

E-Mobility/ E-Bike Technology / Power transmission / Energy technology / Mechatronics / Design engineering / Supplier

“We have no problems with million series”

RINGSPANN scores as a premium manufacturer of compact freewheels for e-bike drives

RINGSPANN is one of the world's leading manufacturers in the freewheel technology market. So that designers of e-bike drives can also pull out all the stops when implementing innovative gear and bottom bracket concepts, the company now offers several types of cage freewheels. They impress with performance-oriented additional functions and make it easier for the e-drive engineers to implement space-optimized drive solutions. The pioneering freewheel design from RINGSPANN can even reduce the effort involved in assembly.

Bad Homburg, January 2023. – If you only look at the quantities produced, RINGSPANN is currently one of the top international suppliers of cage freewheels for the e-bike industry. On the basis of the freewheel know-how acquired over many decades, the company not only entered this special area of drive technology at an early stage, but also set up large-scale production lines for the automated production of e-bike freewheels at its headquarters in Bad Homburg in good time. “We now supply several well-known manufacturers in the industry with different types of freewheels. We have no problem with the realization of annual batch sizes of two million pieces and more”, says Thomas Heubach, who heads the freewheel division at RINGSPANN and is 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.

All components optimally matched

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.

Torque limit included

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 appropriate 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.

Integrated bearing saves components

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.

Implement customer requests quickly

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. *ar*

971 words with 6,221 characters (with spaces)

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Note for editorial staff: Text and images available at www.pr-box.de!

Captions (6 pictures)

Figure 1: Offer designers of e-bike drives maximum scope for the realization of innovative bottom bracket and gear solutions: Highly functional cage freewheels from RINGSPANN. (Image: ©mezzotint_fotolia, Adobe Stock)

Figure 2: Depending on the design, the RINGSPANN e-bike freewheels are suitable for shafts with diameters of around 25 - 60 mm and are predestined for use on the bottom bracket shaft or in the gearbox of the drive unit. Image: RINGSPANN

Figure 3: Thomas Heubach: "The functional elements of our cage freewheels for e-bike drives meet the highest quality requirements and are optimally matched to each other." All images: RINGSPANN

Figure 4: The RINGSPANN cage freewheels of type E (right) score with their high torque capacity of up to 520 Nm; Type F (left), on the other hand, has an integrated torque limiter that protects against overload. Image: RINGSPANN

Figure 5: Engaging and disengaging the electric motor: The cage freewheel ER (right) has an integrated radial bearing; the type HRL (left) also has an integrated axial bearing. Space-consuming roller bearing assemblies can therefore be dispensed with. Image: RINGSPANN

Figure 6: At RINGSPANN, consulting expertise, process efficiency, the use of modern 3D printers and our own test benches (image) ensure that customer-specific modifications of the e-bike freewheels can also be implemented quickly. Image: RINGSPANN

Add-ons:

Video – Direct link to [RINGSPANN-Produktanimation](#).

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