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Well thought-out down to the last detail

RINGSPANN has completely revised the electro-hydraulic disc brakes of its DX series

The industrial brakes in the DX series are among the flagships in RINGSPANN's brake range. They were developed for use in the hoisting and travel drives of conveyor belts, cranes and bucket wheel systems and are designed for a high number of switching cycles on high-speed brake discs. After extensive re-engineering, the German company is now presenting the electro-hydraulic disc brakes as a trendsetter in the field of electro-hydraulic holding and emergency stop systems: implemented as a slim steel construction with a new angle lever and energy-efficient thrusters, they offer considerable added value to OEM designers as well as to operators and maintenance staff of the systems.

Bad Homburg, September 2024. – "The primary goal in the re-engineering of the electro-hydraulic disc brakes of our DX series was to create an economical and convincing solution in every respect for the realisation of assembly-friendly, user-friendly and service-friendly holding and emergency stop systems for cranes, conveyor belt and bucket wheel systems," says Martin Ohler, Business Developer Brakes at RINGSPANN. In order to meet this requirement, he and his team carried out a number of benchmarks, market analyses and customer surveys, which ultimately resulted in significant specifications for a fundamental revision of the previous design. In addition, they set the course for groundbreaking optimisations, which already earned a great deal of praise from experts during the first presentations of the new DX brakes. Above all, there are three factors in particular that could make the new flagships in RINGSPANN's brake portfolio trendsetters in the industry. Firstly, designing important components – such as the brake lever – using flame-cut steel (instead of cast iron). This not only gives the brakes a low unit price, but also simplifies their maintenance, servicing and general overhaul. In addition, the steel composition leads to a slim design of the brake. Secondly, the redesign of the angle lever, which forms the functional connection between the thruster, the brake spring and the brake levers, and has to absorb both bending and torsional forces. To prevent these forces from passing through to the brake levers and bushings, the angle lever has been designed to have the same high torsional rigidity as cast iron counterparts. It consists of only a few parts and is easy to assemble and replace. Thirdly, the flexibility of equipping them with various, partly new and energy-efficient thrusters from RINGSPANN's own production. Their indented installation also contributes to the compact design of the brake. "Overall, our new DX brakes have surprisingly small envelopes. This means that they are space-saving and fit well into existing environments. In addition, they can be exchanged for other models without modifications," explains Martin Ohler.

Basically, the electro-hydraulic disc brakes of the DX series from RINGSPANN belong to the family of spring-operated fail-safe brakes. So they close on a power interruption and open via the thruster. Designed for a high number of switching cycles on high-speed discs with diameters of 500 to 1,000 mm, they apply clamping forces of up to 80 kN – depending on the variant. "As part of the re-engineering, we have also equipped the DX brakes with numerous detailed solutions that make it easier for OEM designers to integrate the brake into their drive system and offer many advantages to both plant operators and MRO personnel," says Martin Ohler.

Wear compensation and self-centering

A closer look at some of the functional features of the DX 280 FEA, the top model in the series, shows what this means in concrete terms. The wear compensation of the brake pads, for example, can not only be readjusted manually, but also automatically via a maintenance-free freewheel device. The compensation ensures that the brake can always develop the same, high clamping force by compensating for the operationally increasing distance between the brake pad and the brake disc. The standard and maintenance-free self-centring, on the other hand, ensures that both brake levers can be opened synchronously. As a result, the air gap on both sides of the brake disc remains equal – even if the brake pads continue to wear. A further compensation mechanism ensures that the brake pads are exactly parallel when ventilated. The distance between the pads and the brake disc is therefore decoupled from the V-position of the brake levers and is the same everywhere. This mechanism can be easily adjusted with adjusting screws.

Thrusters from our own production

The DX 280 FEA can be equipped with various, partly new thrusters from RINGSPANN. They are suitable for braking torques from 1,700 to 28,100 N and clamping forces from 22.5 to 80 kN. Their task is to release the brake via an electrohydraulically generated counterforce to the brake spring. To build up this power, an electric motor, an impeller or gear pump and a piston cylinder interact in each of their compact housings. "Which thruster with which type of pump is preferred depends on the specific requirements for the brake. Important parameters here include opening and closing times, energy efficiency, maintenance costs and price," says Martin Ohler. The TH UEK 475 thruster, for example, has a gear pump that can generate high pressures with a low oil volume. When the brake is open, it switches to pressureless circulation, which reduces power consumption and wear. It enables extremely fast closing times of less than 80 ms and works completely analogue – i.e. without a control card! Since its solenoid valve coils are mounted externally, they are easy to replace.

Large selection of sensors

The sensor range that RINGSPANN offers for the models of the revised DX series is extremely versatile. As standard, the brakes are equipped with easily accessible inductive sensors for monitoring brake release, brake closing, pad wear and manual release. Sensors of other types, and sensors with

ATEX certificate and SIL approval, as well as load pins for measuring contact force and analogue sensors for supervising the reserve stroke as well as pad wear and temperature of the brake pad can be added as an option. This selection offers a great deal of scope for integrating DX brakes into Industry 4.0 environments, as well as for implementing comprehensive monitoring systems for preventive maintenance.

Special models and a little sister

Thanks to their compact design and the mounting dimensions of the base plate, the new electro-hydraulic disc brakes of the DX series from RINGSPANN can easily replace worn-out disc brakes as part of modernisation projects. In addition, the brake is available in special versions for marine, very cold and very warm environments as well as an explosion-proof model. And a little sister can also be found in the RINGSPANN one-stop shop: it has a maximum clamping force of 25 kN and is called DX 230 FEA. *ms*

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Mirco von Stein, freelance specialist journalist, Darmstadt

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

Captions (6 pictures)

Figure 1: New flagship in RINGSPANN's brake range: the DX 280 FEA thruster disc brake for use in hoisting and travel drives on conveyor belts, cranes and bucket wheel systems. Image: RINGSPANN

Figure 2: Eye-catcher: Apart from their design innovations and user-friendly equipment, the new thruster disc brakes of the DX series from RINGSPANN catch the eye with their modern design. Image: RINGSPANN

Figure 3: The DX 280 FEA electro-hydraulic disc brake from RINGSPANN is predestined for holding and emergency stop systems with a high switching frequency on high-speed brake discs with a diameter of 500 to 1,000 mm. Image: RINGSPANN

Figure 4: Martin Ohler: "The DX 280 FEA is very easy to integrate into drive systems and offers many advantages, especially for operators of crane or conveyor systems and MRO personnel." Image: RINGSPANN

Figure 5: Standard: The self-centring of the DX 280 FEA ensures synchronous opening of both brake levers. This means that the air gap on both sides of the brake disc remains uniform – even if the brake pads continue to wear. Image: RINGSPANN

Figure 6: Flexible: The DX 280 FEA can be equipped with five different thrusters from RINGSPANN. They are suitable for braking torques from 1,700 to 28,100 N and clamping forces from 22.5 to 80 kN. Image: RINGSPANN

((Infobox))

Highlighting the added value

RINGSPANN has highlighted the functionality and design advantages of its DX 280 FEA electro-hydraulic disc brake in a [video](#). In just under five minutes, Martin Ohler, Business Developer Brakes, and his colleague Manuel Franz, Product Manager Brakes, explain the added value that this spring-actuated and electrohydraulically released disc brake offers OEM designers, system operators and maintenance staff.

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