

RINGSPANN®

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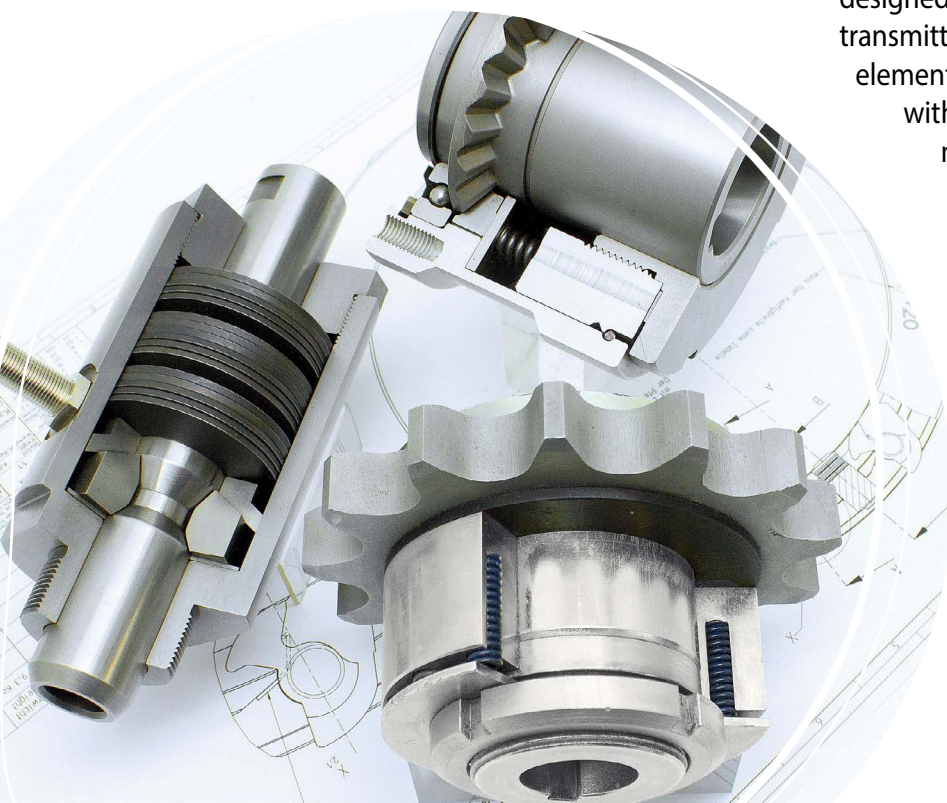
Safe connections for dynamic forces

As a premium manufacturer of components for industrial drive technology, RINGSPANN also has a wide range of innovative design elements to offer the international machine tool industry. For example, the company supplies well-known manufacturers in the industry with high-quality Shaft-Hub-Connections and Overload Clutches as well as clamping systems for the installation of high-torque torque motors and compact electric brakes. Find out which components from the company's portfolio are now becoming standard equipment for many machine tool manufacturers.

When it comes to looking for components for the drivesystems of your machines and machining centres, RINGSPANN's one-stop shop has established itself as one of the go-to supply sources for a number

of large machine tool manufacturers. „It is primarily manufacturers of machines and systems for metal cutting and metal removal who have us supply them with Shaft-Hub-Connections, Overload Clutches, torque motor clamping systems and brakes to optimise the performance and operational safety of their machine tool drives“, reports product manager Marvin Raquet.

In the area of Shaft-Hub-Connections, for which Marvin Raquet is responsible, it is above all the conical clamping elements in the RINGSPANN portfolio that are always the focus of machine tool manufacturers. These internal clamping connections, which operate according to the frictional locking principle for play-free fixing and centring of hubs on shafts are available to machine tool designers in many types and variants. The clamping elements of the RLK 200 and RLK 350 series, for example, have established themselves as a cost-effective standard solution for use in belt drives. They differ in significant aspects and already reveal the broad range covered by RINGSPANN's Shaft-Hub-Connections range alone. While the RLK 200 series is designed for shaft diameters from 20 to 400 mm and transmittable torques from 300 to 428,500 Nm, the elements of the RLK 350 series are suitable for shafts with particularly small diameters from 5.0 to 50 mm and torques from 7.2 to 2,200 Nm. Other Shaft-Hub-Connection series, on the other hand, are characterised by their extremely compact design without clamping screws (RLK 300), offer heightened corrosion protection (RLK 110 K), are suitable for very thin hubs (RLK 110) or transmit exceptionally high torques up into the seven-digit range (RLK 404).





Mounting direct drives safely

The RTM 60... and RTM 134... series form a special group within RINGSPANN's Shaft-Hub-Connections portfolio. They are clamping systems for the installation of torque motors in machine tools that are adapted to various installation scenarios. They are principally suited for frictionally locking and centring the built-in and complete torque motors of well-known manufacturers on shafts or hollow shafts, whereby their design is oriented both to the special requirements of these direct drives and to the machine shafts used for them, which are often designed as thin-walled hollow shafts. „The stand-out features of our clamping systems for these permanent magnet-energised synchronous servo drives include above all the safe, play-free transmission of the torques and a very high centring and concentricity accuracy“, emphasises RINGSPANN manager Marvin Raquet.

Setting limits up to 140,000 Nm

In addition to Shaft-Hub-Connections and torque motor clamping systems, machine tool manufacturers will find another drive-related product group in the RINGSPANN portfolio that is virtually indispensable for the reliable operation of the main and auxiliary drives of highly dynamic machine tools and machining centres: ready-to-install Overload Clutches in numerous sizes and variants. Especially with the positive ratcheting, synchronous, separating and locking torque limiters in the SIKUMAT® family as well as the frictionally engaged RIMOSTAT® torque limiters, the company offers an extremely attractive selection of powerful over-

load protection devices for machine tool drives and spindles. Across all series, they are suitable for use at speeds ranging from 1,000 - 13,000 min⁻¹ and cover limit torques from 0.5 to 60,000 Nm. „Our bi-directional force limiters, which can absorb disengaging forces of 3,600 to 140,000 Nm, are also specially designed for the overload protection of push and pull rods,“ adds Marvin Raquet.

Fast procurement thanks to the one-stop shop

Since the entire RINGSPANN one-stop shop is geared towards the concept of cross-selling, designers and buyers in the machine tool industry can procure many drive technology components from a single source. „Wherever shafts and axles of highly dynamic machine tool drives need to be securely mounted, braked in a controlled manner, reliably protected against overload, while at the same time reducing costs for assembly, our one-stop shop can serve as a central procurement and information platform for customers,“ says RINGSPANN manager Marvin Raquet. <<



More and more standard solutions available online

RINGSPANN is single-mindedly driving forward with its product offensive in the field of shaft couplings. It is a key pillar of the company's international one-stop-shop strategy and also fuels the expansion of the range of standard couplings available at short notice that can be ordered via the online shop. Designers and procurers can now find a considerable range of rigid, torsionally rigid and elastic shaft couplings for the realisation of high-performance drive trains.

On the way to becoming a globally present one-stop supplier for high-quality drive technology components, digitalisation and internationalisation are among the most important catalysts for RINGSPANN. Against this backdrop, the German company attaches great importance to the systematic expansion of its Internet platform. Whenever new products are added to its range, they are also included in the growing scope of products in RINGSPANN's online shop. The portfolio of rigid, torsionally rigid and elastic shaft couplings is currently developing particularly dynamically. It has been expanded in recent weeks and months by numerous additional series, which can now also be selected and ordered directly through the online shop. The online innovations are primarily additional jaw couplings, gear couplings, pin and bush couplings and flange couplings - all of which are shaft couplings that cover a very wide variety of drive applications in plant and machine construction as standard solutions.

Rigid or torsionally rigid coupling

The Tru-Line flange-couplings of the RFK ... TBO series, which have just been added to the RINGSPANN online shop, belong to the group of rigid shaft couplings and are suitable for producing backlash-free conical clamping connections. They exhibit a compact design and impress with a small axial space requirement, which is why they are recommended, for example, for use in drive units or belt drives with limited space. The three new gear couplings of the RDZ ... DTO, RDZ ... DFO and RDZ ... EEO series available in the online shop are also extremely compact. They are torsionally rigid shaft couplings. Depending on the design, they can transmit torques of up to 391,500 Nm without significant rotational angle offset and compensate for axial, radial and angular shaft misalignment. The RINGSPANN series RDZ ... DTO and RDZ ... DFO are primarily designed for applications in heavy industry and mining technology, as well as in pumps, conveyor belts and fans. The RDZ ... EEO shaft couplings, on the other hand, designed as a steel-polyamide combination, are characterised by low weight and are suitable for fluid technology applications (hydraulics, pumps) at temperatures from -25° C to 100° C.

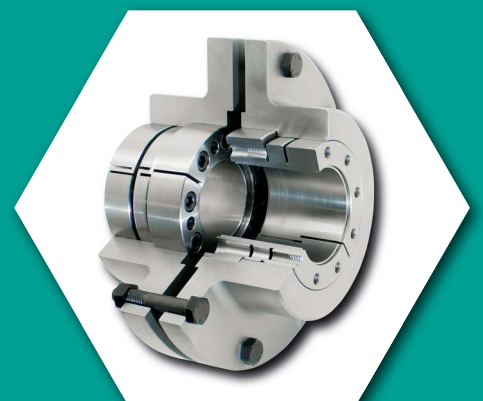
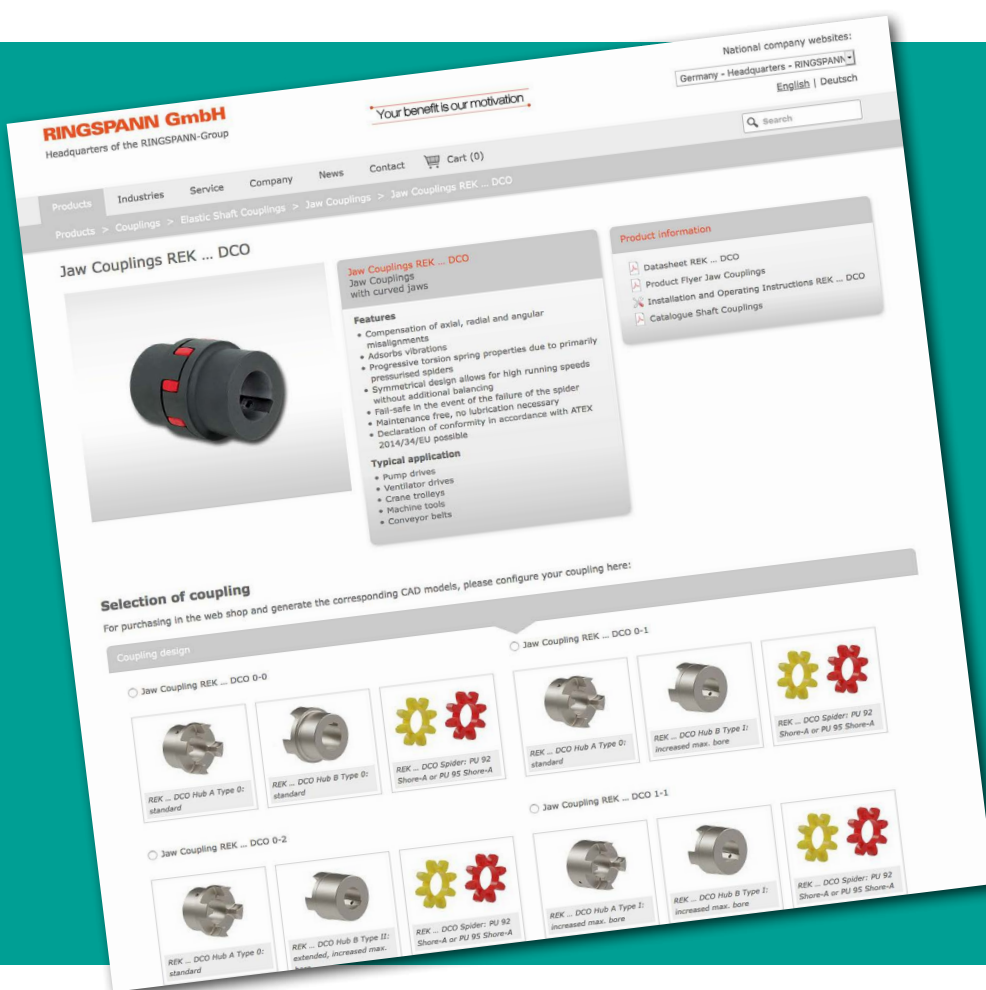
Elastic and maintenance free

The biggest expansion of the RINGSPANN online shop could be found in the category of elastic shaft couplings for vibration-damping torque transmission. Here, the selection available online grew to include the four jaw coupling series REK ... DCO, REK ... DGO,

REK ... DHO and REK ... DGZ, as well as the pin and bush coupling series REB ... DCO. The jaw couplings do not require lubrication and can be supplied with a declaration of conformity with ATEX 2014/34/EU if required. Depending on the type, they have curved jaws (DCO), encapsulated elastomer elements (DGO), encapsulated elastomer elements and two-piece hubs (DHO) or encapsulated elastomer elements and spacers (DGZ). Typical applications for these shaft couplings are the drive systems of pumps, fans, crane trolleys, machine tools and conveyor belts. In terms of transmissible nominal torques, they cover a range from 34 to 169,000 Nm, depending on the version. The REB ... DCO pin and bush couplings in the RINGSPANN range, which can now also be ordered via the online shop, are designed for shaft applications with much higher torques of up to 1,299,500 Nm.

All relevant types

With its current total range of 22 shaft coupling series, representing almost all currently relevant types in mechanical and plant engineering, RINGSPANN offers designers, product developers and engineers great freedom to realise rigid, torsionally rigid or elastic connections between shafts, gearboxes, motors and machines. The company's online shop now covers the bulk of this portfolio thanks to recent expansions. Catalogues, data sheets, operating instructions and 3D CAD data are also available here for free download. <<



Innovative clamping systems for gear

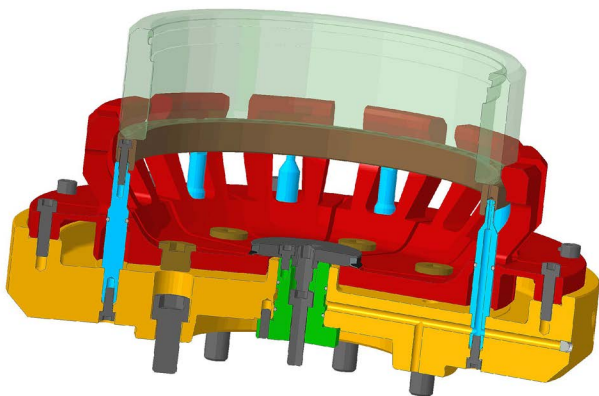
Precision clamping fixtures for the complete machining of thin-walled lightweight components and high-precision internal clamping systems for use in gearing technology – just one reason as to how RINGSPANN has recently consolidated its position as an OEM supplier for machine tool manufacturers. Now the Germany company is surprising the industry with another innovation: high-performance diaphragm and taper sleeve clamping systems that are specially tailored to the requirements of the currently very popular power skiving process for the production of high-precision external and internal gears.

As an alternative to gear hobbing, gear shaping and broaching, skiving is enjoying renewed interest in the domain of gearing technology. Increasing quality and productivity demands in gear manufacturing in particular are reviving the interest of machine tool manufacturers and e-drive producers in the manufacturing principle developed more than 100 years ago. Why? The process not only meets high standards of precision and accuracy but is also proving to be an

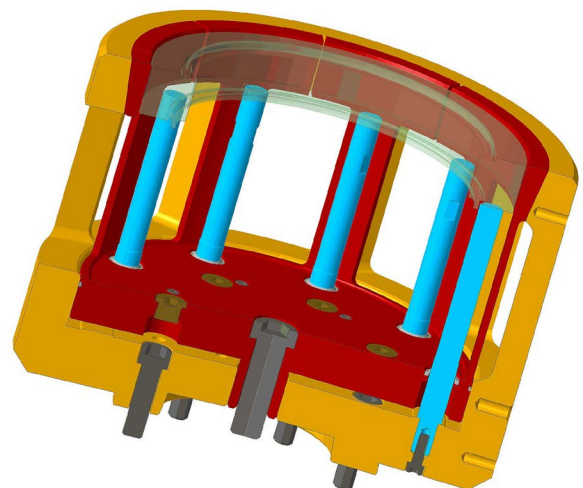
extremely economical method for the cutting soft and hard machining of internal and external gears in the face of growing demands for batch size flexibility in series production. In addition, innovative leaps in control technology, high-performance machining and machine statics are fuelling the entry of skiving into the production processes of gear manufacturers and gear suppliers. While other gearing processes have to be used on special machines, power skiving can be used within the scope of complete machining in modern 5-axis centres. Accuracy losses due to multiple clamping can be reduced, as well as machining and set-up times.

Deformation-free clamping

However, the many advantages of skiving can only be fully realised in the practice of gearing technology if suitable clamping systems are used on the machines. This is because power skiving is characterised by a precisely positioned skew between the driven workpiece and tool axes (axis intersection angle) and the synchronisation of both speeds. The adjustment of the tool with a defined axial feed and the speed coupling of the workpiece and tool result in a relative movement with which the free space between the teeth is



Diaphragm clamping system



Taper sleeve clamping system

ing technology

peeled into the material. In order for this to take place disturbance-free and with very short machining times (up to 50 per cent faster than with gear hobbing), the clamping systems used here must be balanced for high speeds and guarantee problem-free chip removal.

The diaphragm and taper sleeve clamping systems from RINGSPANN, which have been further developed for skiving, are precisely tailored to these requirements. They are particularly predestined for the internal gear cutting of thin-walled workpieces that must not deform under any circumstances during machining – for example weight-optimised toothed rings for planetary gears. In this application, for example, they replace conventional jaw chucks.

Open for safe chip removal

„Both versions of RINGSPANN’s skiving clamping systems are based on fundamental functional principles that have proven themselves in gearing technology over a number of years“, says Volker Schlautmann, head of the company’s Clamping Fixtures / Shaft-Hub-Connections customer team. Typical of their design is a relatively open construction, which enables rapid chip removal. Characteristic of the diaphragm clamping systems are a short overall length and a very uniform application of the clamping forces on the workpiece. They also offer the possibility of clamping on the shortest clamping surfaces. The key features of the taper sleeve clamping systems, on the other hand, are the large clamping depth and an impressive degree of rigidity. In both cases, the frictional connection is made via workpiece-encompassing clamping elements, which can be quickly

and easily exchanged during changeover. RINGSPANN supplies both versions ready for use, balanced and, if required, with air system control.

Added benefit in the process

The e-mobility boom in particular is causing a significant rise in demand for planetary gears. This is currently leading to growing interest in internal gears that can be manufactured very efficiently via skiving. The use of RINGSPANN’s diaphragm and taper sleeve clamping systems can help both gear suppliers and gear manufacturers to fully exploit the productivity and flexibility benefits of this process. Machine tool manufacturers, on the other hand, who offer skiving as part of complete multi-axis machining, can offer their customers RINGSPANN clamping systems as an added benefit within the scope of process integration. <<



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.

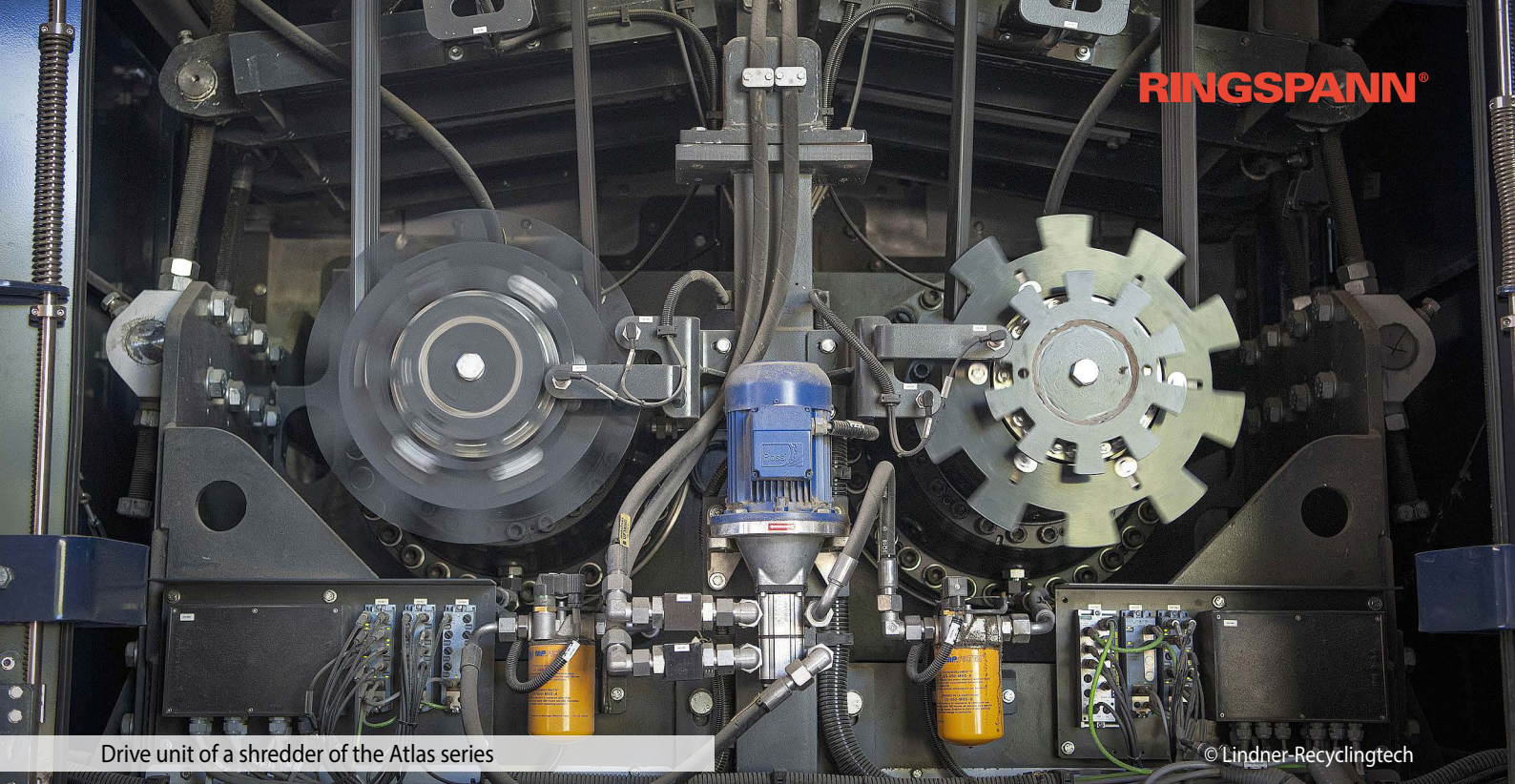
Waste shredders from Lindner Recyclingtech are proving their worth in the shredding lines of waste disposal and processing companies all over the world. Since the company was founded in 1948, it has been part of its quality promise to use only high-quality and durable units and components for the manufacture 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 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.



Drive unit of a shredder of the Atlas series

© Lindner-Recyclingtech

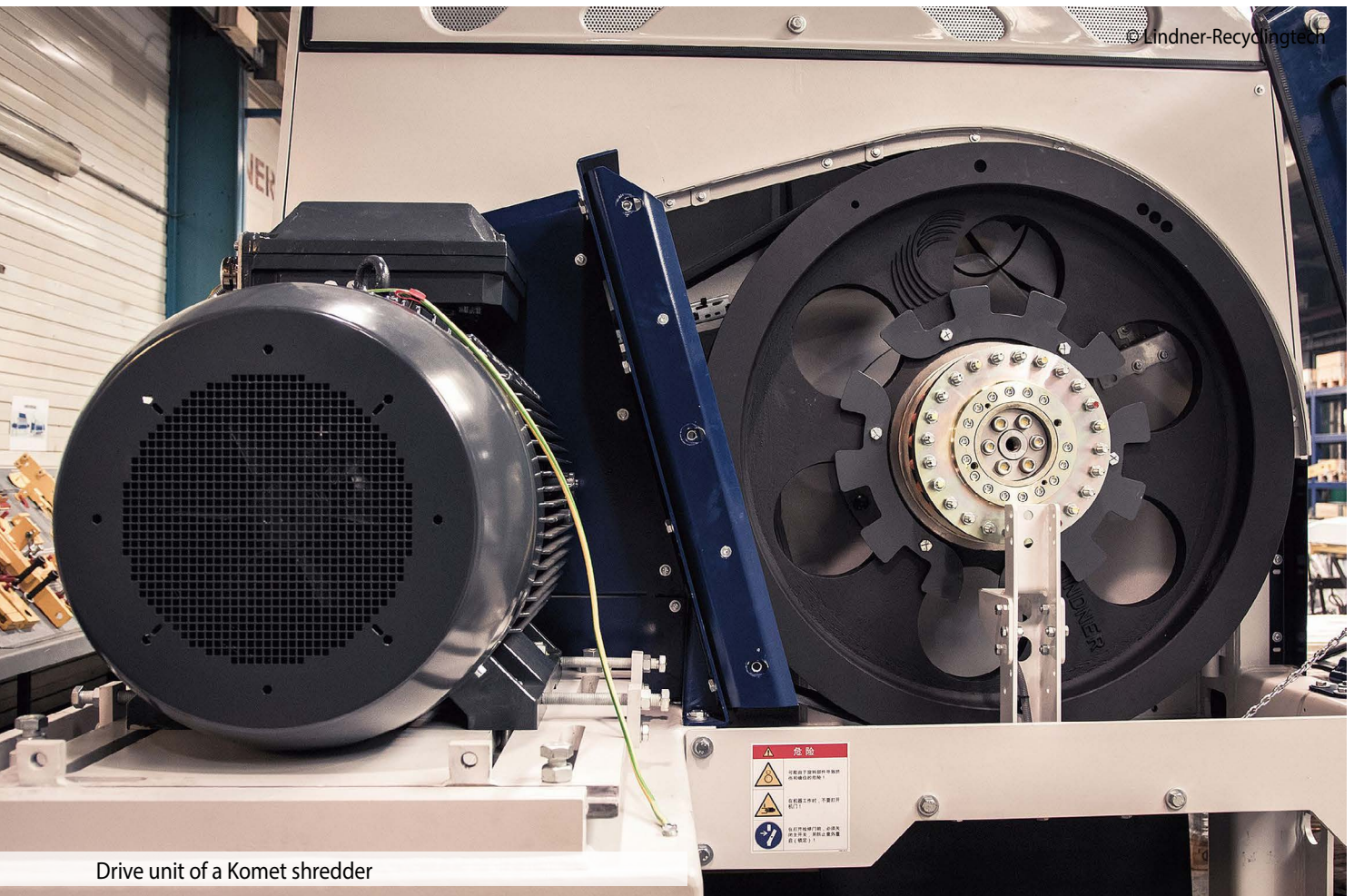
The design of the RSHDs, following the RIMOSTAT® principle of the Bad Homburg manufacturer, offers the decisive advantage that not the disc springs but the ISO helical springs generate the contact pressure on the friction linings. And with a linear, flat characteristic curve, which is why even wear to 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⁻¹. 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⁻¹.

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

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 streng-

thening 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.

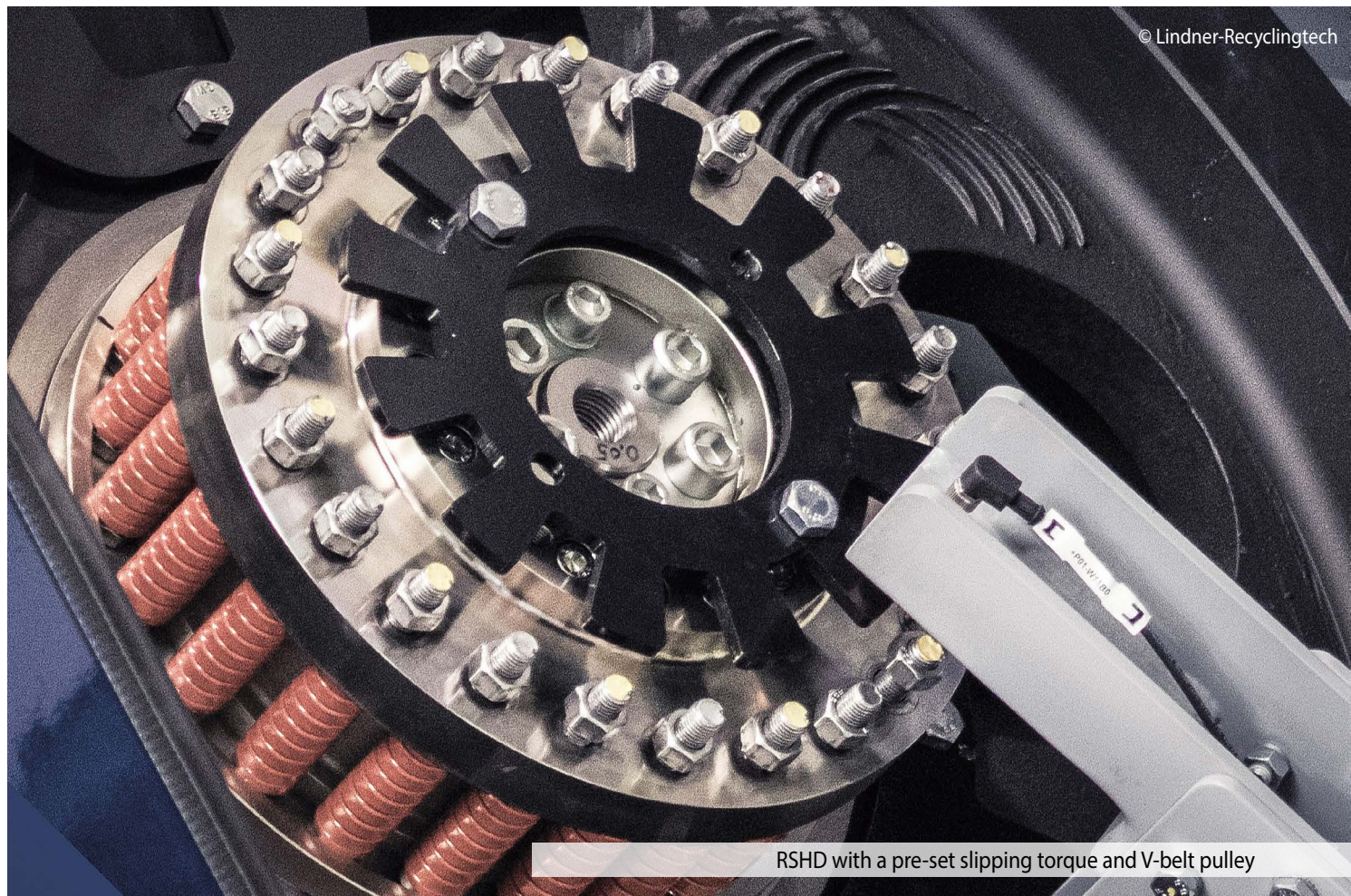
Collaboration potential

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 bet-

ween 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. <<



Markus Berger
Managing Director of
RINGSPANN Austria



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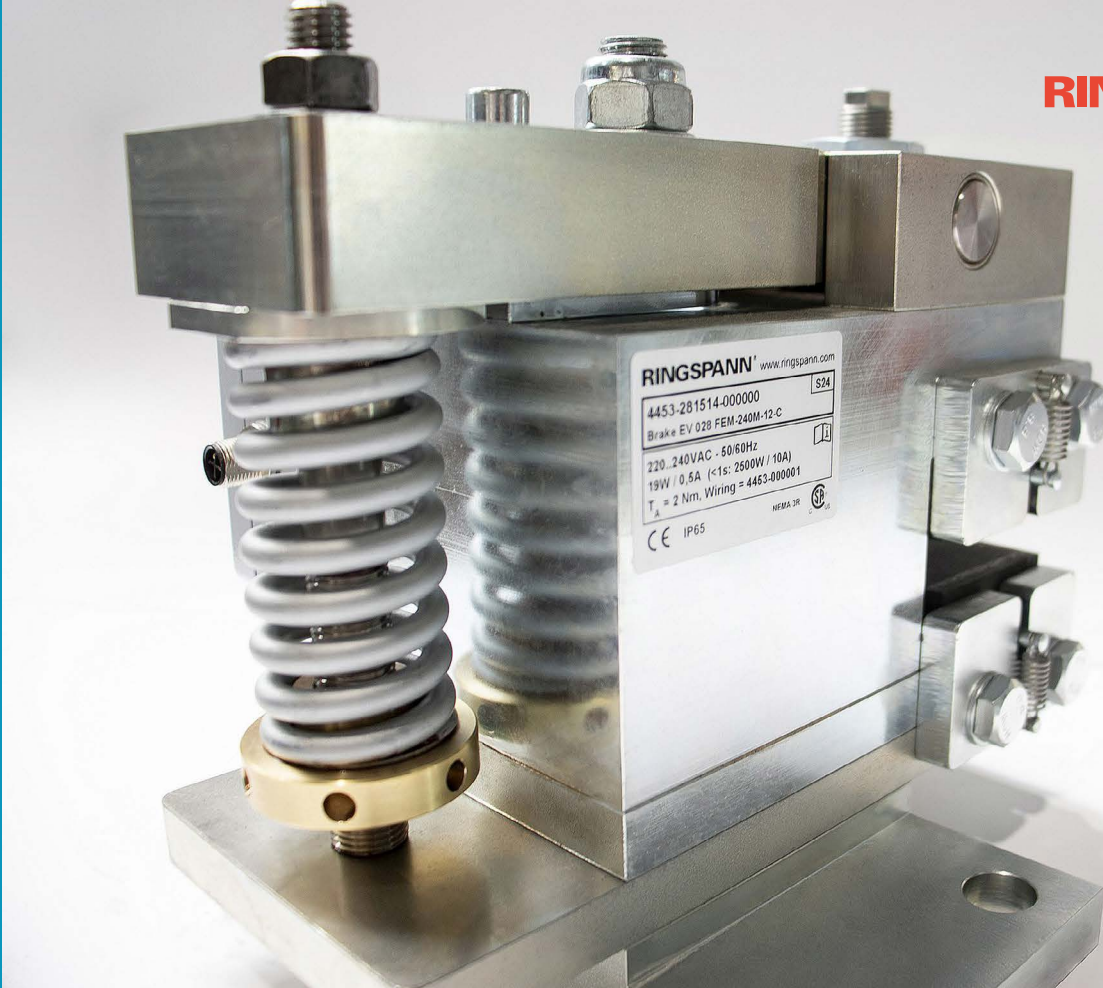
RSHD with a pre-set slipping torque and V-belt pulley

June

New perspectives thanks to an optimised e-brake series

The one-stop supplier RINGSPANN has added several functions and features to the range of its EV/EH series electromagnetic disc brakes. These compact solutions for safely stopping, controlling and holding rotating axes and shafts are thus advancing into many areas of application that were previously thought to be the domains of pneumatic and hydraulic brake calipers. In particular, the innovations of the EV/EH brake series offer designers of drive systems for machine tools, assembly plants, amusement rides and even offshore facilities further options to increase performance and optimise use.





Many machine and plant manufacturers now rely on the use of electromagnetic disc brakes when implementing their drive systems. These electronically driven e-brakes convince both through functionality and energy efficiency, as well as with their compact size and low weight. It also provides a sensible alternative particularly for the producers who do not want to use hydraulic or pneumatic brake systems - not least due to the high installation and maintenance costs. In its dual role as a manufacturer and supplier of high-quality components for industrial drive technology, RINGSPANN was early to respond to this trend and added several electromagnetic disc brake series to its portfolio. The EV/EH series in particular has undergone dynamic transformation. It now consists of four basic sizes (018, 024, 028, 038) for parallel (V) or right-angled (H) mounting on standard brake discs with diameters ranging from 125 mm to 900 mm. All versions have manual wear adjustment and are available in two variants: FEM (spring activated and electromagnetically released) and EFM (electromagnetically activated and spring released). In recent weeks, the company's engineers have now optimised and enhanced these

e-brakes to such an extent that it is opening up a multitude of new perspectives for their use. „In implementing these detailed innovations, we have consistently been guided by the requirements of the market and the wishes of our customers. A number of users who have not yet considered using e-brakes now also stand to benefit,“ emphasises Franz Eisele, who heads the brakes and couplings division at RINGSPANN.

Flexibility in terms of operating voltage

The innovations and optimisations in RINGSPANN's EV/EH series apply to both the internal electronics and electrical engineering of the electromagnetic brakes, as well as to the aspects of performance, service life and operation. The fact alone that the e-brakes can now be used for mains voltages up to 480 VAC offers wide-ranging advantages for their flexible use around the globe. At the same time, the performance of all 230 VAC versions has been increased so significantly that they now reach performance ranges that were primarily reserved for the previous 415 VAC brakes. Franz Eisele illustrates what this means in practical

June

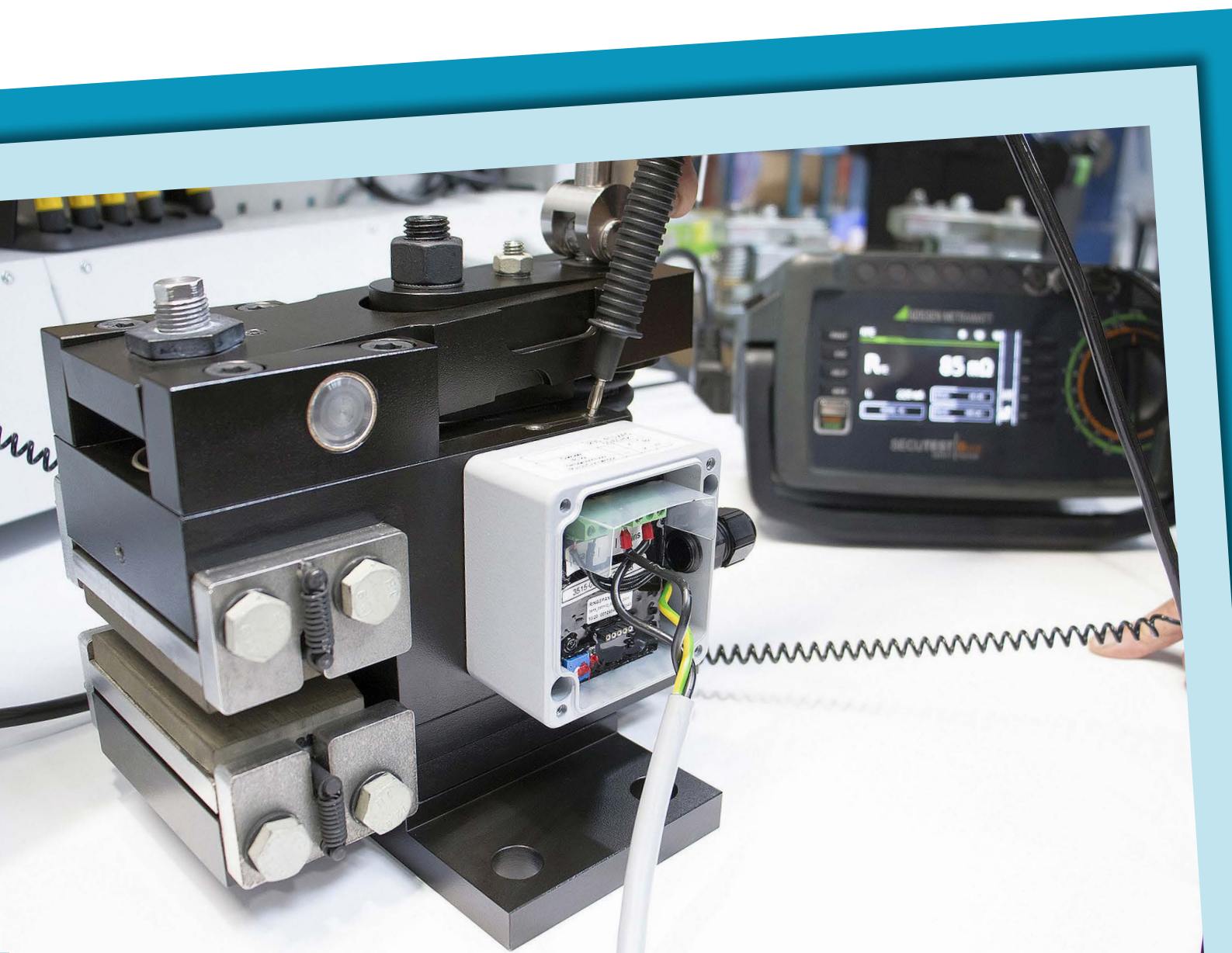
terms with an example: „The clamping forces of the 230 VAC brakes of the third size EH 028/EV 028 have thus been increased from 7,000 N to 10,000 N.“ With regard to the supply voltage, the series have also been closed so that all EH/EV brakes from RINGSPANN are now suitable for operation on 220-240 VAC and 380-480 VAC.

The voltage and performance expansion of the EV/EH series is highly relevant, especially in conjunction with the CSA/UL certification of RINGSPANN's electromagnetic disc brakes. Export-oriented manufacturers of drives, machines and systems who operate on the world market and also serve customers in the USA and Canada particularly stand to benefit from this. Both

the uncomplicated connection and operation of the brakes, and the simple, fast market access through the UL (*Underwriters Laboratories*) and CSA (*Canadian Standards Association*) test seals are proving themselves to be persuasive advantages in international competition.

Intelligent and corrosion-protected

RINGSPANN is also offering users additional perspectives for the practical use of the disc brakes with the other options newly added to the EV/EH series range. While it was already possible to optimise the control and regulation of the brakes with three inductive sensors for the statuses of brake released, brake activated





and wear state, they can now also be (retroactively) equipped with a mechanical emergency release and extended corrosion protection. „The variants with increased corrosion protection in particular are suitable for use in food technology and chemical technology, as well as for applications in offshore and marine technology,“ notes brake specialist Franz Eisele.

The typical areas of application for the RINGSPANN's EV/EH electric brakes include the turbine, fan and ventilator industries and winch technology. The series currently covers clamping forces from 3,200 N to 24,000 N and braking torques from 100 Nm to 3,400 Nm across all 16 types and variants, whereby these figures apply to use on standard brake discs. „The clamping force is the force generated directly by the brake on the brake disc; the braking torque, on the other hand, is the moment that acts on the disc or shaft at the end,“ explains Franz Eisele.



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

By the way: During the entire stopping phase, the disc brakes of the EV/EH series from RINGSPANN require very little power; just 10 watts for the small sizes. This is an excellent figure - even in international comparison - which enables the realisation of energy-efficient drive solutions.



„New opportunities through technological change“

A few days ago, RINGSPANN broke ground on another production hall with an office wing at its headquarters in Bad Homburg. Once again, the corporate group is strengthening its position as an international one-stop supplier for clutches, couplings and brakes as systematic components of power transmission. For Managing Director Fabian Maurer, however, this new building is just one of a number of measures designed to help achieve ambitious growth targets, especially for the freewheels, brakes, shaft-hub-connections and shaft couplings product divisions. In this interview, the company boss discusses which core competencies and business areas the company will be focusing on in order to be even more agile in key industries and future markets.



Fabian Maurer
Managing Director of
RINGSPANN GmbH

Mr. Maurer, are you satisfied with the current development of the company?

Fabian Maurer: Generally speaking, yes. After a brief, Corona-related slump, RINGSPANN is back on a growth path that gives us confidence. We are continuing on our path to becoming an international full-range supplier of high-quality clutches, couplings and brakes and are aiming to significantly increase our turnover. To this end, we have recently implemented many important measures, from which point we are now tackling the next strategic goals.

Which areas are you placing the key emphasis on here?

Fabian Maurer: In addition to continuous process optimisation and employee qualification, we are intensely devoted to further developing our product and service range, improving our customer focus and sales activities, as well as the further digitalisation of the company. All activities in these areas are closely linked and serve the overriding goal of the ongoing internationalisation of the RINGSPANN Group.

Taking the product portfolio as a starting point, can you outline how you go about this?

Fabian Maurer: Within our product portfolio we have now defined freewheels, brakes, shaft-hub-connections and shaft couplings as special areas of focus. For various reasons, these are the areas in which we see considerable growth potential. The global markets for these products are large and RINGSPANN, as a global quality supplier with increasingly international value creation and its own development and engineering know-how, is perfectly poised to excel. We are therefore an attractive partner both for the realisation of complex large-scale projects and to supply customers in new or emerging markets with a highly innovative dynamic - such as e-mobility or hybrid drive techno-



logy. Parallel to the expansion of the product range and the development of new components, the realisation of cost-effective large-scale solutions is also on our agenda here. The construction of another production hall with an office wing at our headquarters in Bad Homburg, which is now underway, and the swift expansion of our plant in Bosnia-Herzegovina should also be seen in this context, as should our bundle of sales measures for improved lead generation and market development.

Let's stay with the new construction in Bad Homburg and the expansion of production in the Balkans ...

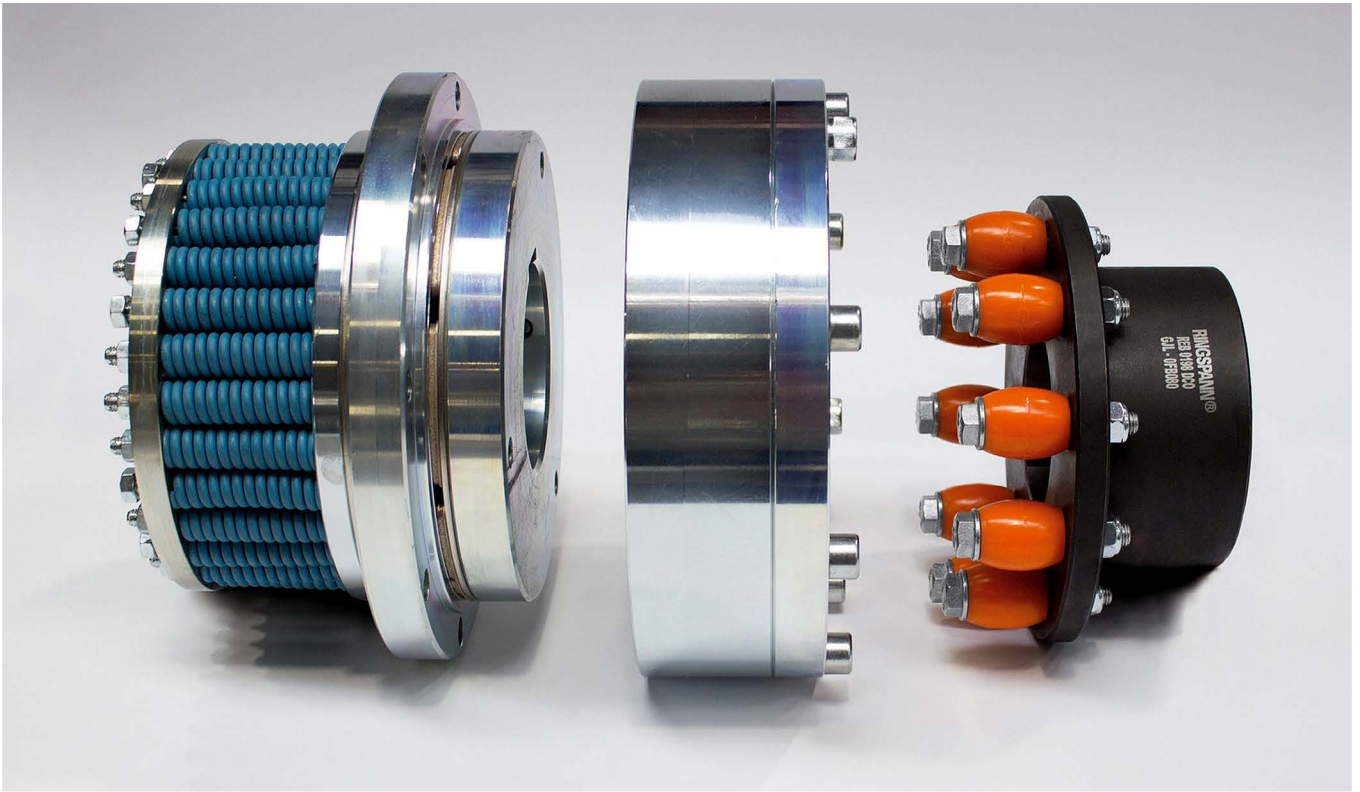
Fabian Maurer: ... with the new production hall in Bad Homburg we are expanding and modernising the production capacities in our areas of focus: brakes, clutches, couplings and shaft-hub-connections. This goes hand in hand with investments in new machines - for precision stamping, for example - and comprehensive process optimisation. The expansion of assembling and production capacities in Bosnia-Herzegovina, on the other hand, is an expression of the advancing internationalisation of our value creation. Turned and milled parts are increasingly being produced here and components for mass-produced freewheels assembled. The RINGSPANN Group now consists of 19 companies worldwide, five of which - in addition to the three plants in Germany - have their own production facilities.

On the topic of „mass production“: Up to now, RINGSPANN has deliberately kept its distance in this regard. Will that change?

Fabian Maurer: Possibly. Whether it's delivery reliability, delivery times, response times, product quality or service - we have gained enormously in efficiency and flexibility through the process optimisation and reorganisation of the recent past. In addition, for two years now we have been producing cage freewheels in the millions on a production line set up specifically for this purpose. We now also consider it conceivable to enter market segments that are new to us, such as large-scale automotive production. Especially since the current technological change is presenting new opportunities for suppliers.

But wouldn't you then come into contact with new, powerful competitors?

Fabian Maurer: We are used to competition and fast and flexible suppliers like RINGSPANN always have an advantage in markets in a state of flux. Especially if they bring their own development and engineering know-how from almost all key technological sectors. We will not rush into anything, but we are currently examining various options in diverse market segments. In this context, we have now also established a new role of business development. And crucially, we are currently in the process of making RINGSPANN's sales machinery even more intelligent and powerful.



You already mentioned measures to improve lead generation and market cultivation ...

Fabian Maurer: ... right, the focus for us here is directing our resources with even more precision than before at customer structures with high growth potential and considerably intensifying our new customer business. To this end, we are professionalising lead generation on several levels, optimising customer care and service and strengthening our real and media market presence. The high level of digitalisation of our business processes that we have achieved provides us with numerous opportunities to do so.

How do you see RINGSPANN positioned in terms of digitalisation?

Fabian Maurer: Very well! We have already achieved a lot in this area and are currently implementing further measures. All companies within the Group now use the wide-reaching process-analytical and communicational possibilities of SAP as an ERP back office. A new CRM system is now being added as a standardised front office, which will substantially improve the quality and efficiency of customer contact and custo-

mer care. 3D CAD has long been standard in design and our EDI - electronic data interchange with customers - is on the rise. All employees in production have e-mail accounts at the machines, electronic notice boards provide the latest information about current events on our intranet and projects for the further digitalisation of work activities and processes are being implemented in almost all operational areas. In the context of „intelligent market processing“, we will also use all relevant online channels even more intensively - this refers, for example, to our website with the online shop, the publication of practical product videos or to the area of social media. Apart from that, the digitalisation of RINGSPANN's products continues to make great strides. Our sensor-supported monitoring systems for backstops, the modern electronics of our e-brakes or the online calculation tools are pioneering.

Speaking of products: What innovations are RINGSPANN's engineers currently working on?

Fabian Maurer: In order to further develop our one-stop range for power transmission components, we have recently expanded the range of our shaft couplings in our online shop and added new functions and

features to our electromagnetic disc brakes. In free-wheels, the focus is currently on a new series for housing freewheels with hydrodynamic roller lift-off and the possibility of mechanically decoupling input and output, on optimising the operating condition monitoring for low speed backstops, and on designing new, particularly cost-effective freewheels for mobile drives. Our interdisciplinary development work in the field of smart solutions is likely to be of interest to many industries - primarily installation-ready combined solutions consisting of clutches, couplings and brakes. And the fact that we are now increasingly supplying complete system units consisting of friction torque limiters and belt pulleys is particularly popular with manufacturers of shredding and heavy-duty equipment.

And what is there to report from the precision clamping fixtures and push-pull cable sectors?

Fabian Maurer: Our precision clamping fixtures department has recently made a name for itself by presenting innovative clamping systems that are specially tailored to the requirements of the currently very popular hobbing process for the production of high-precision external and internal gears. An optimised taper collet flange mandrel solution for vertical balancing technology is also about to be launched. And the remote control specialists at RINGSPANN RCS are currently implementing numerous findings gained from their work with the new digital duplex test rig for push-pull cable systems. Something to look out for. <<



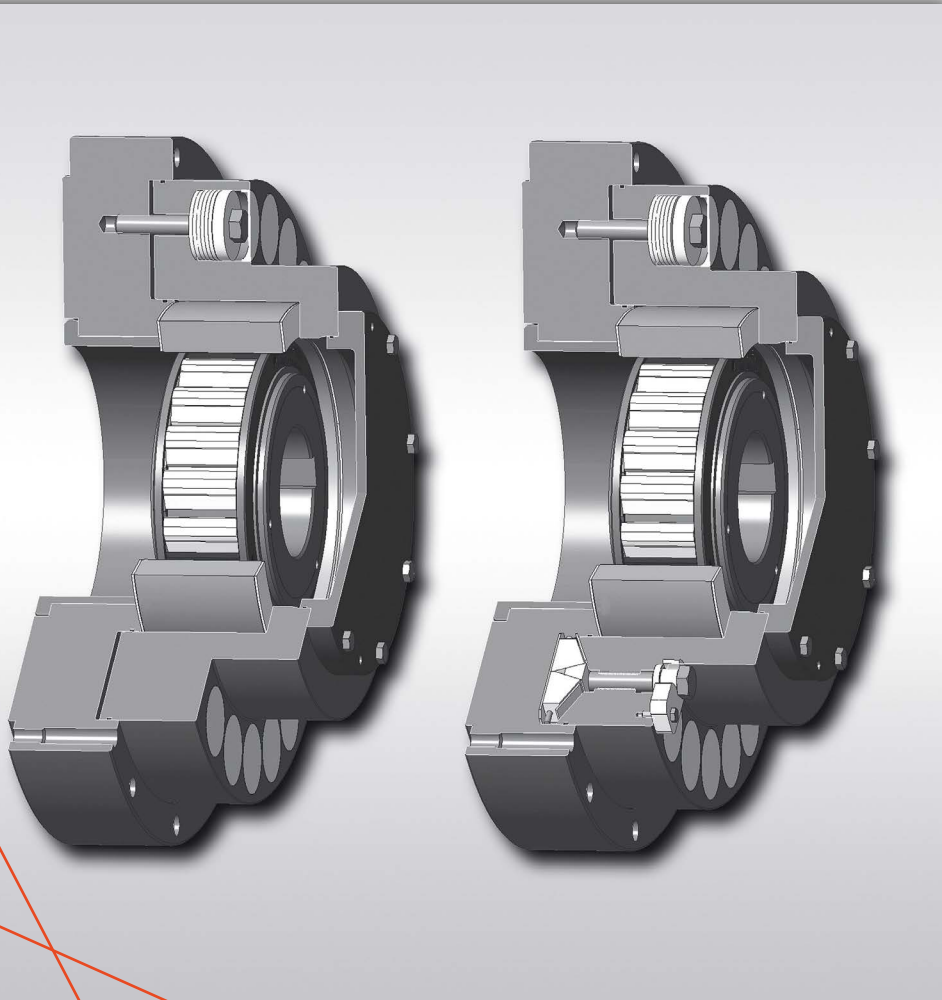
August

Designing multiple drives to be more s

The main field of application for the integrated freewheels of the FXR family from RINGSPANN are the multiple drives of conveying, separating and crushing systems in bulk materials and mining technology. In order to give designers in these industries even more scope for the realisation of safe and maintenance-friendly drive solutions in the future, the German freewheel specialist has now expanded this globally proven series with an innovative variant called FXRB. In addition to a torque limiter and a controllable release device, it excels with a new reverse running function. This considerably reduces the costs required for maintenance and clearance work.

RINGSPANN's FXR freewheels are primarily used as backstops in the types of multiple drives that are typical for continuous conveyors, crushing mills, bucket elevators or dryer drums and screw pumps in bulk material, hydro, recycling and mining technology. In addition to the sprag lift-off X, the special quality features of these freewheels include torque limitation and - depending on the design - an integrated release device that can be controlled with great precision. Thomas Heubach, in charge of the freewheel division at RINGSPANN, explains: „Our FXR backstops with a release device are among other things found in belt conveyors where a precisely controllable release of tension on the belt or the entire system and a limited reverse rotation of the belt drive must be possible at any time - for example, when guide rollers jam.“ However, it sometimes turns out in practice that a partial reverse movement of a conveyor system is not enough to completely eliminate faults and quickly resume operation in some situations.

To overcome this limitation, Thomas Heubach's team has developed a new FXR variant that not only allows controlled release under full load, but also unlimited idling in reverse operation. With this new backstop - available immediately under the designation FXRB - RINGSPANN opens up additional scope for design engineers to realise maintenance-optimised drive systems where the costs for maintenance, repair and clearance work can be significantly reduced. Manufacturers of conveying and shredding systems thus gain an important advantage in international competition.



service-friendly

Staggered distribution of harmful forces

Including the new variant, RINGSPANN now offers a total of five designs of integrated freewheels for slip torques up to 107,000 Nm in the FXR series, which can be used as backstops in multiple drives. As indicated, they all have a torque limiter. This allows the problem of an uneven distribution of the return torque in multiple drives - for example of continuous conveyors - to be solved very elegantly. Thomas Heubach explains: „Without torque limitation, the designer would for safety reasons have to design each backstop on each gearbox for the entire return torque of the conveyor system, as this would primarily act on only one backstop in the event of a system stop due to the different clearances and elasticities in the drives involved. The FXRs don't even let this happen, because their torque limiters slip briefly when the set torque is exceeded until the other backstops successively engage.“ This means the entire return torque of the system is distributed among the individual backstops of the gearboxes. In addition, the dynamic torque peaks are reduced during the locking process, so that all drive elements are protected against their damaging effect. As a result, when using RINGSPANN's FXR backstops, the gearboxes of multiple drive systems can be dimensioned smaller and more compact, which opens up further optimisation potential for the system manufacturer.

Innovative reverse running function

The individual versions of the FXR series from RINGSPANN are each offered as standard in ten sizes with bores from 65 to 240 mm and are designed for front screw mounting on drive shafts. In addition to the common features of sprag lift-off X and torque limitation, they are available in variants with (FXRU) and without (FXRW) a release device, as well as in the new FXRB variant with a free reverse running function. In the latest generation, all FXRs have high-performance carbon friction pads. Compared to the organic friction linings used in the past, they enable significant torque increases and allow the outer diameters of the free-

wheels to be made smaller, which is why the FXRs are so compact. „For older applications, however, we still offer the old versions with the organic friction linings,“ says Thomas Heubach.

If you ask the head of RINGSPANN's freewheel division about the design refinements of the innovative reverse function of the new FXRB freewheels, he is understandably reserved. He does at least reveal that plain bearings – seen with other designs on the market - do not play a role here: „Plain bearings only enable short-term reverse movements of the system. We use a different bearing basis for the free reverse function of our FXBR,“ says Thomas Heubach. It is also worth mentioning that the release device is purely mechanical as standard; however, a hydraulic release is offered as an option.

Global market leadership

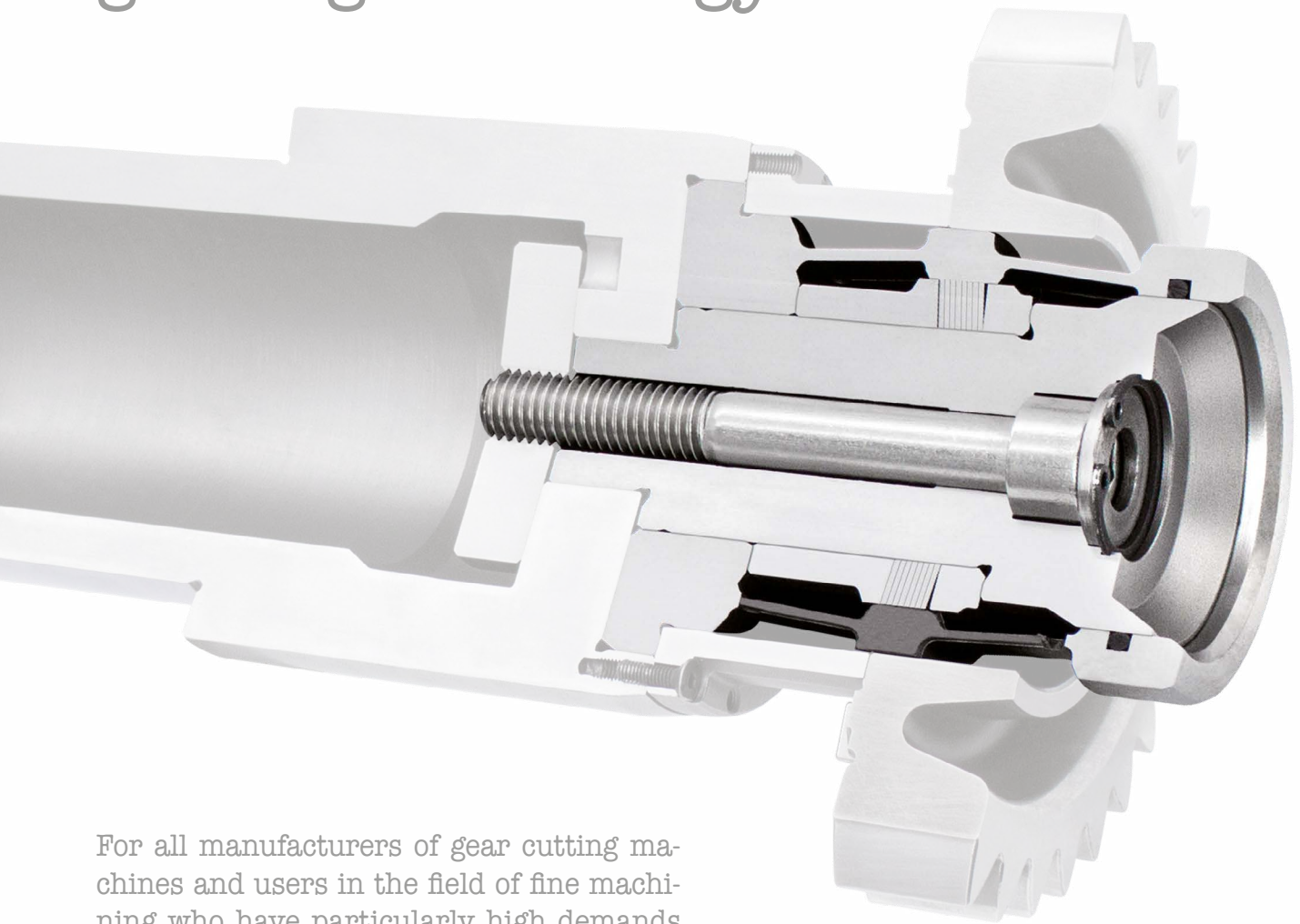
In addition to the catalogue selection of FXR freewheels available at short notice, RINGSPANN also produces special designs on customer request - for example for unusual bore dimensions or special flanges. Depending on the requirements and quantities, the RINGSPANN Group can harness the capacities of eight production plants worldwide. „We view both the extensive international distribution of our FXR series and the new FXRB variant as proof of our market leadership in the global freewheel market and our positioning as a one-stop supplier for high-quality couplings and brakes in industrial drive technology,“ emphasises Thomas Heubach. <<



Thomas Heubach
Head of Division Freewheels
at RINGSPANN GmbH

September

A hidden champion of gearing technology



For all manufacturers of gear cutting machines and users in the field of fine machining who have particularly high demands on the precision and flexibility of their clamping fixtures, RINGSPANN has a real hidden champion in its range: the mechanical expanding sleeve mandrel HDDS. As an alternative to hydraulic expanding fixtures, it convinces with a comparably high concentricity of $\leq 5 \mu\text{m}$ with a surprisingly great expansion. While the first manufacturers are testing the patented HDDS as a potential standard component in their gear cutting machines, RINGSPANN is also positioning it as a component for simplified entry into automated production.

The mechanical production of high-quality spur and bevel gears for use in gear manufacturing in particular has been characterised for years by increasing demands on their geometric accuracy. For a long time, customers in this sector of fine machining were satisfied with gear qualities of 8 or 9 according to DIN 3961, but today suppliers are usually required to achieve qualities of level 7 or 6. And if you want to survive as a supplier in motor racing, gear qualities of at least 5 or 4 are the gold standard. Yet every experienced gear

manufacturer knows that such high accuracies cannot be achieved without specially designed clamping fixtures. Volker Schlautmann, head of RINGSPANN's clamping fixtures/shaft-hub-connections customer team, puts it in a nutshell: „Ideally, such a clamping system not only supports gear technicians in meeting the constantly increasing quality requirements, but also provides them with more application and economic flexibility.“ It was this threefold objective that guided Volker Schlautmann's team in the development of the HDDS expanding sleeve mandrel.

Clamping without risk of leakage

As a mechanical internal clamping system, the HDDS is a real highlight of modern clamping technology. It convinces with a concentricity of $\leq 5 \mu\text{m}$, offers an absolute expansion four times greater than that of most hydraulic clamping fixtures, and is therefore currently regarded as one of the best mechanical alternatives to the hydraulic expanding mandrels often found in gearing technology. „Our HDDS accommodates workpieces with bores up to tolerance class IT10, while most hydraulic clamping fixtures are only suitable for accommodating workpiece bores up to tolerance class IT7,“ specifies Volker Schlautmann. Since the expanding sleeve mandrel from RINGSPANN, unlike hydraulic expanding clamping fixtures, is also free of any leakage risks, its use increases process reliability in series production, where even the smallest leakage on hydraulic clamping fixtures triggers the need for repair. The only source of wear on RINGSPANN's HDDS is its clamping discs. „But they are quality products with long service lives from our own production, which are also easy to replace,“ stresses Volker Schlautmann.

Higher accuracies than expected

The HDDS from RINGSPANN was able to demonstrate its performance capability and power reserves during high-precision cylindrical gear grinding in the production of a Swiss gear manufacturer. Here, its axial and radial run-out accuracy were measured both with a control workpiece on a tactile measuring device and with an original blank in a coordinate measuring system. The results were even better than expected: The measuring equipment recorded accuracies of $\leq 2 \mu\text{m}$ for the axial runout and $\leq 3 \mu\text{m}$ for the radial runout.

„In addition, the geometric accuracy achieved for the involute toothing on the series workpiece was well within the defined tolerance limits and thus well above the customer's requirements,“ notes Volker Schlautmann.

High flexibility due to large expansion

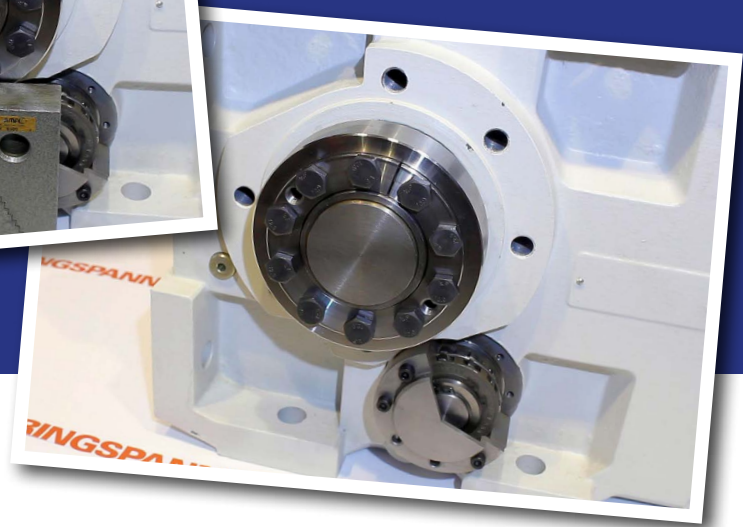
Other practical cases have since shown that the expanding sleeve mandrel from RINGSPANN not only enables the achievement of high gearing qualities, but that it also supports the realisation of fully automated manufacturing concepts. The reason for this is easy to understand: Since hydraulic expanding mandrels have only a low expansion rate due to their physics, high-precision handling systems are usually needed to feed them, which also drives up the costs for the required measurement and control technology for the periphery. As already mentioned, the HDDS from RINGSPANN, on the other hand, has an expansion that is four times greater than that of many hydraulic clamping fixtures. „Due to the high expansion rate, the technical expenditure for the entire periphery is considerably reduced, which makes the entry into fully automated machining much easier,“ emphasises Volker Schlautmann.

RINGSPANN's mechanical expanding sleeve mandrel is capable - depending on the version - of clamping bores with diameters from 25 mm and is also suitable for bores whose internal geometry is interrupted by a groove. In addition, it can also be used to machine components with very short clamping lengths, because its mechanics provide a pull-back action in which the workpiece is pressed against a contact and aligned at the same time. Also worth mentioning: In applications in high-precision machining, it has been shown that further advantages can be achieved by using a spindle sleeve because this increases the reproducibility of the clamping result to $\leq 2 \mu\text{m}$ - while simultaneously increasing the rigidity of the entire system. „This also means that the clamping system is insensitive to very large radial forces applied by the tools,“ explains Volker Schlautmann.

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November

Safe clamping and easy assembly



RINGSPANN's steel shrink discs are regarded as the premium solution for frictional and backlash-free fastening of hollow shafts and hubs on shafts. In particular, the two-part versions of the RLK 608, RLK 608 E and RLK 606 series are very popular in many areas of industrial drive technology. A key reason for this is the safe and simple assembly of these external clamping elements, which does not even require the use of a torque wrench. This benefits mechanical and plant manufacturers and maintenance technicians alike.

If you want to identify one trend in the field of shaft-hub-connections, this is it: The use of frictional shrink discs is gaining traction in mechanical and plant engineering. The main reason for this is probably that - in contrast to positive shaft-hub-connections with a key-

way - considerably higher torques can be transmitted and many designs can therefore be made smaller. This correlates with the desire of many users for increasingly compact drives. A more detailed analysis also reveals that at present it is primarily shrink discs in a two-part design that have caught the eye of designers of industrial drive systems. Marvin Raquet, Product Manager for shaft-hub-connections at the premium supplier RINGSPANN, knows the reason: „If the two-part shrink discs are high-quality solutions like those of our RLK 608, RLK 608 E and RLK 606 series, users benefit from a very high degree of connection reliability, usability and ease of assembly. That is because, in addition to their excellent workmanship, these shrink discs at RINGSPANN always offer the advantage of distance-controlled assembly.“ What Marvin Raquet is hinting at is proving to be a tangible efficiency factor in practice - both for plant manufacturers in their role as OEM, and for fitters and maintenance technicians.

Distance instead of power to save time

With the principle of distance-controlled assembly, RINGSPANN's RLK 608, RLK 608 E and RLK 606 series two-part shrink discs enable the user to considerably simplify and speed up handling when mounting or installing. Since they do not have to keep an eye on the torque, there is no need to use a heavy torque tool. All they need is a simple ring spanner to tighten the clamping screws evenly arranged in rows until the face of the (outer) stepped conical ring of the shrink disc is flush with the face of its (inner) stepped conical bush. Once this state is reached, the worker can be sure that the frictional connection between the hollow shaft and the shaft is established and that the values for the torques and axial forces listed for this purpose in the RINGSPANN technical product tables are guaranteed to be transmitted. Product Manager Marvin Raquet stresses in this context: „The prerequisite for distance-controlled assembly is the exceptionally high precision that we employ to manufacture the individual steel components of our two-part shrink discs. Low-cost products cannot keep up and still have to be assembled with pre-set torque tools.“

No clamping without lubrication

Another positive effect of the path control arises from its quasi internal quality assurance. On the one hand, the transmissible torques have always already been reliably set and on the other hand, the user can only complete the assembly of the shrink disc in accordance with the regulations if its taper surfaces or screws are sufficiently lubricated - for example during maintenance. Without lubrication, for example, the clamping element cannot be reassembled without problems, which is immediately noticeable. For the initial commissioning, the user always receives the shrink discs lubricated ready for use. Also worth mentioning: In contrast to three-part shrink discs, the two-part versions from RINGSPANN offer the advantage of a closed design. In practice, they therefore prove to be very resistant to contamination.

Wide range of application

The RINGSPANN RLK 608 and RLK 608 E series are available for shaft diameters ranging from 30 to 620 mm and transmit torques of up to 4,225,000 Nm. The RLK 606 series shrink discs, on the other hand, are suitable for shaft diameters ranging from 24 to 155 mm and transmit torques of up to 36,200 Nm. These three series alone thus cover an extremely wide range of applications. These range from heavy-duty mechanical engineering in mining and wind power technology to classic gearbox construction, printing machine technology and robotics - to name just a few typical areas of application. In total, the current RINGSPANN range of frictional shaft-hub-connections encompasses more than 30 series. In addition to externally clamping shrink discs, they include internally clamping cone clamping elements, internally clamping star discs and star spring washers for play compensation on ball bearings as well as clamping systems for frictionally locking torque motors on machine shafts. „Our large selection of shaft-hub-connections is a prime illustration of RINGSPANN's emergence as an international one-stop supplier for industrial drive elements,“ says Product Manager Marvin Raquet. <<



December

Complete packages for industrial drivetrains

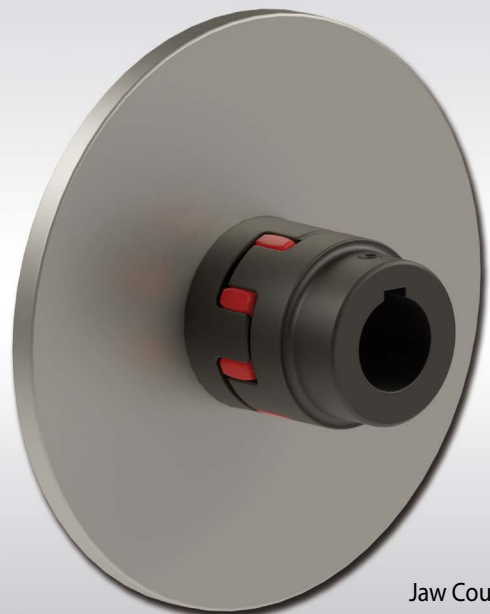
With numerous product innovations, RINGSPANN is fuelling the expansion of its international presence as a one-stop supplier for system components in industrial drive technology. The realisation of ready-to-install and multifunctional smart solutions is becoming increasingly important. A current example of this are complete solutions consisting of shaft couplings and brake discs, which the company can design specifically for customers and projects on the basis of its large product range. They are available for drive torques ranging from 180 Nm to 112,000 Nm and are deliverable at short notice.

How can the work of designers in industrial drive technology be simplified and the assembly costs of machine and plant manufacturers significantly reduced? By providing them with package solutions consisting of

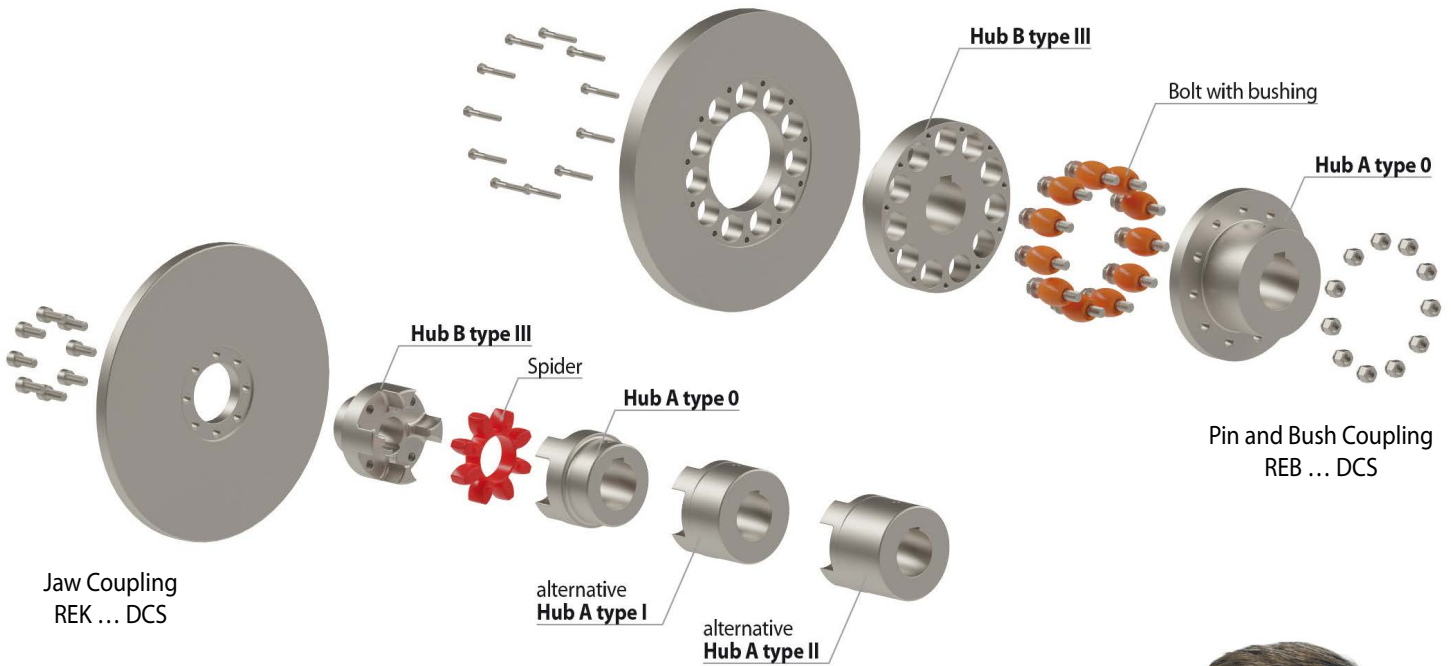
several system components that they can integrate directly into their drivetrains completely and with reduced assembly costs. RINGSPANN is increasing its commitment to pooling the expertise of its product divisions and developing more and more smart solutions that combine various drive technology functions. After the company recently made a name for itself with the combination of shaft couplings and overload clutches as well as slip hubs and belt pulleys, it is now presenting complete packages consisting of shaft couplings and brake discs. „In terms of design, this new smart solution is a really clever solution because it no longer requires an additional shaft extension for the brake disc,“ explains RINGSPANN product manager Martin Schneewis. This new combined solution is available at short notice for drive torques ranging from 180 Nm to 112,000 Nm, while there is a great deal of scope for customer and project-specific designs and configurations thanks to the broad selection of shaft couplings and brake systems in the RINGSPANN portfolio.



Pin and Bush Coupling
REB ... DCS



Jaw Coupling
REK ... DCS



A variety of combination solutions can be realised

On the coupling side, the company’s development engineers primarily use elastic pin and bush couplings from the REB ... DCS series and jaw couplings from the REK ... DCS series to realise the new smart solutions. Typical areas of application for this include materials handling technology, ventilator construction, general machine and engine construction and also the heavy-duty technology sector. In the case of brake discs, on the other hand, there is the option - depending on the specific application and the expected load - of choosing between variants made of steel or spheroidal cast iron.

While the coupling then compensates for the misalignment between the shafts of the drivetrain and dampens shocks and vibrations caused by operation, the brake disc forms the rotating element of the disc brake used for the specific case or unit. Depending on the customer’s wishes and requirements, RINGSPANN’s engineers can choose from a wide range of hydraulic and electromagnetic disc brakes. The primary question to be clarified is always the task the brake is primarily designed to fulfil: An (emergency) stop function, which brings a rotating shaft to a standstill within a matter of seconds; a control function, which enables the controlled adherence to or deceleration of defined forces; or a holding function, which prevents the unintentional start-up of rotating components. „By selecting the optimum brake type, the best material

Martin Schneweis
RINGSPANN
product manager
of Shaft Couplings



for the brake pads and the suitable brake disc, we can configure the ideal solution for our customer with the components of our standard range alone - also with a view to putting together the smart solution of a shaft coupling and a brake,” stresses RINGSPANN’s product manager Martin Schneweis.

Lots of potential for reducing costs

Due to the international expansion of the last few years and the resulting expansion of almost all product groups, RINGSPANN’s technicians now have a wide-ranging portfolio of drive technology components at their disposal to develop innovative smart solutions. Beyond the aforementioned combinations of shaft coupling/overload protection, torque limiter/pulley and shaft coupling/disc brake, this offers the company and its customers great potential to realise further package solutions, which promise to significantly reduce the time and costs involved in both engineering and assembly. <<

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61348 Bad Homburg
Deutschland
+49 6172 275-0
info@ringspann.de
www.ringspann.de

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