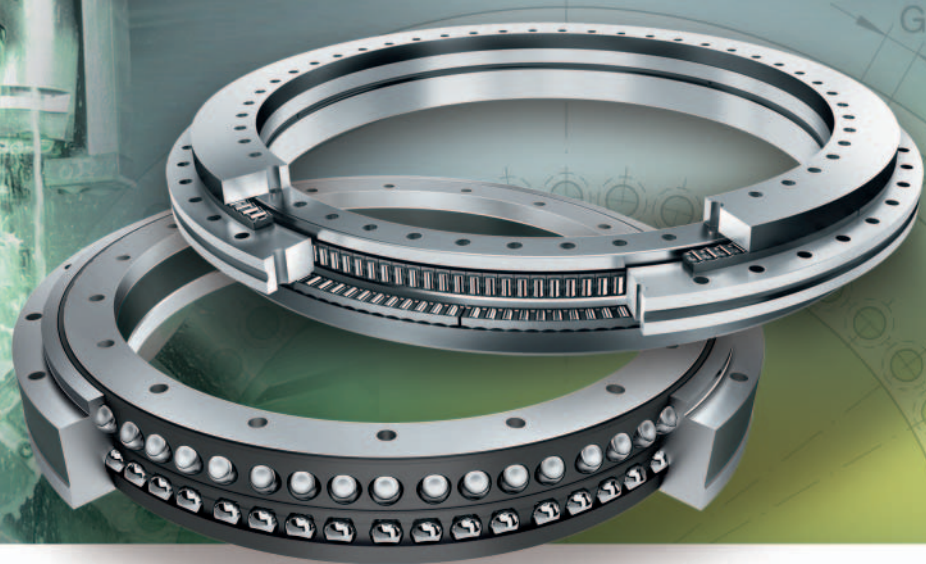




FAG

added
competence



High Performance Rotary Axis Bearings for Combined Milling and Turning

Higher rigidity and reduced friction

SCHAEFFLER GROUP
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High performance rotary axis bearings for combined milling and turning

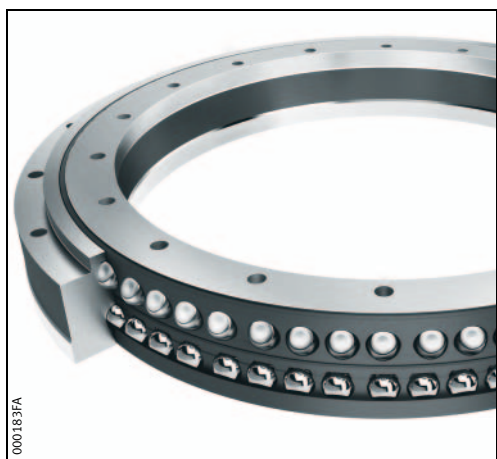


Figure 1: Rotary table bearing ZKXDF with lower frictional torque and high speed limit

The Schaeffler Group is introducing YRTC and ZKXDF, two new series of rotary axis bearings that contribute to a sustainable reduction in operating and component costs.

YRTC as a combined solution

Existing standard

For rotary axes in high performance machine tools, the two established series YRTS and ZKLDF are available up to a bore diameter of 460 mm.

Both bearing series have a very low bearing frictional torque and thus allow the design of (energy) efficient rotary axes with excellent control characteristics.

They have developed to become the standard for rotary tables with a main spindle function, for example in the case of combined milling and turning.

In the case of axial/radial cylindrical roller bearings YRTS, the focus is on maximum rigidity within the design envelope. In contrast, the double row axial angular contact ball bearings ZKLDF can be used to achieve even higher speeds while maintaining adequate rigidity, *Figure 4* and *Figure 5*.

Trend towards higher speeds

Combined milling and turning is also advantageous for smaller workpiece diameters. For geometrical reasons, however, this requires far higher speeds. Through optimisation of the raceway system, it has been possible to significantly reduce the bearing friction of series ZKLDF...-B. For almost all series, its limiting speed has been doubled.

In addition, size 180 has been introduced. Series ZKLDF...-B provides a new generation of compact bearings that opens up new possibilities in

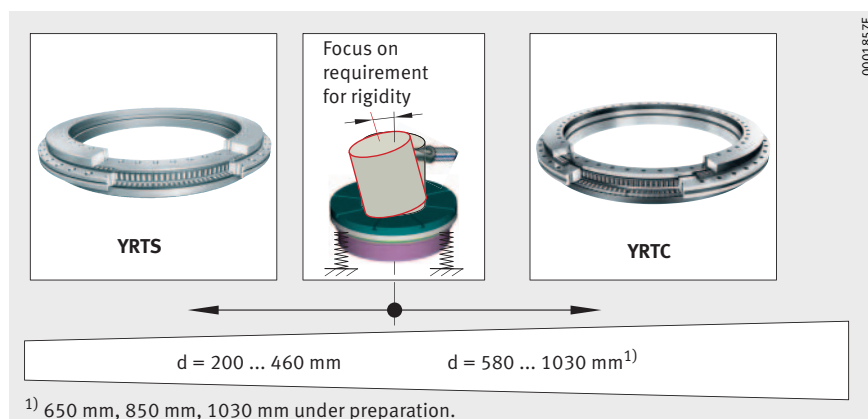
machining without any loss in performance.

Trend towards larger machines

For larger tables with milling and turning options, the compact bearing series have been expanded to include the bore diameter range from $d = 580$ mm to $d = 1030$ mm.

Series YRTC has been introduced alongside series YRTS, *Figure 2*. This combines the advantages of the proven YRT bearing for swivel motion under the INA brand with those of the established rotary table bearing RTC under the FAG brand and improved characteristics. This has resulted in higher rigidity and considerably reduced power losses in comparison with conventional axial/radial cylindrical roller bearings, *Figure 3* and *Figure 5*.

The larger cutting volumes achievable, in combination with the reduced frictional losses in continuous



¹) 650 mm, 850 mm, 1030 mm under preparation.

Figure 2: Selection of series with a focus on the requirement for rigidity

operation, make an effective contribution to reducing not only the operating costs (TCO) but also the component costs at the same time as improving machine performance.

ZKXDF as an expanded solution

The rotary table bearing ZKXDF represents an expansion of the series ZKLDF, *Figure 1* and *Figure 4*.

The innovative feature here is the use of ball rollers. As a result, single piece bearing rings without filling plugs can be incorporated in the design. This leads not only to higher rigidity but also to better accuracy.

In addition, the mounting and adaptation of accessories is simplified. The bearing size ZKXDF580 is already on test at selected pilot customers in high performance machining centres and is on its way to volume usage.

Features and advantages of series YRTC

- Axial/radial bearing with optimised friction
- Very high rigidity
- Very high axial and radial runout accuracy
- Reduced friction leads to less heating of the bearing and to increased speed limits.

Features and advantages of series ZKXDF

- Single piece bearing rings
- Suitable for flange mounting, with centring facilities for adjacent parts and torque motors
- Inner and outer ring axially offset.

This makes it possible to achieve innovative rotary tables with table diameters ≥ 1 m for combined milling and turning.

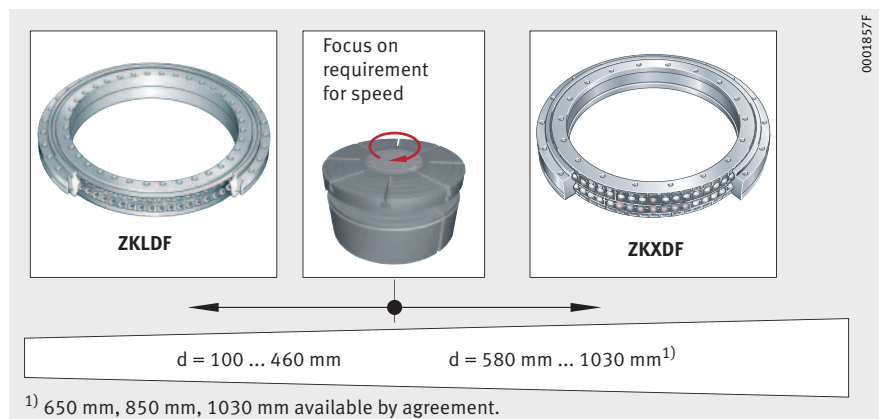


Figure 4: Selection of series with a focus on the requirement for speed

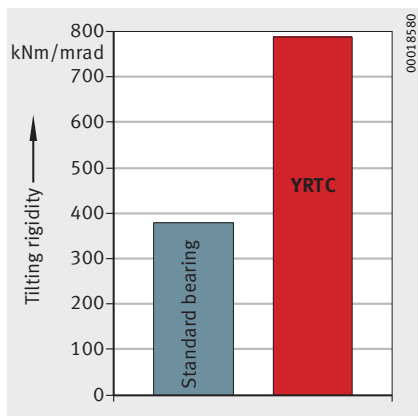


Figure 3: Higher tilting rigidity as shown in the example of YRTC580

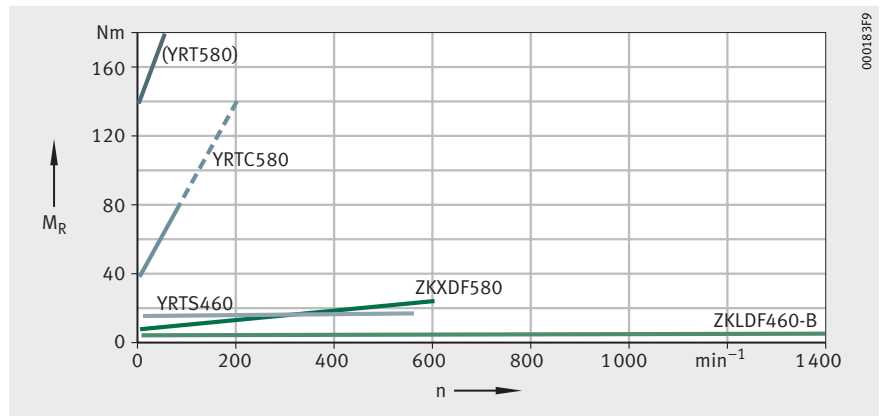


Figure 5: Speed and frictional torque of rotary axis bearings



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