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Mechanical coupling for high-speed drives

Modern test bench enables the development of innovative housing freewheel series

Type FHHS freewheels are among the latest new developments from RINGSPANN. They are suitable for applications with high speeds of up to 12,000 rpm and are designed for the implementation of overtaking functions in stationary multi-motor drives and turbines. In systems with redundant drive systems in which high-speed shafts operate, they can therefore be used as wear-free and automatically switching couplings. The technological basis for the implementation of this freewheel innovation was the commissioning of a test bench at RINGSPANN's main plant, which is the only one of its kind in the world.

Bad Homburg, July 2026. – "With the housing freewheels of our FHHS series, we offer manufacturers of drives for refinery, chemical process engineering and petrochemical plants in particular an innovative coupling solution for the realisation of flexibly switchable and energy-efficient multi-motor drives," as RINGSPANN customer advisor Manuel Assmann puts it in a nutshell. These ready-to-use freewheels are fully enclosed overtaking freewheels with their own input and output shafts that can be driven at speeds of up to 12,000 rpm. They work wear-free, do not require any additional switching equipment and, depending on the version, transmit nominal torques from 1,356 Nm to 24,405 Nm. FHHS freewheels are designed for stationary installations, and are able to manage the on-demand engagement and disengagement of different motors of the same powertrain in applications with high-speed shafts. Speeds in idle and drive mode may be at the same or similar level.

Hydrodynamics as a key factor

The linchpin for the performance of RINGSPANN's FHHS housing freewheels is the hydrodynamic clamping roller lift-off, in which the lifting force is generated by an oil jet guided in the bearing of the freewheel. This enables both the aforementioned high speeds and wear-free idle operation. As Manuel Assmann explains, the relative speed between the inner and outer ring of the freewheel is the decisive momentum for the effect of the hydrodynamic lifting of the clamping rollers: "If it drops, the lifting force is also reduced. Even before synchronous running begins, the clamping rollers – which are guided here in a cage – attach themselves to the raceway of the outer ring via the central spring and are ready for locking. This ensures immediate load transfer when the synchronous speed is reached."

RINGSPANN housing freewheels with hydrodynamic clamping roller lift-off always prove to be the optimal solution when the drive of an actuator of a system is either by two or more motors or

turbines with similar or even the same speed. Plant operators benefit in three ways: First, they can engage or disengage individual actuators of the drive train as required without complex control technology. Secondly, even if an energy source or drive unit fails, uninterrupted process control is ensured. And thirdly, especially in partial load operation, they can achieve significant energy savings.

The standard equipment of an FHHS housing freewheel includes sensor monitoring of the bearing temperatures. The sensor and telematics modules of RINGSPANN's condition monitoring system can be integrated as an option – this also includes data analysis, remote maintenance and connection to higher-level control systems. Operators and maintainers of complex drive systems can thus monitor all important performance and MRO parameters of the installed freewheels in real time.

Test bench with added value for the customer

With the aim of validating the performance of its FHHS cabinet freewheels, RINGSPANN developed a new test bench, which was put into operation at the company's main plant in Bad Homburg at the end of 2025. "This is probably the most modern test bench for housing freewheels in the world. For the first time, it enables us to generate speeds of up to 12,000 rpm and document the performance of our housing freewheels," reports Manuel Assmann. For manufacturers of drive systems, this offers the advantage that they can integrate measurement and test results from RINGSPANN into their own quality assurance.

The FHHS series underpins RINGSPANN's international market leadership in the field of freewheel technology. This is because the company offers a high-quality alternative for high-speed applications with customer-side oil supply through its standard FH Series housing freewheels and mechanically separable FHD housing freewheels, which are characterised by an OSHA-compliant lockout-tagout safety function. "In addition, our entire range of housing freewheels is experiencing a significant innovation boost with the possibilities of the in-house test bench, as the performance of the models of all series can be verified here under practical conditions," says Manuel Assmann.

By the way: RINGSPANN also provides its customers with a large selection of shaft connections in its one-stop shop, that can be used to connect housing freewheels structurally to input and output shafts. Designers of multi-motor drives therefore obtain shaft connections from the same source as the housing freewheels. *ms*

691 words with 5,669 characters (incl. spaces)

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

Captions (5 pictures)

Figure 1: Housing freewheels in the RINGSPANN FHHS series are designed for high speeds of up to 12,000 rpm. They are suitable for the realisation of automatically operating and wear-free couplings in multi-stage drive systems with high-speed shafts.

Figure 2: In the drive systems of pump systems, the FHHS casing freewheel from RINGSPANN enables starter motors to be engaged and disengaged as required. Also shown in the picture are RINGSPANN shaft connections.

Figure 3: Manuel Assmann: "With the FHHS housing freewheels, we offer manufacturers of drives for refinery, chemical process engineering and petrochemical plants in particular an innovative coupling solution for the realisation of flexibly switchable and energy-efficient multi-motor drives."

Figure 4_de: The key design factor of the FHHS housing freewheels from RINGSPANN is the hydrodynamic clamping roller lift-off, in which the lifting force is generated by an oil jet guided in the bearing of the freewheel.

Figure 5: The new high-speed test bench, with which RINGSPANN can provide evidence that the new FHHS housing freewheels are suitable as overtaking freewheels for high speeds.

All images: RINGSPANN

Add-ons:

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

Infobox I

For example: an FHHS casing freewheel in a pump system

A pump system is often started by means of a motor. After the start-up, however, an HPRT – a hydraulic power recovery turbine – for example, takes over operations. Engagement and disengagement are done via a RINGSPANN FHHS freewheel. The starting motor can then be switched off, so that the hydraulic energy present in the system can be used efficiently, reducing energy consumption and operating costs. This interplay has proven its worth, especially in industrial applications with continuous pump operation, because it optimises the operation of the entire system.

84 words with 652 characters (incl. spaces)

Infobox II

Hydrodynamics instead of complex switchgear

RINGSPANN housing freewheels with hydrodynamic clamping roller lift-off are primarily used as automatic overtaking clutches in multi-motor drives. They are the mechanical alternative to complex switchgear. In the case of hydrodynamic clamping roller lift-off, the lifting force of the clamping rollers is generated by an oil film that is applied to the raceway of the outer ring with centrifugal force during idle operation. In this way, practically wear-free idle operation is possible.

58 words with 541 characters (incl. spaces)

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