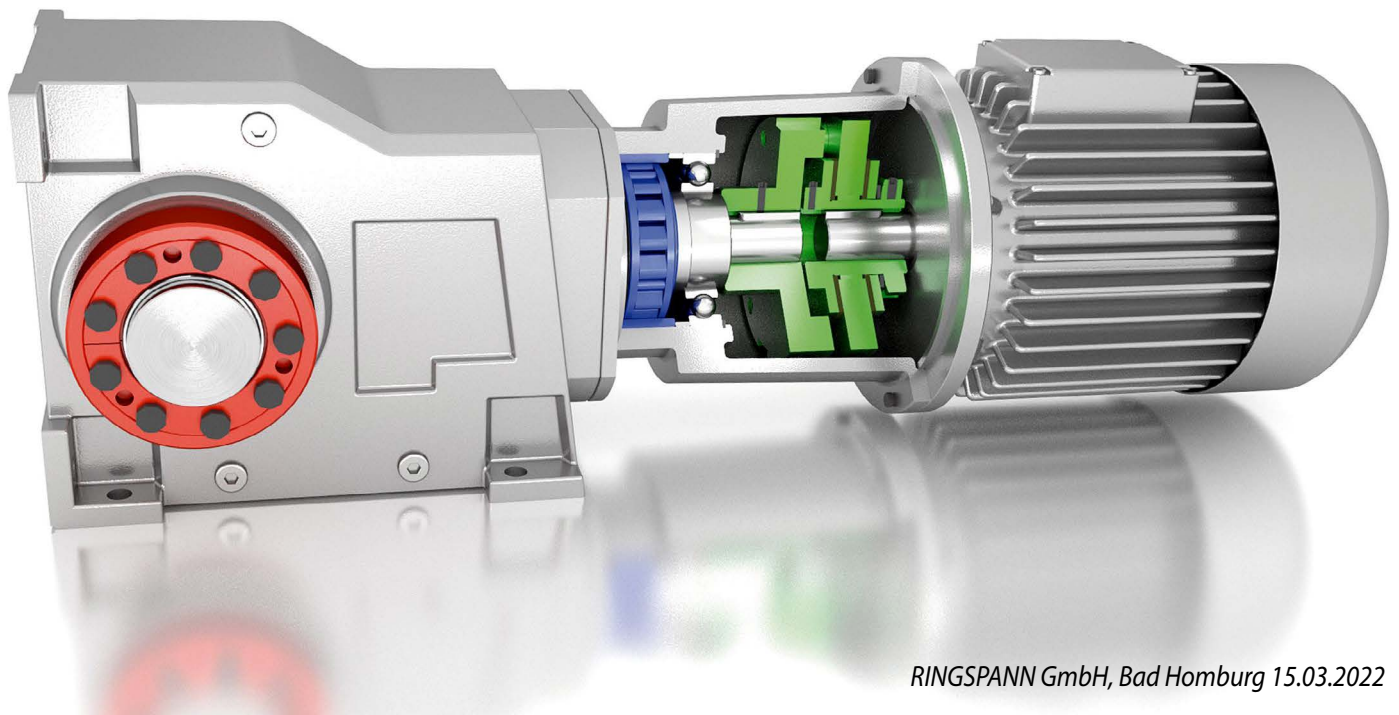
## EXPANSION OF PRODUCTION PLANTS

As a consequence of the exceptionally good order situation in the area of Shaft-Hub-Connections, RINGSPANN is currently expanding the production capacities of its international locations in South Africa, China and Europe. While, for example, extensive investments in production are pending for the plant in Bosnia in the coming weeks, RINGSPANN China received the first new machines a few days ago in order to be able to meet – as mentioned – in particular increased demand for the new RLK 603 S Shrink Discs series.

Among other things, new CNC robot machines were put into operation here at the beginning of the year. The installation of further CNC robot systems and drilling machines, as well as an increase in the workforce by up to 20 percent, are also planned for this year. "With all these measures, we are strengthening both our international production sites and RINGSPANN's position as a global manufacturer of first-class Shaft-Hub-Connections and one-stop supplier of quality products for industrial drive technology," says Marvin Raquet. <<



**Marvin Raquet**  
RINGSPANN  
Product Manager of  
Shaft-Hub-Connections



# Greater availability thanks to lockout tagout

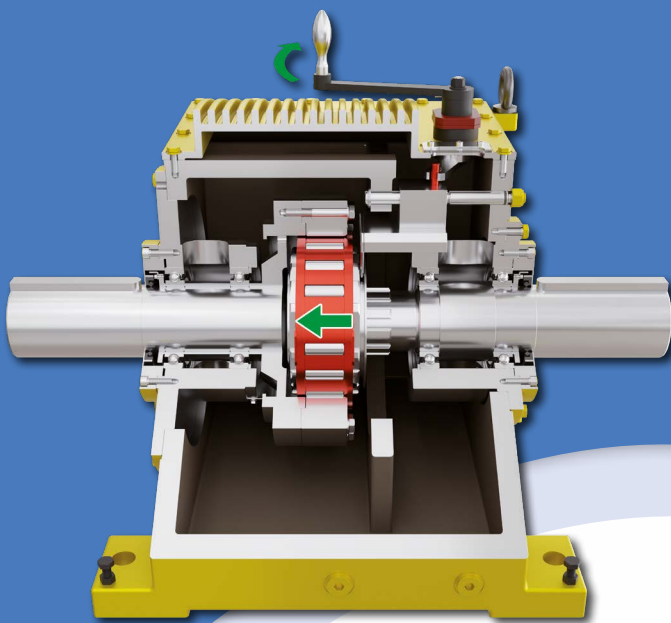
Worldwide, the Housing Freewheels of the FH series from RINGSPANN are regarded as a premium solution for the realization of overrunning functions in powertrains with several motors or turbines. In power plants, refineries as well as conveyor and process engineering plants, they ensure their availability in the event of a failure of the energy supply or a drive and allow energy-efficient partial load operation. In order to further reduce the maintenance costs of the plant operators, the company has now supplemented the series with the FHD type. The special feature: it has a lockout tagout security function according to the international OSHA guidelines.

Many plant manufacturers and designers have been waiting for this: A Housing Freewheel for high-torque applications and wear-free continuous operation with a maintenance-friendly lockout tagout function (LOTO) that meets the safety requirements of the US *Occupational Safety and Health Administration* (OSHA). Manufacturer RINGSPANN – the world leader in the field of freewheel technology – now offers such a Housing Freewheel under the type designation FHD. The fully encapsulated unit transmits nominal torques of up to 24,405 Nm and is designed for use in the multi-motor and multi-turbine drive systems of large generators, pumps, blowers, fans and uninterruptible power supplies. It therefore offers considerable added value in particular to plant manufacturers in power plant and refinery technology as well as petrol, process and conveyor technology. Its na-

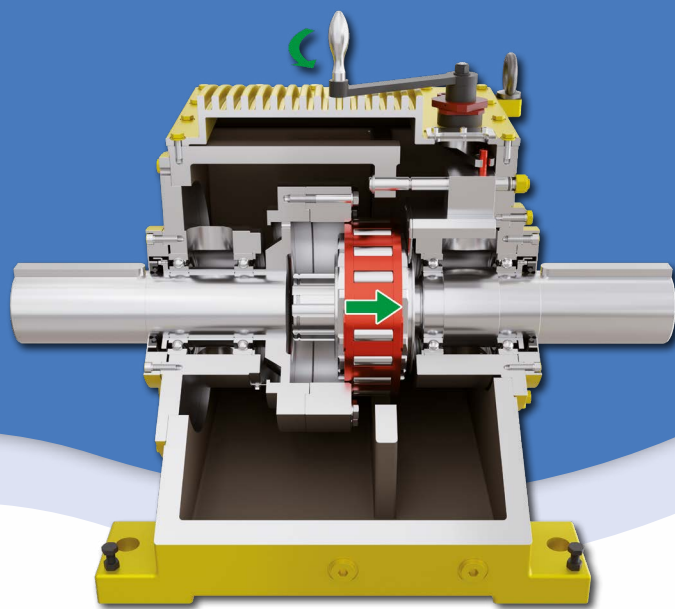
tive, manually operated and OSHA-compliant LOTO function simplifies maintenance, repair and overhaul work on powertrains, improves occupational safety for the employees entrusted with it and increases the availability of the system. In multi-motor systems, the mechanical disengaging function enables the fast, safe and torque-free disengagement of rotating shafts from the drive train. Individual power units can thus be replaced during operation.







*Freewheel engaged (ready for use)*

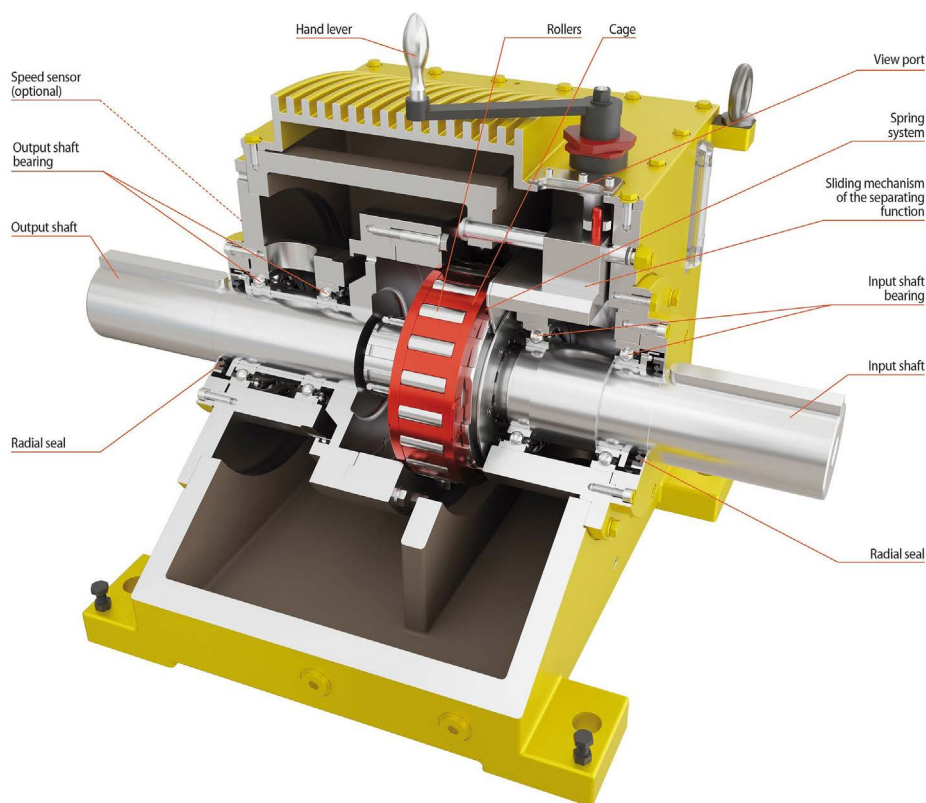


*Freewheel mechanically separated*

## Gently and safely disengaged

Externally, the new Housing Freewheel from RINGSPANN is recognizable by a hand lever on its top. If this is cranked counterclockwise, the inner ring of the freewheel with the clamping rollers slides out of the engagement of its outer ring in the FHD – which interrupts the drive train. This separation process can be carried out with rotating shafts and disengages the drive and output gently and reliably. The operator can visually control this through a small viewing window.

After completion of the maintenance or repair work, the input and output trains are reunited and coupled by resetting the hand lever. From the outside, the position of the lever can also be secured with a padlock. As envisaged by OSHA, the lockout tagout system of the new FHD from RINGSPANN thus enables the isolation, locking and marking of those energy sources that could pose a safety risk to persons. Thanks to the disengaging function, central drive components can be maintained or replaced without having to interrupt production.



## High efficiency at high speeds

Like all representatives of the FH series, the new OSHA-compliant Housing Freewheel from RINGSPANN also works with hydrodynamic, wear-free clamping roller lift-off (see info box). As a speed-dependent overload clutch, it is the drive technology alternative to expensive and technically complex shift clutches. In its external dimensions, it corresponds to the FH sister models and in practice proves to be a low-noise endurance rotor with very high efficiency. The six available sizes transmit nominal torques from 1,356 to 24,405 Nm, whereby the input and output shafts may run at speeds of up to 5,600 min<sup>-1</sup>.

Due to their hydrodynamic clamping roller removal, FH Housing Freewheels from RINGSPANN are regarded as a high-performance overrunning freewheel solution for stationary applications in which a unit – for example a fan or a pump – is optionally operated by several motors or turbines at the same or similar speed. In the event of a drive failure, they enable the system to continue running smoothly. In addition, they allow a drive to be easily switched to economical part-load operation – which benefits the system's energy balance.

By the way: if required, Housing Freewheels in the FH series can also be equipped with a heater as well as the sensor and telematics modules of the innovative condition monitoring system from RINGSPANN. The monitoring system includes data analysis, remote maintenance and integration into higher-level control systems. This allows operators and maintainers of complex multi-motor systems in particular to monitor all important power and MRO parameters of the installed freewheels around the clock in real time. <<



*RINGSPANN GmbH, Bad Homburg 12.04.2022*

## Mechanical automatic shifting

Housing Freewheels are usually used as automatically operating overrunning couplings in multi-motor drives. They are regarded as an alternative to complex shifting devices. A technical highlight of the Housing Freewheels of the FH series from RINGSPANN is the hydrodynamic clamping roller lifting. Here, the lifting force of the clamping rollers is generated by an oil film, which is applied to the track of the outer ring with centrifugal force in idle mode. This enables virtually wear-free idling operation. RINGSPANN supplies more than 6,000 customers worldwide with freewheels for the realization of backstops, overrunning and indexing functions in industrial drive technology.

## Industry 4.0 solution for Housing Freewheels

The Housing Freewheels of the FH series from RINGSPANN act as overrunning freewheels in pumps, generators, conveyor belts, fans and uninterruptible power supplies. Depending on the complexity of the drive systems, several FHs can be installed in difficult to access places. RINGSPANN has developed a condition monitoring system for its FH Housing Freewheels to ensure that plant operators and service teams are always aware of what is happening inside the freewheels as part of predictive maintenance. In addition to modern sensor and diagnostic modules, telematics tools are also used in this predictive maintenance solution at Industry 4.0 level. Thus, users have a complete solution that offers them a full overview of the functional-kinematic status of each Housing Freewheel integrated into the CMS system.







## Maximum offset compensation thanks to hinged joint

**With great commitment, one-stop supplier RINGSPANN is expanding its range of functional system components for industrial drive technology. In the field of Shaft Couplings, the internationally active one-stop supplier has recently attracted attention with further standard elements and ready-to-install smart solutions. Now the company has announced the development of a novel hinged joint coupling, whose innovative design compensates for extreme radial, axial and angular displacements. This offers maximum flexibility and high safety in "unsteady" powertrains.**

Some drive trains in plant and mechanical engineering can only be realized under the condition of maximum flexible shaft connections. The reasons for this can be manifold. Often it is extreme temperature changes of the systemic periphery, operational imbalances or sporadically occurring vibrations that lead designers and developers to search for Shaft Couplings that are as adaptable and variable as possible. In the RINGSPANN Innovation Centre, the company's coupling specialists are therefore working on solutions for such tasks.

A promising example of this is a new, highly mobile hinged joint coupling, which has the ability to reliably compensate for large radial, axial and angular deviations during operation. "This is a real innovation in the field of Shaft Couplings that enables plant and machine builders to easily and safely compensate for technically unavoidable changes in length and position in drive trains", says RINGSPANN Product Manager Martin Schneewis.



## Acrobat with balancing character

The new hinged joint coupling from RINGSPANN has a sophisticated kinematics based on the controlled interaction of two joints rotated exactly 90° against each other and several mounted bolts. Similar to a cardan shaft, this arrangement ensures a pulsation-free transmission of the torque and the rotary motion. While the two joints compensate for radial, axial and angular displacements, the mounted bolts allow the shafts to be moved under load. Seen in this light, the new hinged joint coupling from RINGSPANN could also be described as a compact cardan coupling with integrated length compensation. "This design gives our new coupling enormous mobility – regardless of whether tolerance compensation is required for thermal or mechanical reasons", emphasises Martin Schneweis.

## Innovative problem solution

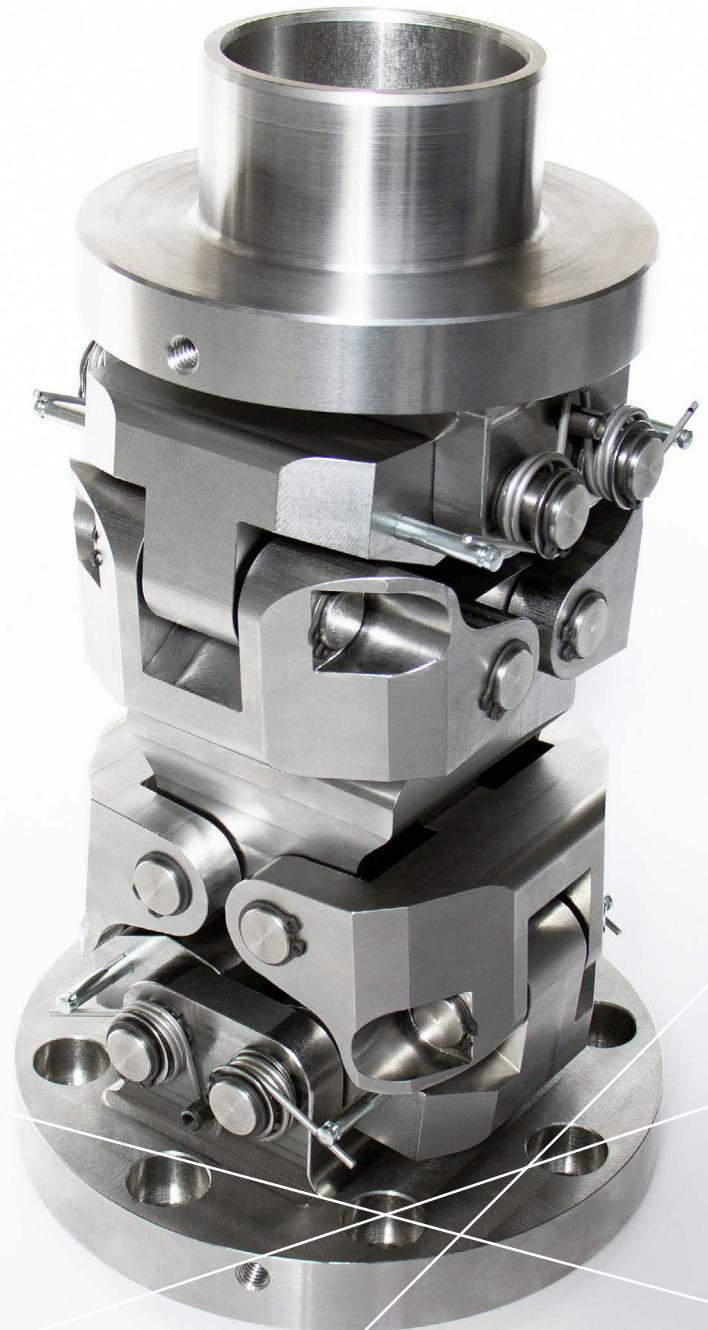
With this innovation in the field of Shaft Couplings, RINGSPANN offers an elegant solution to many design problems in industrial powertrains. Merely for the realization of pump drives that have to work in demanding thermal environments – for example in power generation and power plant technology, the new hinged joint coupling means considerable simplification. It can also make a significant contribution to higher operational reliability and lower maintenance costs in conveying systems for thermal oils or in superheated steam blowers. "The same applies, for example, to printing machines and dryers in the paper industry, where the drive shafts shift against each other for operational reasons", adds Martin Schneweis.



**Martin Schneweis**  
RINGSPANN  
Product Manager  
of Shaft Couplings

## Rigid, torsionally rigid or torsionally flexible

The new hinged joint coupling enriches RINGSPANN's current Shaft Coupling range with another innovative solution. In total, the selection extends over 23 series, which represent almost all types currently required in mechanical and plant engineering. Designers, product developers and engineers thus have a great deal of freedom to realize rigid, torsionally rigid or torsionally elastic connections between shafts, gearboxes, motors and machines. A large part of the portfolio can now also be found in the company's online shop. Catalogues, data sheets, operating instructions and the 3D CAD data are also available for free download. <<





# Focus on mining in South America

**The RINGSPANN Group is continuing its internationalization course with the establishment of its now 17th foreign subsidiary in the Chilean port of Iquique. The range of services offered by the new company RINGSPANN Sudamérica SpA covers all of the company's product groups, but focuses primarily on drive components for heavy-duty applications. Shortly after the start of business activities, the first major orders from the mining industry have already been received.**

“With the establishment of RINGSPANN Sudamérica SpA, we are moving into the immediate vicinity of our customers in the mining industries of Chile, Peru, Colombia and Ecuador. Better than ever before we now equip mining, material handling and raw material extraction companies based here with our drive components”, states Daniel Riedel, RINGSPANN's international Sales Manager. The 17th foreign subsidiary of the RINGSPANN Group started operations in June and quickly gained a foothold in the Pacific region of South America. “During my several years as an Area Manager of the US-based RINGSPANN Corporation, I had the opportunity to get to know the markets in Chile and Peru in particular. I can now build on that”, reports Erik Farmer, who now leads the business of RINGSPANN Sudamérica SpA as General Manager. The new company is located in Iquique, the capital of





the Chilean region of Tarapacá. It has a population of just under 200,000, is located directly on the coast near the border with Peru and has a modern container port. "From here, we are positioned well to serve the industrial and mining areas in Chile and Peru, as well as mechanical and system engineering companies in this region", emphasizes Erik Farmer.

*The Group's synergies are already taking effect*

Due to the direct wire to the US RINGSPANN Corporation and based on the integration into the international network of the Group, the new company can now provide enterprises in Chile, Peru, Colombia and Ecuador with RINGSPANN's complete product and service portfolio with immediate effect. "As we have prepared our market entry diligently, we are in a position to offer South American customers all standard services from the product areas Freewheels, Industrial Brakes, Shaft-Hub-Connections, Overload Clutches, Shaft Couplings, Clamping Fixtures and Push/Pull Cables right from the start. This is already bearing fruit. We have already received our first major orders since starting operations in June of this year", reports Erik Farmer.

*Present in the coal and steel industries of the world*

Chile's mining industries are among the world's most important producers of raw materials. For German companies, they are among the most important suppliers of copper, aluminium and iron. The components provided by RINGSPANN Sudamérica SpA are mainly used in the heavy-duty machines and their drive units required for the mining and processing of these raw materials. "Both equipping the manufacturers of such heavy-duty equipment and the MRO business with their operators and maintainers are among our core competencies worldwide. In long term we therefore see great sales potential for RINGSPANN's quality solutions in South America", says Daniel Riedel.

RINGSPANN's long-term internationalization strategy aims to establish the company as a one-stop supplier for high-quality drive technology components in all important mechanical engineering regions of the world – and always with its own local staff. The foundation of RINGSPANN Sudamérica SpA is a further step in this direction. Like all international companies of the RINGSPANN Group, the South American subsidiary has access to all services of the manufacturing plants in Germany, Italy, Bosnia-Herzegovina, the USA, China and South Africa. <<



**Erik Farmer**  
General Manager of  
RINGSPANN Sudamérica SpA



**Daniel Riedel**  
International Head of Sales  
of RINGSPANN

## *RINGSPANN on all continents*

RINGSPANN has been pursuing the internationalization of the company with determination for several years. While the subsidiaries in France, Great Britain and the USA have existed for some time, further companies in China, Benelux and India were added by 2011. In the years from 2014 to 2016, foreign subsidiaries were established in Sweden, South Africa and Italy, and RINGSPANN Austria was founded in 2017. In 2018 RINGSPANN Singapore and RINGSPANN Australia started operations. The following year, RINGSPANN Bosnia-Herzegovina was launched and 2020 saw the foundation of RINGSPANN Korea (South Korea). With the start of business operations of RINGSPANN Sudamérica SpA in June 2022, the RINGSPANN Group now has a total of 18 subsidiaries – 17 of which are abroad.

„Mass production in millions is no problem for us“



**RINGSPANN is one of the world's leading manufacturers in the field of freewheel technology. In order to give designers of e-bike drives maximum scope for the realization of innovative bottom bracket and transmission solutions, the company now offers four different types of cage freewheels. They are characterized by performance-oriented additional functions and enable e-drive developers to implement space-optimized and compact drive concepts. Read here why the forward-looking freewheel design from RINGSPANN even reduces the work in module assembly.**

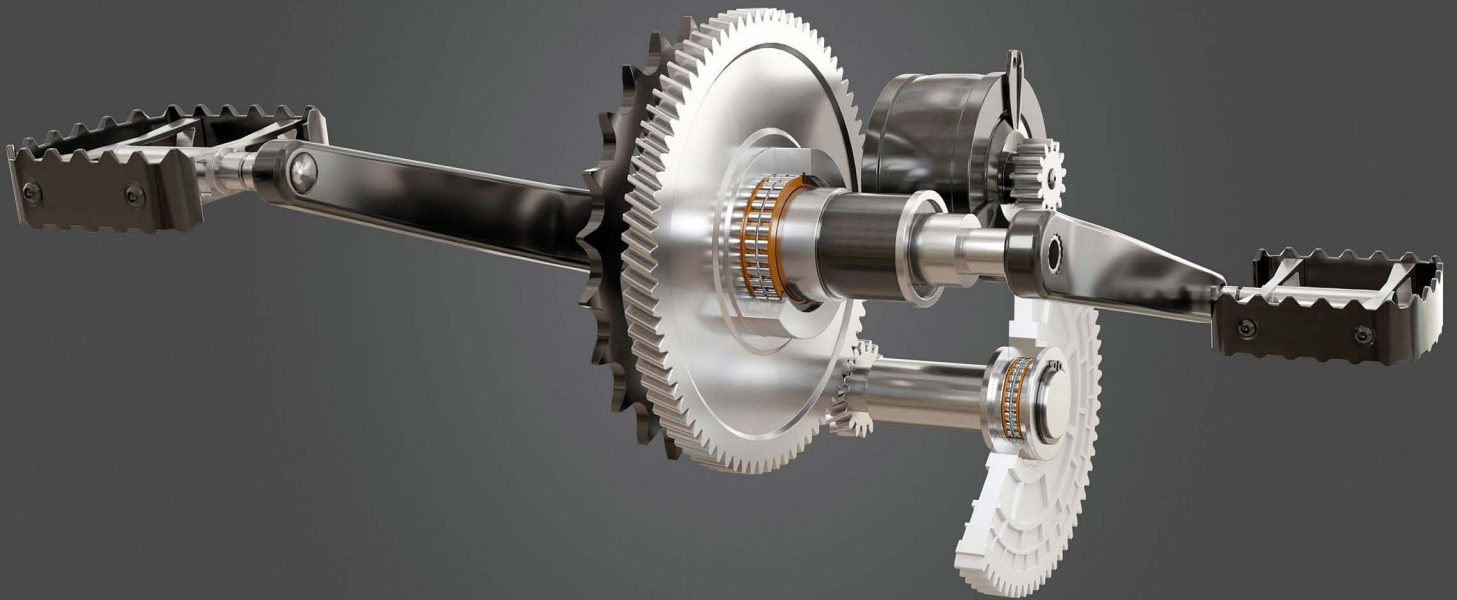
If we take just the quantities produced as a yardstick, RINGSPANN is one of the world's top suppliers of cage freewheels for the booming e-bike industry. Based on its comprehensive freewheel know-how, the company not only entered development work at an early stage, but also installed highly automated production processes for the large-scale production of e-bike freewheels in good time at its main plant in Bad Homburg. "Today, we supply renowned manufacturers in the industry with various types of freewheels, whereby annual batch sizes of two million pieces and more are no problem for us", reports Thomas Heubach, who heads the freewheel division at RINGSPANN and is significantly involved in many product innovations. Under his direction, the current selection of cage freewheels for use in e-bike drives has now grown to four basic types. From a technological point of view, they are likely to be among the best that the market currently has to offer in this field of e-mobility. Depending on the version, they not only allow the transmission of the highest torques or their targeted limitation; they also enable the realization of space-saving and reduced part drive systems, which ultimately even reduce the manufacturer's assembly work.

## Highest quality standards

RINGSPANN offers all four types of e-bike freewheels for shafts with diameters of approx. 25 - 60 mm. Their sprags are all made of hardened chrome steel and their cages are made of polyamide. Depending on the design, they are predestined for use on the shaft of the bottom bracket or in the gearbox of the drive unit. "And what applies to all our freewheels also applies here: all functional elements of their design meet the highest quality standards and are optimally matched to each other", emphasizes Thomas Heubach.

Type E cage freewheels have now proven themselves millions of times in practical e-bike use. They impress with their high transferable torque of up to 520 Nm, which makes them an extremely durable and robust universal solution for many different e-bike drive systems. According to Thomas Heubach, the torque capacity of these sprag freewheels is "three times higher than that of drawn cup roller clutch freewheels". In addition, their optimized geometry allows high component tolerances in the design environment – for example, when installing between customer-supplied inner and outer rings.



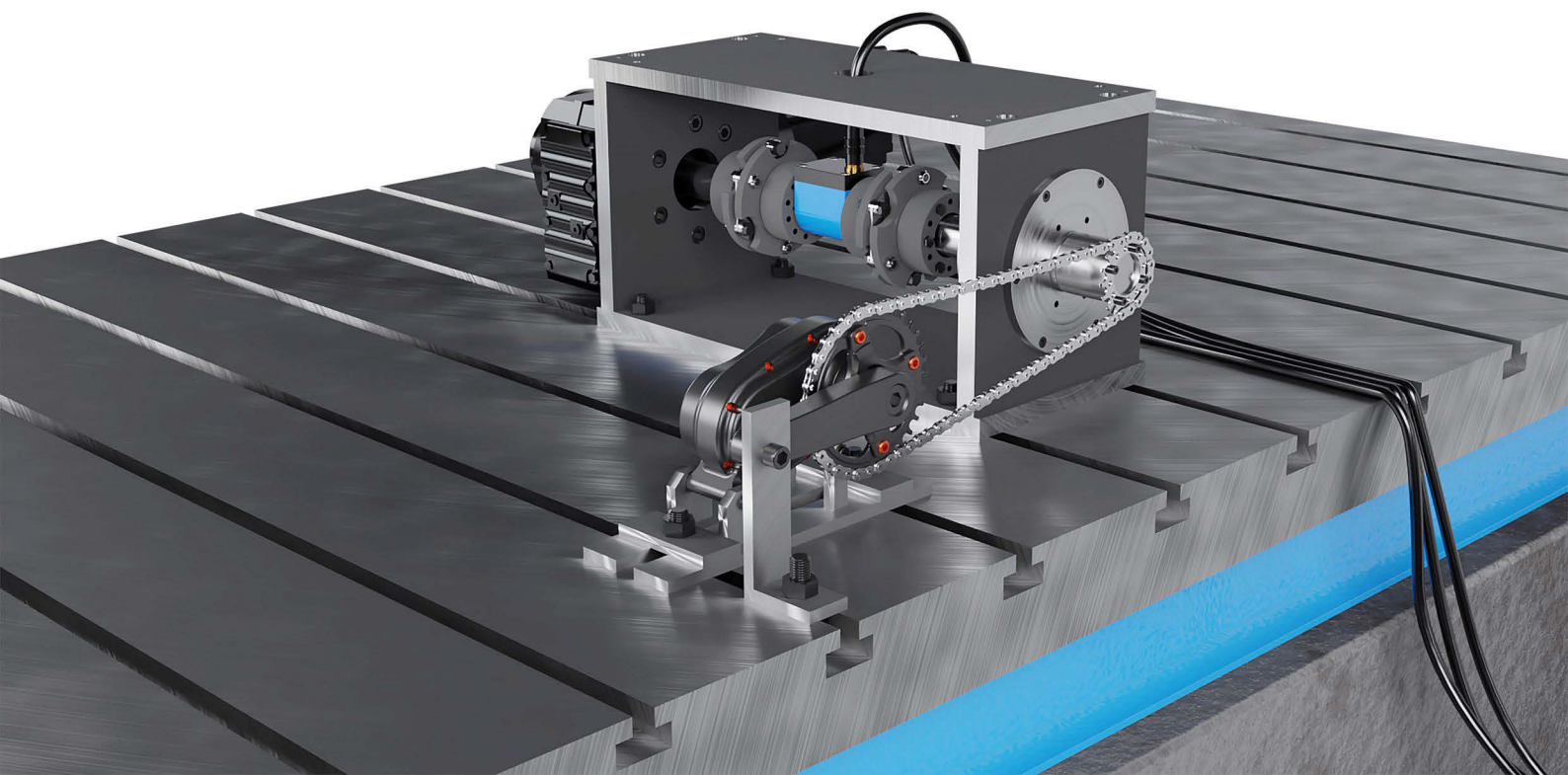


Depending on the version, e-bike freewheels from RINGSPANN are suitable for shafts with diameters of approx. 25 - 60 mm and are predestined for use on the shaft of the bottom bracket or in the gearbox of the drive unit.

## Capping torque peaks

The RINGSPANN type F freewheel has a different application focus. This cage freewheel is predestined for use on the bottom bracket shaft, where it protects against overload thanks to its integrated torque limitation. Thomas Heubach explains, "Extremely high torques can occur on the bottom bracket shaft of an e-bike, depending on the application and rider. For this scenario, we have developed the Type F, whose sprags are characterized by a special design. With appropria-

te component tuning, it enables targeted slipping as soon as the application-specific limit torque is exceeded. This not only protects the freewheel itself, but also all adjacent components of the drive." In this respect, the e-bike F freewheel from RINGSPANN is also an ideal solution for applications in which the maximum torque of the bottom bracket cannot be predicted and therefore cannot be designed exactly.







## Innovations replace bearing

The latest RINGSPANN innovations in the field of e-drive freewheels include the two types ER and HRL. These cage freewheels are regarded as a pioneering premium solution for coupling and uncoupling the electric motor, as they leave the designers plenty of leeway for the realization of space-optimized and part reduced drive systems. The reason for this: both designs reduce the design work for the usual bearing of the freewheels. While the type ER already has an integrated radial bearing, the type HRL gains points with an integrated radial and axial bearing. "When using these cage freewheels, the e-drive designer can therefore dispense with space-consuming roller bearing assemblies. As a result, they can design the drive more compactly and also reduce the costs of assembling the entire assembly by reducing parts. Or they can use the space gained to install additional functional elements", explains Thomas Heubach.

The radial bearing of the ER freewheel is carried out via several travelling pairs of rollers that are integrated into the modified plastic cage. With the HLR type, a special bearing disc on the freewheel also ensures the axial bearing and securing, whereby an additional bearing is not required, even with helical gears on the drive shaft of the motor. "Both designs with integrated bearings are now patent pending and are already being used by the first e-drive designers", reports Thomas Heubach. In both cases, it is also conceivable to use the free space gained thanks to the elimination of the rolling bearing assemblies for a track widening of the freewheels – which can increase their torque capacities.

## Rapid realization of customer requests

RINGSPANN attaches great importance to the fact that the design of all four e-drive freewheels basically offers many possibilities for customer- and application-specific modifications and special designs. In combination with the company's consulting expertise and high process efficiency, the use of modern 3D printers in prototyping and the operation of its own freewheel test benches, this ensures that innovative approaches and new developments quickly find their way into practical implementation at the customer's site. <<

„All functional elements of our cage freewheels for e-bike drives meet the highest quality standards and are optimally matched to each other.“



**Thomas Heubach**  
Head of Division Freewheels  
at RINGSPANN GmbH

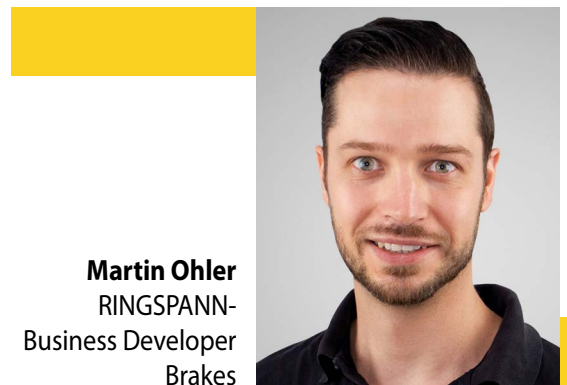




# Storm-proof stand for heavy equipment

Rail clamps and rail brakes are among the heavy-duty solutions in the extensive range of industrial brakes in RINGSPANN's One-Stop-Shop. As safety components in the drive systems of cranes and excavators in coal and steel, harbour and mining engineering, they combine a compact design with very high holding forces. Read here why the company's hydraulic and electric storm brakes are also considered extremely maintenance-friendly and are particularly suitable for retrofit projects.

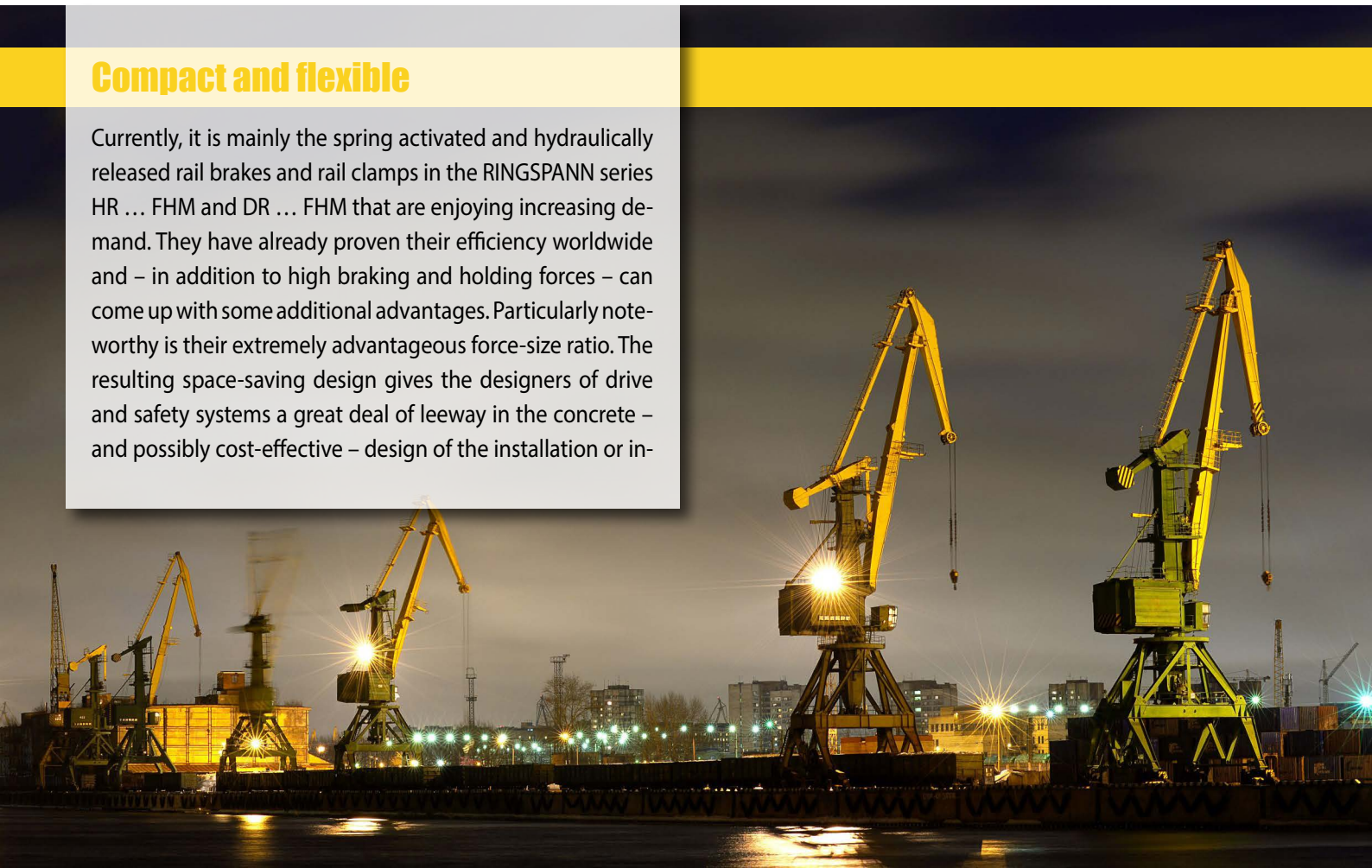
When storms throw themselves against the coast and the surf crashes on quay walls and jetties, the rail brakes and rail clamps from RINGSPANN are in their element. With holding forces of up to 530 kN, they hold the portainers, harbour cranes and gantry systems installed here in place, to prevent them from giving in to the pressure of the wind and moving uncontrollably. Elsewhere, they also give bucket wheel excavators, steel mill cranes and large photovoltaic systems the necessary stability and storm resistance. "In view of the extreme weather events predicted for the future, even the designers of conventional tower cranes for construction site use and rail-guided conveyor systems are now showing growing interest in our storm brakes", says Martin Ohler, Business Developer Brakes at RINGSPANN.



**Martin Ohler**  
RINGSPANN-  
Business Developer  
Brakes

## Compact and flexible

Currently, it is mainly the spring activated and hydraulically released rail brakes and rail clamps in the RINGSPANN series HR ... FHM and DR ... FHM that are enjoying increasing demand. They have already proven their efficiency worldwide and – in addition to high braking and holding forces – can come up with some additional advantages. Particularly noteworthy is their extremely advantageous force-size ratio. The resulting space-saving design gives the designers of drive and safety systems a great deal of leeway in the concrete – and possibly cost-effective – design of the installation or in-



## Electrical with fail-safe function

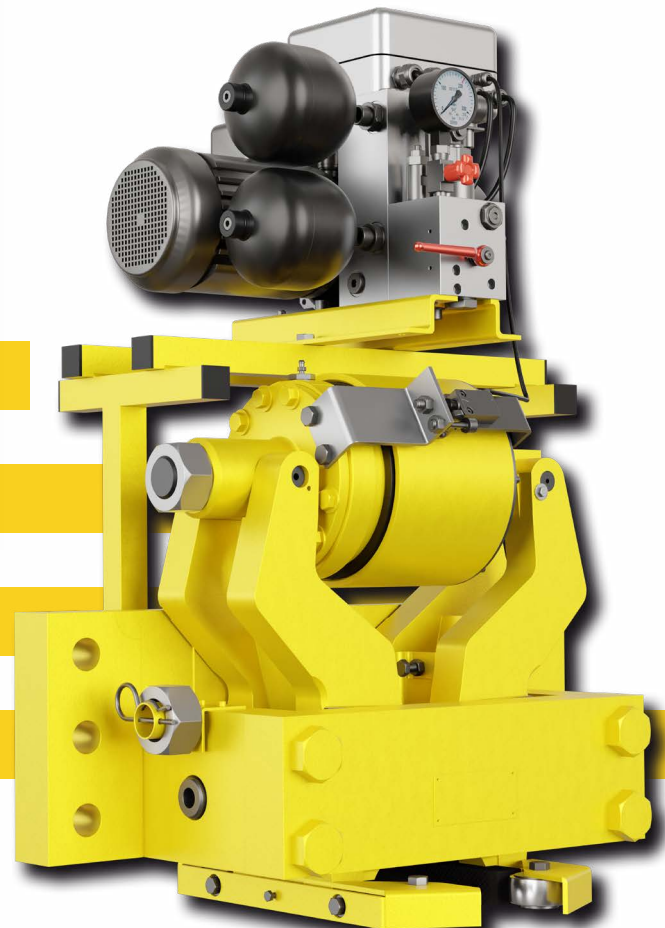
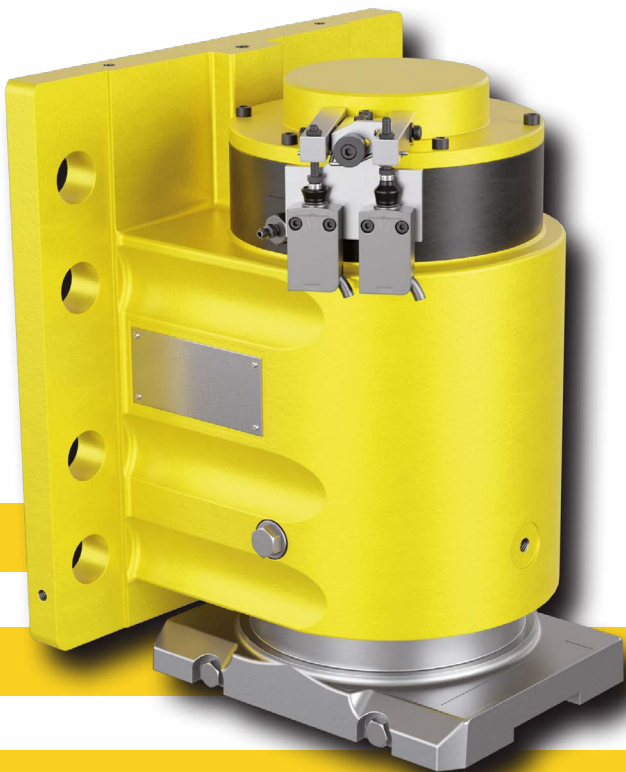
The term fail-safe comes from safety technology. It stands for the principle of automatically transferring technical systems to a safer state in the event of failure of a technical component or in the event of human error. With the electromechanical rail clamps in the DR series ... FEM from RINGSPANN, this principle is realized by a sophisticated interaction of the electric motor and the release mechanism for the compression of the diaphragm spring. It ensures that the rail clamps close automatically in the event of a power failure. In this way, the product developers at RINGSPANN have combined the advantages of hydraulic clamps with fail-safe function (e.g. high holding force, compact design) with the advantages of electric clamps (e.g. environmental protection).

stallation situation on the excavator or crane. Their compact design also makes these storm brakes an ideal solution for retrofitting older crane, conveyor and earthmoving systems. "They can be integrated very flexibly into existing environments and still leave room for the installation of additional modernization components – for example from the field of Industry 4.0 applications," explains Martin Ohler.

A closer look at the HR ... FHM and DR ... FHM series also shows that they offer a number of advantages not only to OEM designers, but also to the service and maintenance teams entrusted with the maintenance of rail-guided heavy-duty systems. RINGSPANN's product developers designed the hydraulic safety brakes according to the same pattern as the company's hydraulic disc brakes (also widely used in the heavy-duty sector). Martin Ohler emphasizes that "many maintenance personnel therefore no longer need to think of two different technologies, but can transfer their existing knowledge about the inner workings of the brakes – for example with regard to disc springs, hydraulic pistons and seals". This simplifies MRO processes, speeds up repair and replacement work and reduces the error rate.

## Forward-looking innovation

In principle, industrial brakes in the RINGSPANN series HR ... FHM and DR ... FHM not only serve for storm protection, but also act as holding and parking brakes for the







## All relevant brake types

Industrial brakes from RINGSPANN serve as stopping, controlling and holding systems in conveyor and crane systems, lifting and handling systems, mining and construction machinery, as well as in marine, harbour, recycling and metallurgical engineering. In its one-stop shop, the company provides customers with a technologically almost complete range of brakes that covers all important functional and design types. In addition, in order to make it easier for designers and engineers to select the right brake, RINGSPANN also offers a free calculation tool at [www.ringspann.com](http://www.ringspann.com). This allows the determination of braking torques and braking forces. For example, it can be used to calculate the braking of rotating masses (e.g. shafts), chassis, winches and conveyor belts.

safe positioning of rail-guided crane, excavator or conveyor systems during loading and unloading processes. Depending on the basic version, they press from above on the rail (brakes/HR) or grip the track (clamps/DR). In addition to this option, RINGSPANN offers drive system designers the appropriate hydraulic units, as well as oil sumps, seawater protective covers (for brakes and power units) and optimized brake pads – for both static and dynamic applications. To protect bodies of water and the soil, the company even offers biodegradable oil for the hydraulic units of its safety brakes.

As a sustainable and forward-looking alternative to hydraulic brakes, RINGSPANN has recently introduced the DR ... FEM to its range. In the latest generation, these are spring-activated and electro-mechanically released rail clamps that are characterized by a decisive innovation: they have an integrated fail-safe function that ensures that the electric rail clamp closes automatically immediately in the event of a power failure. "This safety function has long been standard in hydraulic solutions, but it is a novelty in the field of electric rail clamps. Once again, RINGSPANN has underscored its leading role in the field of industrial brakes," says Martin Ohler.

## Know-how creates investment security

For several decades, RINGSPANN's storm and holding brakes have contributed to the realization of high safety standards in ports, shipyards, mining plants, steel and power plants around the globe. At present, there are probably only a few companies whose engineers can access even an approximately comparable pool of know-how in the design of industrial brakes for heavy-duty applications. In addition, both the large number of innovative detailed solutions and the large selection in the current brake portfolio document how closely RINGSPANN is oriented towards the specific requirements of its customers.

The company guarantees the high availability of its industrial brakes by constantly keeping all technically relevant components available at its European locations. All wear and spare parts are available here on demand. The integration of brake mounting in just-in-time scenarios can also be realized. On the basis of its in-house test bench technology, the one-stop supplier of quality components for industrial drive technology can also offer its customers a high level of planning and investment security. The scope of delivery of the industrial brakes therefore includes installation descriptions, operating instructions and technical documentation, including the test reports required for quality assurance. <<



# NEW MATERIALS FOR MORE SHAFT SAFETY

RINGSPANN is driving forward the expansion of its portfolio of functional machine elements for industrial drive technology with a large number of small and large innovations. The internationally active one-stop supplier is becoming particularly dynamic in the field of shaft couplings. While it has recently made a name for itself here with a new type of hinge joint coupling, the company is now presenting new spiders made of more temperature-resistant materials for the torsionally flexible jaw couplings of its REK ... DCO series and its Smart Solution REK ... DCS. This gives designers the opportunity to make compensation of radial, axial and angular misalignment in drive shafts even safer.

When it comes to the vibration-damping and compensation of dynamic radial, axial and angular offsets in drive trains, the torsionally flexible jaw couplings of the REK ... DCO series from RINGSPANN are among the preferred premium solutions for many well-known machine and plant manufacturers. These maintenance-free and fail-safe shaft couplings score with a progressive torsion spring characteristic and are characterized by their compact design and excellent running properties, among other things. In particular, the vibration-damping transmission of torques in the drive shafts of crane chassis, machine tools, belt conveyor, pumps and fans is part of their large areas of application. In order to give designers and developers in these industries even more leeway for the realization of safe, heavy-duty and high-performance shaft connections, RINGSPANN is now supplying its REK jaw couplings with new spiders made of elastomer materials with increased temperature resistance. In concrete terms, this means: the jaw couplings in the REK ... DCO series can now be equipped in all ten sizes with three different spiders with the hardness 92 Shore-A,

98 Shore-A and 65 Shore-D, which allow operating temperatures of up to 120°C. RINGSPANN Product Manager Martin Schneewis explains what this means for the practical use of the couplings: "Our new spider materials are suitable for operating temperatures of up to +120°C and offer up to 13 percent higher strength than the previously used plastics. As a result, in the average temperature range from 30°C to





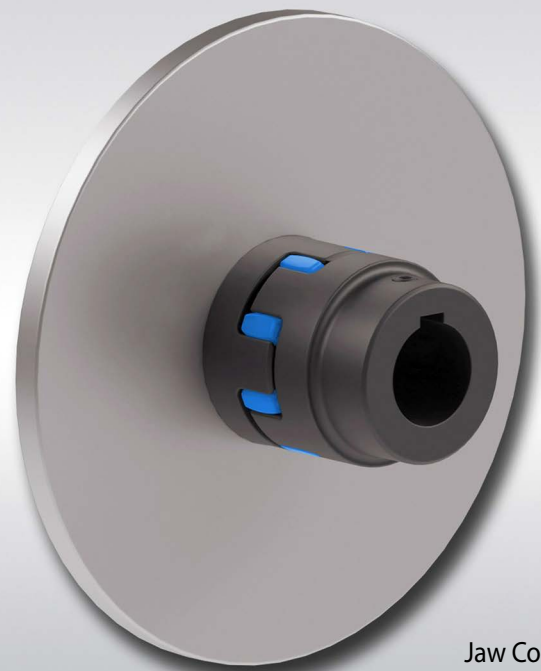


**Martin Schneweis**  
RINGSPANN  
product manager  
of Shaft Couplings

80°C, the nominal torques of the jaw coupling increase considerably compared to the previous versions. Even at room temperature, the new materials allow higher torques than their predecessors thanks to their higher hardness."

## HIGHER SAFETY LEVEL ACHIEVABLE

By equipping the REK jaw couplings with the new spider materials, RINGSPANN enables plant designers and machine manufacturers to raise their drive trains to a higher level of safety. Incidentally, the same applies to those customers who use the Smart Solution REK ... DCS, a ready-to-install combination solution of REK coupling with brake disc, in their applications. Replacing older versions is also simplified by the fact that the size of the couplings compared to the predecessors does not change in all this. "For reasons of customer orientation and service quality, however, we will continue to provide the spider materials offered so far in minimum quantities on a project- and customer-related basis", stresses Martin Schneweis. The new spiders remain visually distinguishable due to their colouring: the TU 92 Shore-A variant is gray, TU 98 Shore-A is blue and TU 65 Shore-D is white. The older versions are red and yellow.



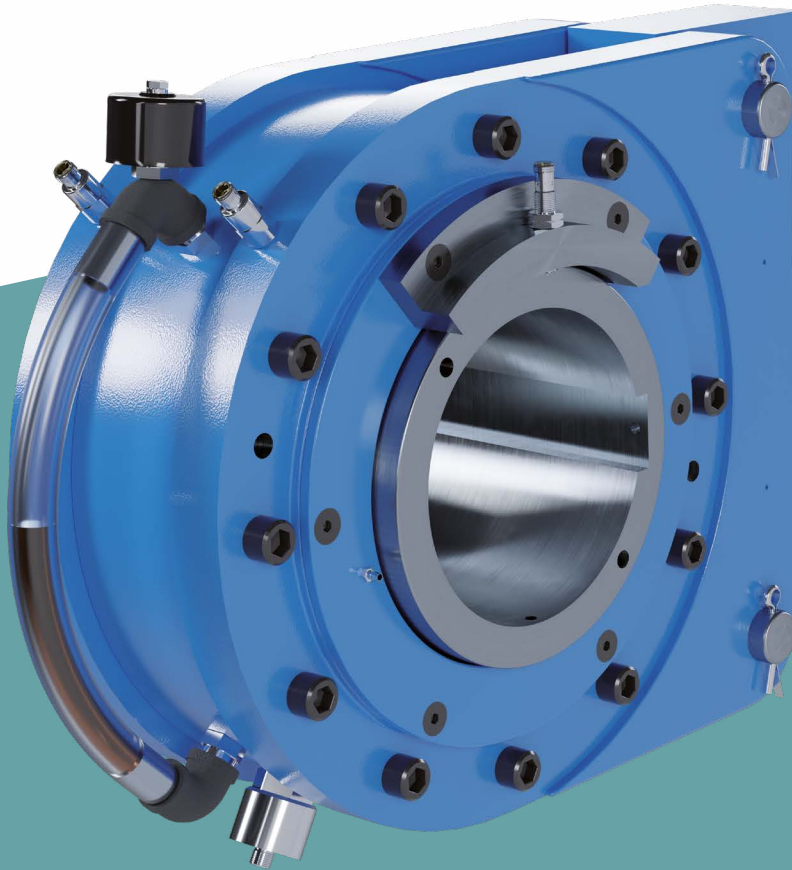
Jaw Coupling  
REK ... DCS

## MORE POSSIBILITIES FOR DESIGNERS

The introduction of new, more temperature-resistant spider materials for the jaw couplings of the REK ... DCO series and the Smart Solution REK ... DCS is one of numerous detailed innovations that RINGSPANN has recently implemented in this area of torsionally flexible shaft connections. In addition to the already existing range, it once again expands the possibilities of customer- and application-specific adaptation of this type of coupling many times over. "As a result, customers can no longer only choose from ten sizes with different bore diameters as well as hubs made of steel, cast iron or aluminium on the input and output side, but now also from three elastomer spiders with different degrees of hardness", says Martin Schneweis.

RINGSPANN's current complete range of shaft couplings extends over 23 series, representing almost all types currently required in mechanical and plant engineering. Designers, product developers and engineers thus have a wealth of quality solutions for the implementation of rigid, torsionally rigid or flexible connections between shafts, gearboxes, motors and machines. A large part of the portfolio is now available in the company's web shop, where catalogues, data sheets, operating instructions and the 3D CAD data are also available for download. <<

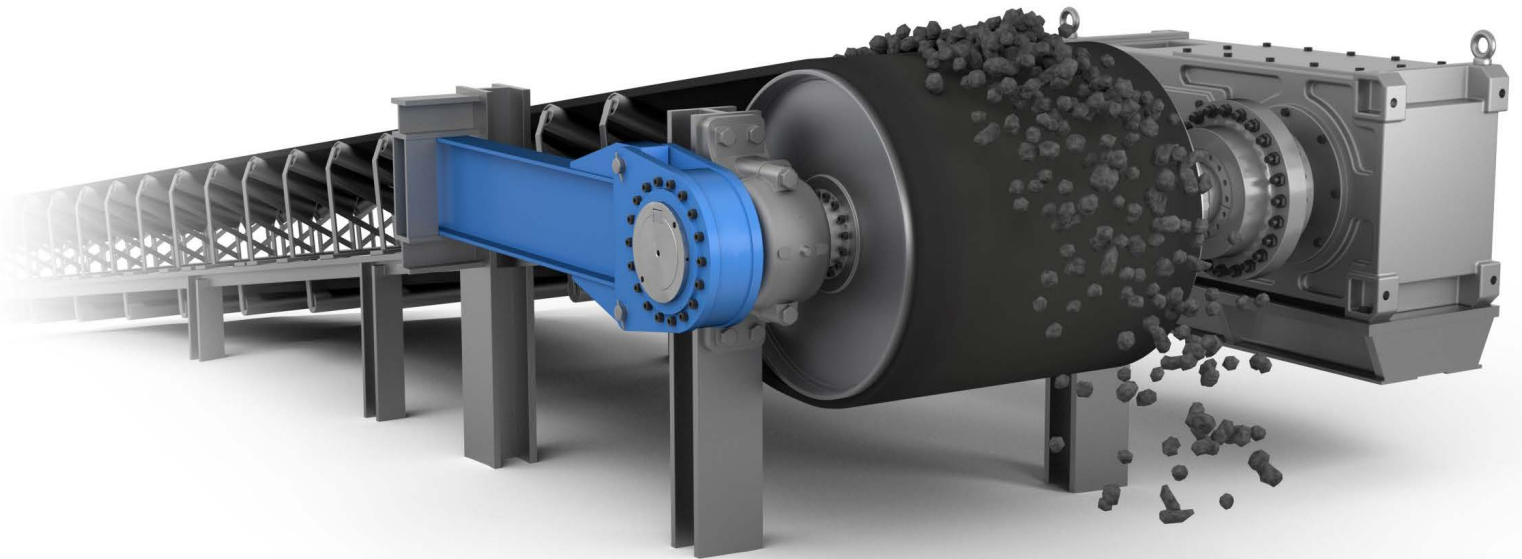
# Knowing what's going on inside



From now on, RINGSPANN is also offering a software- and sensor-supported condition monitoring system with WWW connection for its low speed backstops. It enables comprehensive real-time control of all function-relevant events inside the freewheels. In particular, this gives operators and maintainers of bulk material plants the opportunity to proactively monitor important performance parameters of the backstops in the drive systems of their conveyor systems. This increases operational reliability and reduces maintenance costs.



The low speed backstops of the FRHD, FRHN and FRSC series are among the freewheels of the RINGSPANN portfolio that the company provides as a ready-to-install complete solution with torque arm for mounting on the shafts of conveyor systems and output shafts of gearboxes. They are used worldwide as components of operational safety in conveyor belts, bucket elevators, screw conveyors, elevators and pumps for bulk materials, recycling and coal and steel technology. "On the one hand, they prevent serious accidents due to unexpected backward running of the systems, but on the other hand, they enable the drive units to be decoupled at any time in a controlled manner – when the conveyor belts or bucket elevators are fully loaded", explains Thomas Heubach, head of RINGSPANN's freewheel division. These backstops are characterized by a number of noteworthy quality features. For example, the high-quality Taconite seals, which give them an extremely high resistance to dirt, and the exceptionally high nominal torques of up to 1,215,000 Nm.



## Condition monitoring at 4.0 level

RINGSPANN now offers a sensor- and software-supported operating status monitoring system at Industry 4.0 level for all three series of its low speed backstops. Both the operators of the conveyor systems and their MRO and service teams thus receive a modern instrument of condition monitoring that can be used in the context of preventive maintenance. The system solution consists of a vibration sensor for monitoring bearings and imbalances, a speed sensor and an oil moisture sensor with temperature sensor and all the diagnostic electronics required for further analysis. The user can (remotely) retrieve all measurement data from the sensors in real time via an Ethernet interface and evaluate them with the Smartobserver software, which is also part of the system scope.

With the new operating status monitoring, RINGSPANN covers all aspects that are relevant for the sustainable, efficient and cost-effective operation of its low speed backstops. In the sense of preventive or predictive maintenance, the system informs, for example, about the possibility of unexpectedly high heating of the backstop – and opens up the possibility of planning maintenance sensibly. This is an important contribution to increasing plant availability. Expensive consequential damage can be avoided and the repair effort can be reduced, because the system detects irregularities at an early stage and the affected systems can then be shut down in a controlled and safe manner. In addition, the system supports the identification and analysis of sources of interference, from which targeted measures for process optimization can



"I'm pretty sure that we will gradually expand the topics of condition monitoring and predictive maintenance to other series of our freewheel portfolio."

**Thomas Heubach**  
Head of Division Freewheels at RINGSPANN GmbH



be derived. The effectiveness of repairs carried out can also be checked. And the data obtained from the operating condition monitoring can also be used to provide evidence in the event of warranty issues.

## Remote scrutiny

Thanks to the Ethernet interface and data transfer via WWW, the control station personnel of the plant operator, the quality manager or the maintenance technician can follow the MRO-relevant events in the backstop in real time. For this purpose, the Smartobserver software provides all functions in the RINGSPANN operating status monitoring system: world and country maps show the user the locations of the freewheels, various traffic light symbols mark the position and function of the sensors, and diagrams provide informa-

tion about vibrations and vibration limits. A warning symbol lights up if a fault is diagnosed inside the backstop or a critical condition is reached. If required, the user can also send the analysis and monitoring data for evaluation directly to the freewheel specialists of the international manufacturer of high-quality components for industrial drive technology.

With the new operating status monitoring for its low speed backstops, RINGSPANN is expanding the range of its Industry 4.0 solutions for condition monitoring. Such a system has also been available for the housing freewheels of the FH series for about two years now. These are overrunning freewheels with nominal torques from 1,356 to 81,000 Nm, which are used, for example, as automatic overrunning clutches in powertrains with multiple fast-rotating engines or turbines. "I am pretty sure that we will gradually expand the topics of condition monitoring and predictive maintenance to other series in our freewheel portfolio," says Thomas Heubach. <<



## Market leader with growing one-stop shop

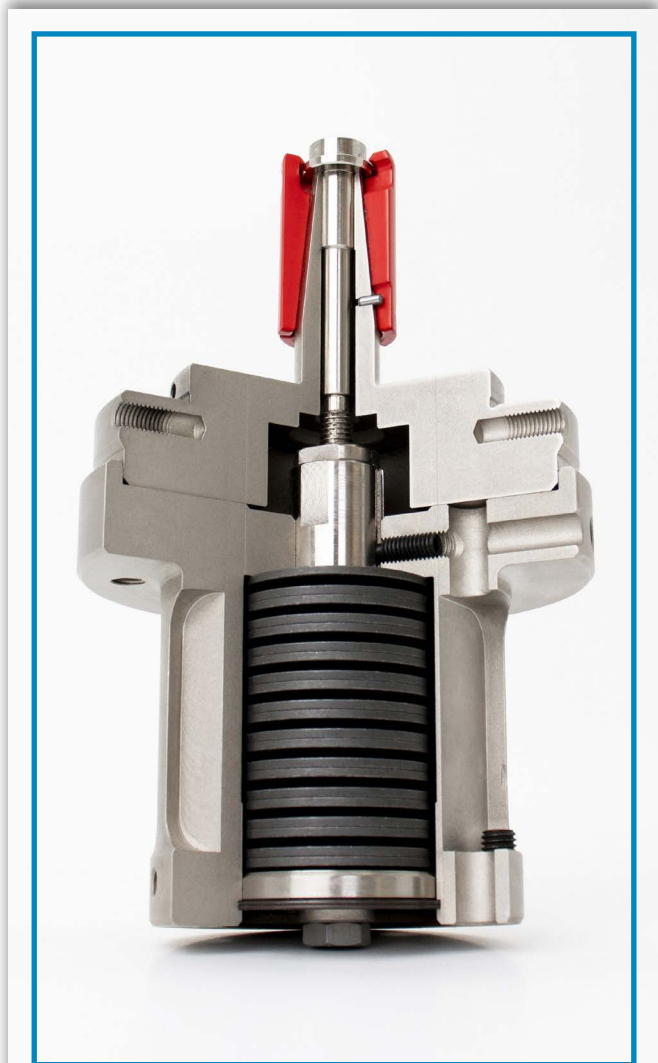
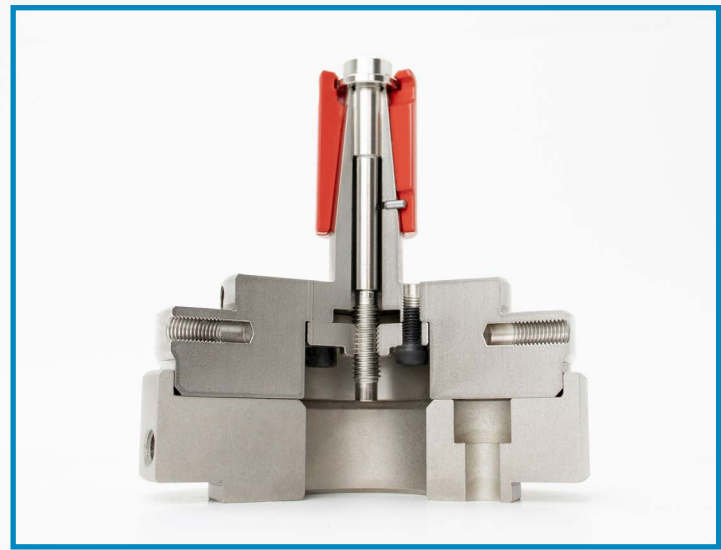
RINGSPANN is regarded as the international market leader in the field of freewheels. The company supplies around 6,000 customers worldwide with these machine elements for the realization of backstops, overrunning and indexing freewheels in drive technology. In principle, freewheels consist of an inner and an outer ring with intermediate clamping elements (sprags). In one direction of rotation there is no connection between the inner and outer ring (freewheeling); in the opposite direction, on the other hand, the sprags ensure a frictional connection between the inner and outer ring (driving mode). In addition to its numerous freewheel series, RINGSPANN offers a large selection of shaft-hub-connections, overload couplings, shaft couplings, industrial brakes as well as precision clamping devices and remote controls in its web shop. Both the web shop and the overall offer are constantly being supplemented and expanded.



# More universally applicable and quicker to set up

**The flange mandrels from RINGSPANN's BKDF series and their FUSR-type force-generating spring force actuators rank among the standard clamping systems for balancing rotationally symmetrical components in automotive, pump and gearbox construction. With the aim of significantly reducing the set-up costs and increasing the flexibility of users, the company has now revised the design of these internal clamping fixtures and optimised them for use on many different balancing machines. This is tantamount to simplifying the process and reducing investment costs.**

Vertical balancing machines are part of the basic configuration of production-related quality assurance and testing technology at many well-known manufacturers of rotationally symmetrical components for use in automotive, gear and pump construction. In many cases, the precision clamping systems required for this come from RINGSPANN. Particularly for vertical balancing in series production, the ten sizes of taper collet flange mandrels from the BKDF series have established themselves as an industry standard. They are often used in combination with FUSR-series spring force actuators for machine-independent clamping force application. In order to further simplify the use of these internal



clamping systems for users, RINGSPANN has now revised their design and improved it in one crucial area: the geometry of the seating body with which the flange mandrels can be docked onto their power clamping unit has been standardized and is now identical for the entire series, which now bears the new BKDW designation. For all balancing scenarios in which the flange mandrels are used in conjunction with a FUSR spring force actuator as the clamping unit, from now on only one spring force actuator will be required. What this means in practice is summarised by Christoph Schulz, Product Manager Clamping Fixtures at RINGSPANN: "Since all ten sizes of flange mandrels in our new BKDW series now work with the same type of spring force actuator - previously three different ones were necessary - both the set-up costs at the balancing machine and the acquisition costs for the clamping systems have been lowered. In addition, many of our customers operate balancing machines from different manufacturers. These can now all be equipped with one spring force actuator or intermediate flange and can access the same taper collet flange mandrels from the BKDW series. This overarching compatibility enables us to fulfil the wish of numerous users for a neutral and as universal as possible clamping system in vertical balancing technology."



## High concentricity guaranteed

RINGSPANN's new BKDW series thus consists of ten sizes of taper collet flange mandrels with basically identical connectors. They are all characterised by an excellent true running accuracy of  $\leq 0.01$  mm. The most important distinguishing features include the clamping range of the taper collet, the change in its diameter as well as the maximum transmissible torque and the maximum actuating force. When used with the spring-loaded FUSR, the BKDW series covers a clamping range of 11.9 to 132 mm and offers flange mandrels with maximum actuating forces between 2,300 and 3,840 N, which can transmit torques of 11 to 25 Nm. The diameter expansion of the taper collet is a maximum of 1.2 mm. "With these parameters, our new BKDW series offers a technical bandwidth that fulfils many currently relevant requirements in automotive and vehicle construction, in gear and pump construction as well as in e-mobility for the vertical balancing of rotationally symmetrical, cylindrical series parts with an internal bore", emphasises Christoph Schulz.

## Highly efficient combined solution

In many cases, RINGSPANN's internal clamping systems already form part of the basic OEM plant configuration of balancing machines. In industrial practice, however, the use of BKDF and BKDW flange mandrels can vary from user to user - depending on which machines determine what happens on site. If the vertical balancing machine or station has its own power clamping device, the taper collet flange mandrels from RINGSPANN can be connected directly via an intermediate flange. In all other cases, the combination of a BKDW flange mandrel and a FUSR spring force actuator (as a power clamping unit) forms a high-precision clamping system for efficient balancing - even at the high speeds common today. The manual operation of taper collet flange mandrels is now rather rare in balancing technology; but RINGSPANN still offers a selection of intermediate flanges for this purpose as well, which serve as connection adapters.



**Christoph Schulz**  
Product Manager  
Clamping Fixtures



In principle, each flange mandrel from the BKDW series consists of a taper collet with a draw bolt and a - now universal - seating body with which it is connected to the spring force actuator FUSR or to the intermediate flange of the balancing machine. It is set into action via the draw bolt, which is connected to the power clamping device (of the spring force actuator or the machine). Christoph Schulz explains: "The draw bolt is guided through the flange seating body (base body), which has a pin or plate for the circumferential positioning of the taper collet. This enables the highest reproducibility of balancing results to be achieved." During clamping, the taper collet is pulled over the taper of the seating body and expands radially. In this way, the workpiece is securely centred, pressed against the backstop surface and aligned flat. Upon request, RINGSPANN also supplies the functional unit of a taper collet and draw bolt with pre-centring for use on fully automated systems with integrated handling systems.

All taper collet flange mandrels of the BKDW series are suitable for balancing both thin-walled and solid workpieces. The maximum insertion depths range from 31.9 to 147.55 mm. For the calibration of the clamping system consisting of the FUSR spring force actuator (or intermediate flange) and flange mandrel BKDW, the user receives an optional control balancing ring from RINGSPANN - designed for the respective clamping diameter. <<





## Strong precision solutions for heavy-duty drives

**Cone clamping elements and shrink discs from RINGSPANN belong to the top group of friction-type shaft-hub-connections. Worldwide, they ensure safe and loss-free power transmission in the drive trains of conveyor systems, construction machinery, pumps, turbines and generators. The True Centering clamping sets and shrink discs of the RLK family are particularly suitable for use in earthmoving and bulk material installations in the coal and steel and mining industries. Read here to discover what distinguishes these machine elements.**

As indispensable functional elements of friction-type power transmission, shaft-hub-connections from RINGSPANN can now be found in countless drive systems in international mechanical and plant engineering. The company's True Centering clamping sets and RLK shrink discs set standards in heavy-duty applications in coal and steel, mining and power plant engineering. They are characterised by extreme accuracy in hub-shaft centering and impress with their high transmittable torques. "In addition, they can always be optimally adapted to the customer's drive peripherals – for example, if only low surface pressures are possible because the hubs are very thin-walled or because other connection parts have to be protected", says RINGSPANN Product Manager Marvin Raquet.

### Exact fit thanks to double slot

The True Centering clamping sets RLK 402 TC and RLK 404 TC from RINGSPANN are internal clamping connections for backlash free fastening of hubs on shafts and are primarily used in the drive systems of bulk material conveying systems for coal and steel. Among other things, they are considered the optimal solution for applications with components that are exposed to increased bending stresses during operation – such as large conveyor belt drums. They score with excellent machining quality, transmit torques from 18,500 to 1,701,000 Nm and are suitable for drive shafts with diameters of 100 to 600 mm. In addition to their three-part design with particularly long and flat cones, a characteristic feature of the True Centering clamping sets from RINGSPANN is above all a double side slot of the inner and



outer ring. "This double slot ensures extremely high accuracy when centering the hub on the shaft – even with multiple mounting; in addition, under normal requirements during clamping, axial displacement of the hub to the shaft is not to be expected," explains Marvin Raquet. This means that a cone clamping element of the type RLK 402 TC or RLK 404 TC centres a belt drum on the drive shaft with the greatest precision, and drum and shaft remain positioned exactly in relation to each other. This means that the drive system designer does not have to consider potential inaccuracies in advance, nor do maintenance technicians have to worry about their maintenance work lacking precision. "Our RLK 402 TC and RLK 404 TC clamping sets make a direct contribution to safe and efficient plant operation and also support the reduction of MRO effort", says Marvin Raquet.

## "Upper performance limit"

The high performance of the two- and three-piece shrink discs in RINGSPANN's RLK family is also based on the frictional locking principle. However, these are external tension connections for the backlash-free attachment of hollow shafts or hubs to drive shafts. They are used in mining and raw material extraction technology primarily in the gearboxes of bucket elevators, elevators or bucket wheel excavators. "With maximum transferable torques of 4,225,000 Nm, these shrink discs cover almost the entire range of coal and steel and power plant applications. At the same time, they currently mark the upper performance limit of our friction-type shaft-hub-connections in terms of power transmission," explains Marvin Raquet.

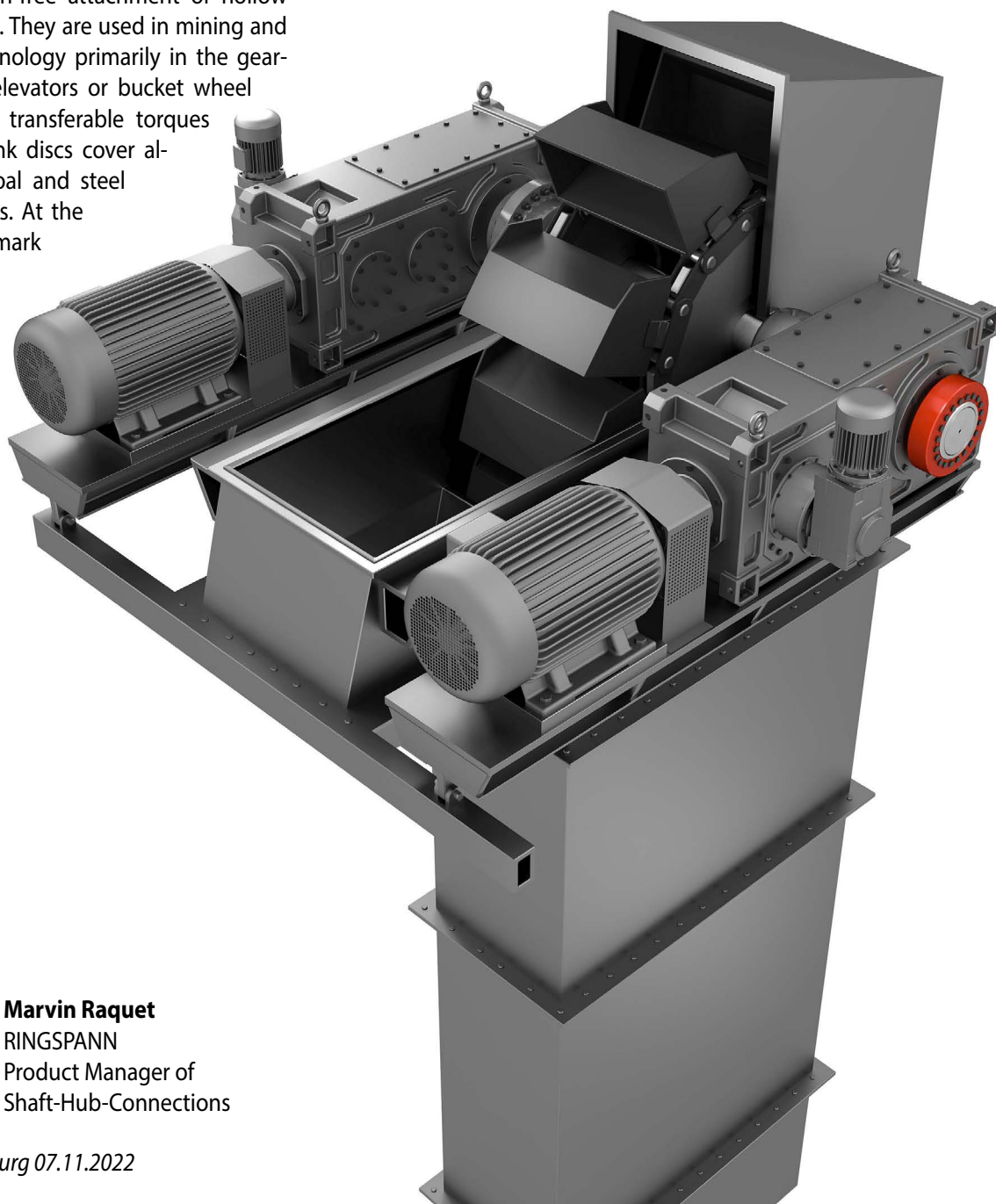
RLK shrink discs from RINGSPANN are extremely easy to install and, depending on the variant, are suitable for shafts with a diameter of 14 to 620 mm.



**Marvin Raquet**  
RINGSPANN  
Product Manager of  
Shaft-Hub-Connections

The company's current bestsellers currently include the three-part shrink discs of the still relatively new RLK 603 S series. They score as versatile universalists for hollow shafts and hubs with outer diameters of 14 to 190 mm and transmit torques from 18 to 156,100 Nm.

By the way: thanks to its extensive engineering expertise and its high level of vertical integration, RINGSPANN is always in a position to make constructive modifications to its shaft-hub-connections or to implement customer-specific special solutions. "An example of this is the light version of our True Centering clamping sets, which today belong to the standard range, but were originally developed on behalf of customers for drive systems with mass-optimised light-weight hubs," reports Marvin Raquet. <<





# Agility and efficiency in a modern form

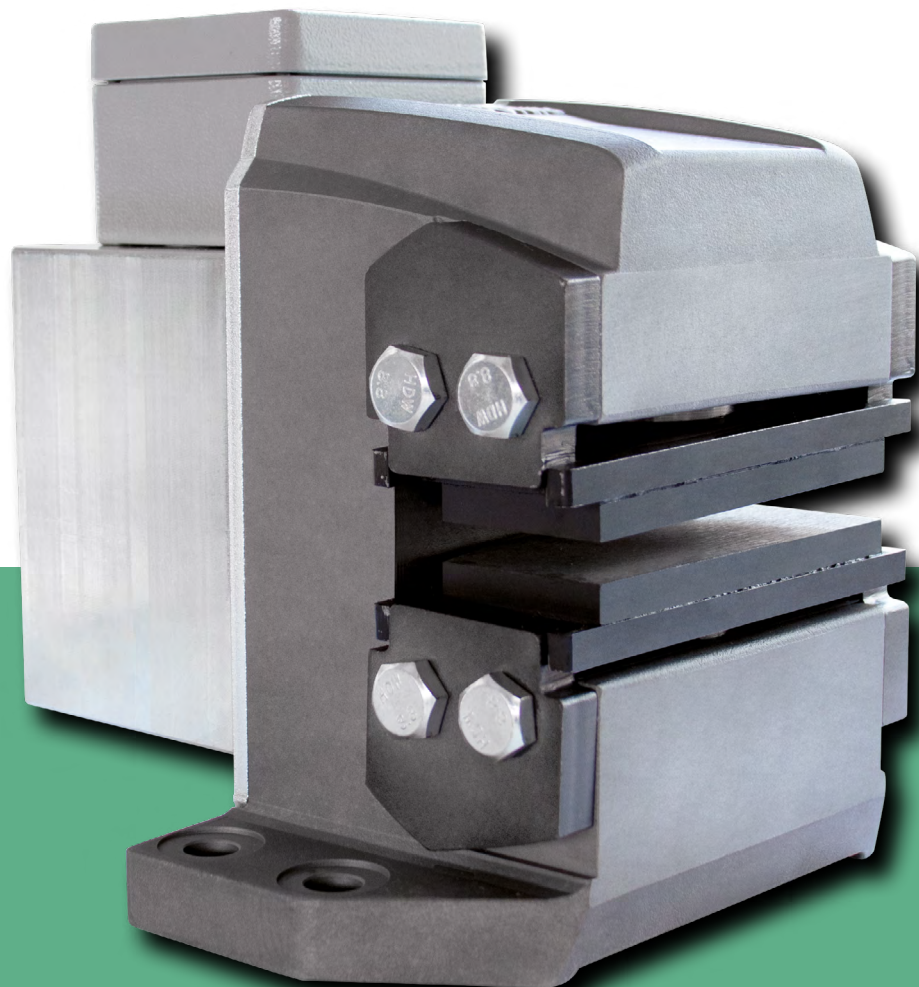
The electromagnetic disc brakes of the RINGSPANN series EV/ EH are regarded worldwide as a proven standard solution for the implementation of restraining and emergency stop systems in mechanical and plant engineering. Now, however, the company is presenting a new generation of electric brakes that set standards in terms of switching performance, energy efficiency and design. They bear the series designation MV, have an innovative locking mechanism and apply clamping forces of up to 25,000 N to the disc.

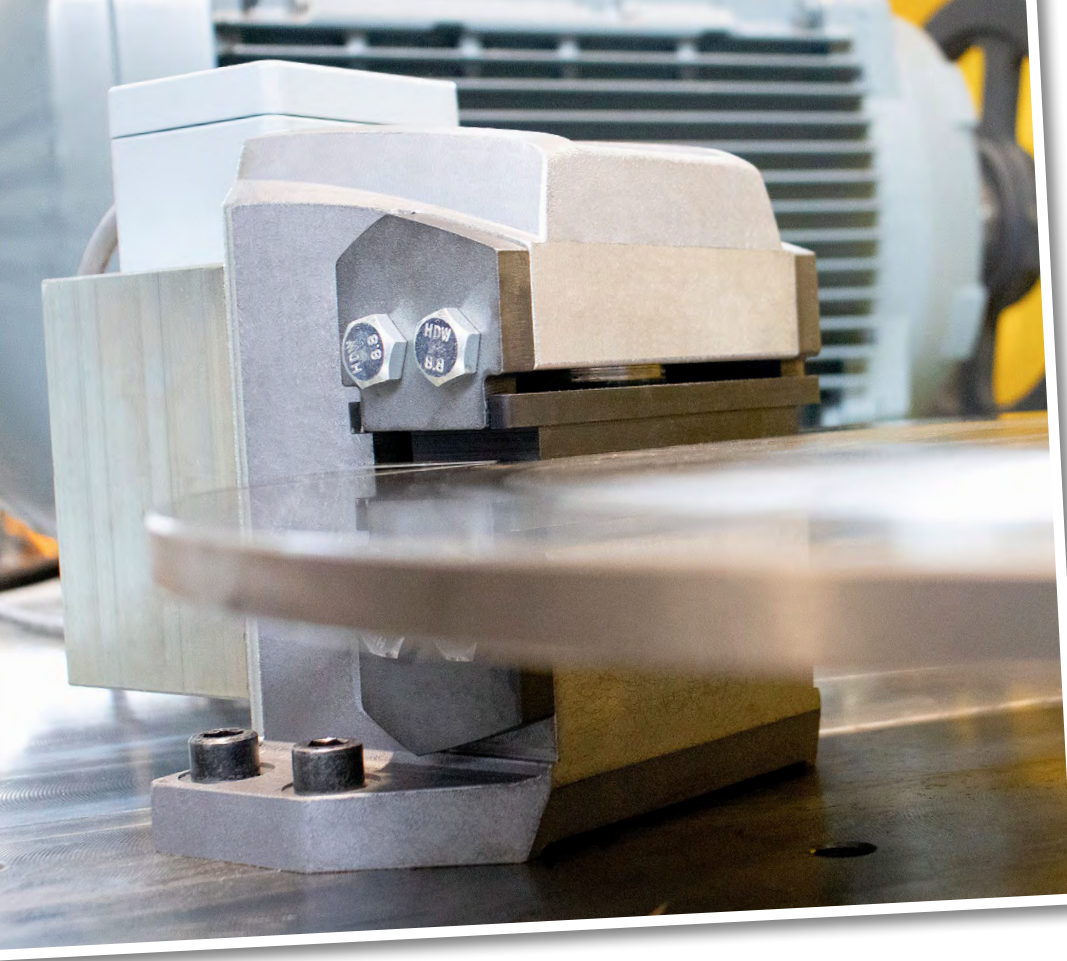
Their closed shape follows the rules of modern industrial design, their high switching rates open up extended performance and flexibility potentials for the user and their energy requirements are only minimal. In addition, they have intelligent electronics and work with a highly efficient closing mechanism. This refers to the new spring-operated and electromagnetically released disc brakes of the MV se-

ries from RINGSPANN. Designed for clamping forces of up to 25,000 N and available as standard for brake disc diameters from 300 to 710 mm, they cover a wide range of holding, emergency stop and deceleration applications in mechanical and plant engineering. Their specific fields of application include machine tool construction, turbine, fan and blower technology, winch and winding technology, the wind power industry and general drive technology. They are particularly attractive for those designers who want to spare users and operators the high installation and maintenance costs of hydraulic and pneumatic brake systems.



**Franz Eisele**  
Head of Division  
Brakes, Couplings  
and Clamping Fixtures  
at RINGSPANN GmbH





generation of brakes with a clear conscience”, says Franz Eisele, who heads the brakes and clutches division at RINGSPANN. In addition to the modern industrial design of the brakes, two technical aspects in particular are decisive for this view: their extraordinary switching performance and a new closing technology. With up to 550 shifts per hour in 230 VAC operation and up to 450 shifts per hour in 400 VAC operation as standard, MV brake callipers from RINGSPANN are probably among the fastest and most agile electric disc brakes on the world market. In combination with its closed, robust design, it predestines it for use in demanding environments with frequent braking. Ongoing test runs by RINGSPANN suggest that a B10d value of several million switching

### “Big leap in innovation”

From a purely chronological point of view, the electromagnetic disc brakes of the new MV series could also be seen as a further development of the widely established EV/EH e-brake series from RINGSPANN. “However, the leap in innovation in this case is so great that we can speak of a new

switching cycles will be achieved for the MV series. In addition, the new, now patented locking mechanism gives the brakes an above-average air gap with only minimal loss of spring force during bridging of the gap. “As a result, the new MV series covers an exceptionally wide range of applications in the field of electromagnetic brakes,” explains Franz Eisele. Also worth mentioning is the integrated floating mounting of the brakes, which compensates for small axial asymmetries of the brake disc.

### Economical and intelligent

RINGSPANN offers the new MV disc brakes for operating voltages from 220 to 240 VAC and 380 to 480 VAC. In terms of energy efficiency, they build on the excellent values of the EV/EH series. An inductive encoder for sensory monitoring of the brake function (open/closed) and the degree of wear of the brake pad can also be attached as an option. Friction block replacement is done in a few simple steps and without dismantling the brake. Braking torque and clamping force can be easily and precisely adjusted to the application via an adjusting nut. Another option is a lever for manual, controlled opening of the brake. “With a view to modern Industry 4.0 applications, we have also ensured that the sensor monitoring functions can be integrated into higher-level safety and control systems,” emphasizes Franz Eisele. All these are important contributions to improving the efficiency, operational safety and availability of industrial drive systems.

### What does B10 and B10d value mean?

The B10 value is a statistical factor determined from lifetime tests with a corresponding number of specimens. It stands for the average number of switching cycles or cycles of a unit, after which a maximum of 10 percent failures can be expected. The value is valid under defined conditions; failure refers to exceeding specified limit values (switching time, leakage, ...). It should be noted that a component can fail even before the B10 value is reached. The stated probability of survival therefore does not constitute a manufacturer's warranty. According to ISO 13849-1, the B10d value indicates the number of switching cycles or cycles after which dangerous failures occur in 10 percent of the units considered (“d” stands for “dangerous”). The value is relevant for risk and hazard analyses as well as for the evaluation of machine or plant safety.

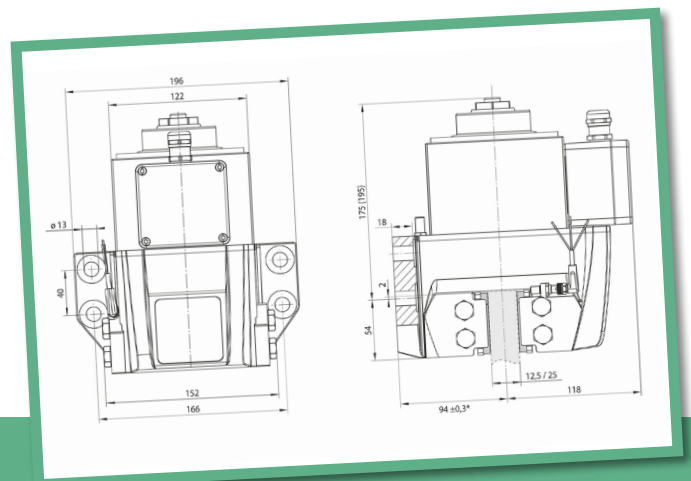




## Expanded scope for designers

In addition to its previous portfolio of electric disc brakes, RINGSPANN can now provide designers of drive systems with six further basic types of innovative e-brakes in the new MV series. They are now available in the three frame sizes 022, 033 and 044 with clamping forces from 4 to 25 kN and can be used very flexibly as stopping, emergency stop or service brakes. The frame size 022 is suitable for brake discs of thicknesses of 12.5 and 20 mm, size 033 for 12.5 and 25 mm thick discs and for size 044 the brake discs can be 25 and 30 mm thick. In combination with thicker brake discs, the MV brakes of sizes 033 and 044 can also be used for thermally sensitive braking processes. Design advantages also result from the compact design of the RINGSPANN brakes and their low dead weights. "Both prove to be an advantage for all cases in which the brake is an integrated part of a moving unit," explains Franz Eisele.

RINGSPANN offers the new MV brakes in versions with manual wear adjustment (type FEM) as well as in a variant with automatic wear adjustment (type FEA). While manual adjustment is primarily suitable for holding applications or applications with rather infrequent braking, automatic wear adjustment is primarily recommended for service brakes with demanding deceleration tasks. <<



## A great deal of safety for just a little energy

The electronics of the electric disc brakes from RINGSPANN work extremely reliably and ensure the functional operation of the brake. It is redundantly protected against voltage peaks and in the event of a mains fault, the functionality of the generously dimensioned switching transistors is guaranteed at all times. In addition, RINGSPANN was able to reduce the required tightening power of the latest brake generation by up to 20 percent. The magnetic circuit was optimized using modern FEM calculations. The result is very compact magnets and an optimal interaction of magnet and electronics.





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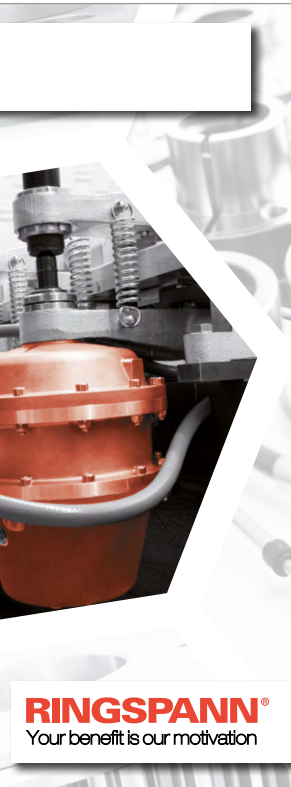
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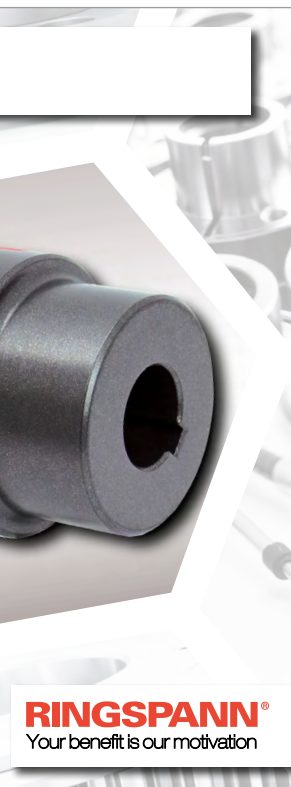
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