



## Higher torque thanks to wide-gauge design

The freewheel specialists at RINGSPANN have developed a new cage freewheel for use in e-bike drives. Especially when the radial installation space is tight, it offers bicycle designers another opportunity to implement compact solutions with higher torques in the gears and bottom brackets. Like all e-bike freewheels from the German manufacturer, this new one can also be designed and adapted to customer requirements in many ways. It will be presented to the trade audience at this year's Eurobike (21-25.6.2023) in Frankfurt.

It is the practical result of numerous discussions with customers and should raise a sigh of relief from many designers of e-bike drives: the new cage freewheel in the ER series, which RINGSPANN will be presenting at the upcoming Eurobike in Hall 80 (Stand F18). It bears the additional designation DR – for double-row – and scores with a number of features that allow the gears and bottom brackets of electric bicycles to be designed to be even more powerful, compact and safer at neuralgic points. Especially when the designer is faced with the task of having to save radial installation space without a loss of torque capacity, the new ER-DR proves to be a real solution to the problem. Thomas Heubach, who heads the freewheel division at RINGSPANN, explains the reason for this: "Thanks to its innovative cage design, our new e-bike freewheel is, so to speak, a wide-gauge double-row. This is because the special design of the polyamide cage makes it possible to cover the freewheel with two double rows of clamping pieces in order to reduce its overall diameter, while fully maintaining the torque capacity. This allows the designer to quickly gain several tenths of radial installation space without having to lose performance." In addition to the radial bearing integrated as standard in the ER series, the increase in relative width associated with the

reduction in diameter gives the freewheel a high level of tilt resistance. If, on the other hand, sufficient installation space is available, the new ER-DR from RINGSPANN can also be used to increase torque.

### Withstands torques of up to 300 Nm

As Thomas Heubach further emphasizes, the new cage freewheel can be adapted to very different customer wishes and design requirements as part of customizing. This applies not only to its dimensioning, but also to the selection of the clamping pieces and their positioning in the cage. "For ex-



## Freewheels for millions of e-bikes

In terms of the number of units delivered, RINGSPANN is currently one of the world's leading manufacturers of e-bike freewheels. On the basis of its comprehensive freewheel know-how, the company entered this market segment of drive technology at an early stage and set up large-scale oriented assembly lines for the automated production of compact cage freewheels at its headquarters in Bad Homburg. Today, numerous renowned manufacturers in the industry rely on freewheel solutions from RINGSPANN, which is reflected, among other things, in annual batch sizes of two million pieces and more. In terms of engineering and quality, freewheels from Bad Homburg are likely to be among the top products in this field of e-mobility. They not only enable the transmission of high torques or their limitation, but also the implementation of space-saving light-weight drive systems with reduced parts.



ample, we have realized prototypes for gearbox and bottom bracket applications for numerous customer-specific test runs, which make you forget the previously existing performance and bearing problems," reports the freewheel expert from RINGSPANN. It has also been shown that the new ER-DR can transmit maximum torques of up to 300 Nm.

### Four types and many variants

With the market launch of the new "wide gauge", RINGSPANN is expanding its range of compact freewheels for e-bike applications with another type in the ER series. These cage freewheels are basically premium solutions – for example, for engaging and disengaging the electric motor – which offer great scope for part- and space-reduced assembly designs. They share the advantage of making the usual bearing of the freewheels superfluous with the E-Drive freewheels of the HRL series. In the case of the ER, this is done via the already mentioned integrated radial bearing, which is carried out via moving pairs of rollers in the plastic cage. The HRL, on the other hand, has combined radial and axial bearings through the use of a bearing disc on the freewheel. As a result, the e-drive designer can dispense completely with space-occupying rolling bearing assemblies and make the drive more compact and lighter. "Even with helical gears on

the drive shaft of the motor, no further bearing is necessary," says Thomas Heubach. And of course, where fewer parts have to be installed, the assembly effort is also reduced.

Predestined for use on the bottom bracket shaft is the type F cage freewheel from RINGSPANN. It scores with an integrated torque limiter that protects against overload damage. "Bottom bracket shafts of e-bikes have to absorb high torques depending on the type of rider and riding situation. With the appropriate coordination of the components, the special clamping piece design of the F freewheel enables targeted slipping when the application-specific defined limit torque is exceeded. This protects the freewheel and all adjacent components of the drive," explains Thomas Heubach. The F e-bike freewheel is therefore also an ideal solution for bottom bracket applications where the maximum torque cannot be accurately predicted.

### Used millions of times

The undisputed best-seller among RINGSPANN's e-bike freewheels is still the type E, which will also be exhibited at the Eurobike in Frankfurt. Using 160 million sprags, it has already been installed 5.3 million times worldwide and has proven itself as a durable universal solution in many different e-bike drives. With up to 520 Nm, the torque capacity of this sprag freewheel is three times higher than that of drawn cup roller clutches. Its optimized design also allows high component tolerances in the design environment.

As standard, RINGSPANN offers the e-bike freewheels of all four series for shafts with diameters of approximately 25 to 60 mm. The clamping pieces are always made of hardened chrome steel, while the cages are made of polyamide. All freewheels are designed in such a way that application-specific modifications and special designs can be implemented quickly. <<



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