

Axial/radial bearings

Series YRTS



Ideal for
direct drives



Features

INA axial/radial bearings YRT are high precision bearings used in many applications involving combined loads. This proven series has already been further developed to give an additional version with an integral measuring system. As a result of the new technical and economic requirements placed on high precision bearing arrangements, we have now developed series YRTS.

Series YRTS is characterised by a decisive technical advantage over conventional concepts of this bearing type:

- while maintaining its high level of tilting rigidity, the bearing frictional torque has been significantly reduced.

Advantages

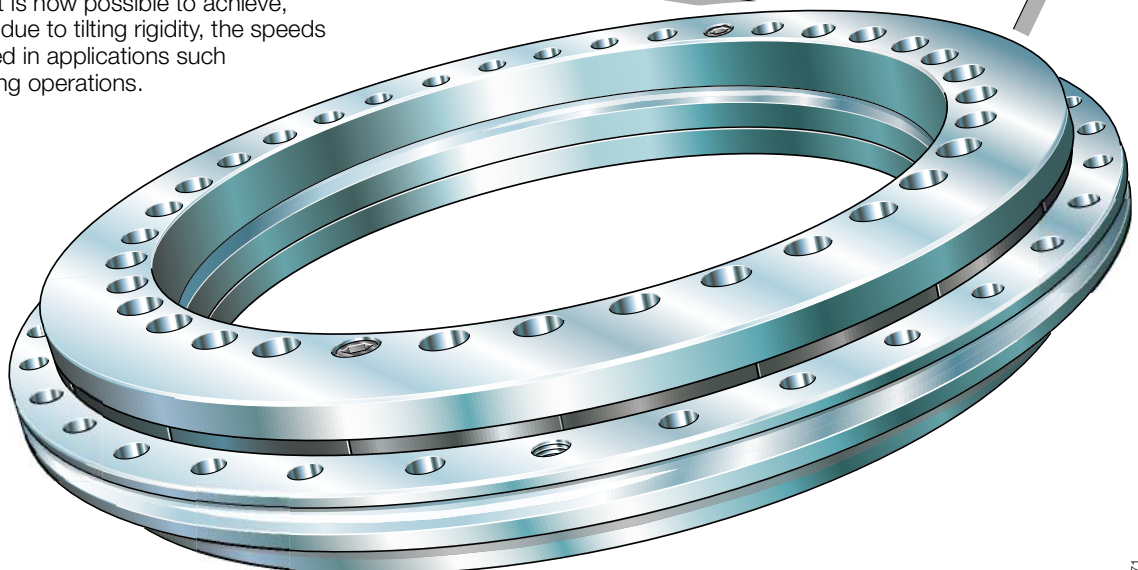
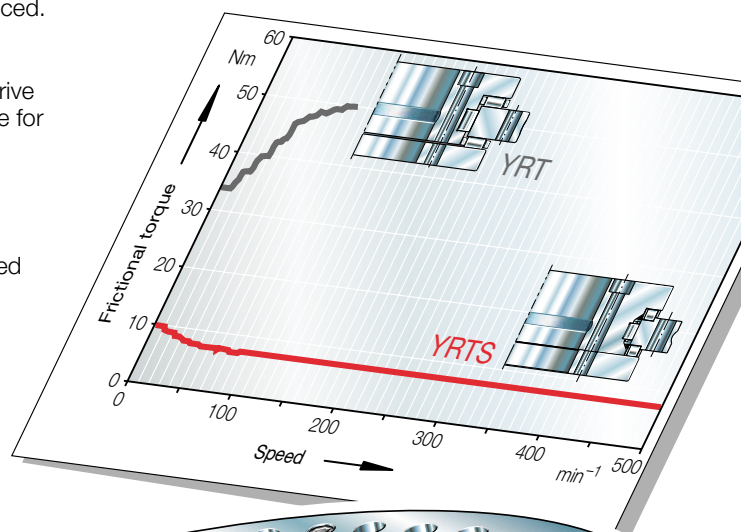
- Due to the significantly lower bearing friction, the drive power required is reduced and is therefore available for highly dynamic acceleration
- the reduced heating of the bearing leads to higher accuracy of the overall assembly
- the increased limiting speeds allow the full performance capacity of *direct drives* to be exploited
- the constant frictional torque over the whole speed range allows excellent control of the power transmission system
- interchangeability with series YRT and ZKLDF allows existing designs to be retrofitted with YRTS.

This new series thus offers the basis for the development of machine concepts with improved performance. It is now possible to achieve, without losses due to tilting rigidity, the speeds that are required in applications such as turning/milling operations.

Applications

Axial/radial bearings YRTS are preferably used:

- in rotary tables with *direct drive*
- in rotary tables for combined turning and milling operations
- in face plates
- where high precision bearing arrangements with extremely high rigidity and suitable for screw mounting are required for combined loads.

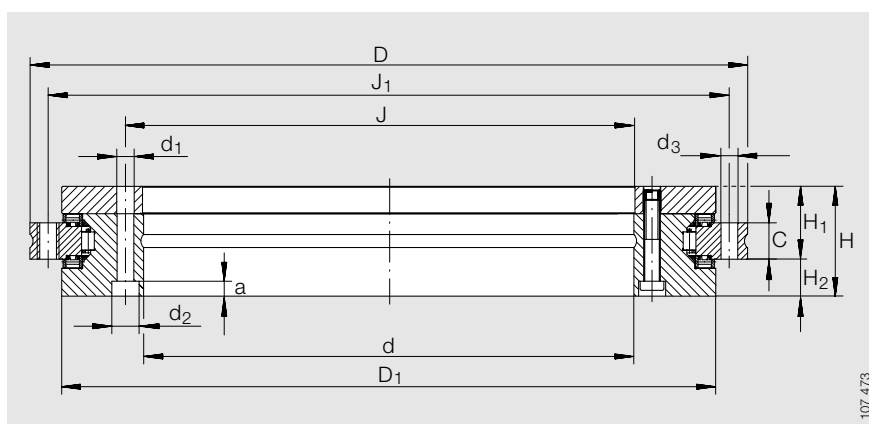


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Axial/radial bearings

double direction

Series YRTS



YRTS


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Dimension table · dimensions in mm

Bearing bore diameter	Designation ⁵⁾	Mass ≈kg	Dimensions								
			d	D	H	H ₁	H ₂	C	D ₁	J	J ₁
200	YRTS 200	9,7	200 _{-0,015}	300 _{-0,018}	45	30 ±0,175	15	15	274	215	285
260	YRTS 260	18,3	260 _{-0,018}	385 _{-0,02}	55	36,5 ±0,2	18,5	18	345	280	365
325	YRTS 325⁴⁾	25	325 _{-0,023}	450 _{-0,023}	60	40 ±0,2	20	20	415	342	430
395	YRTS 395	33	395 _{-0,023}	525 _{-0,028}	65	42,5 ±0,2	22,5	20	486	415	505
460	YRTS 460	45	460 _{-0,023}	600 _{-0,028}	70	46 ±0,225	24	22	560	482	580

1) Including retention screws and threaded extraction holes.

2) Tightening torque for screws to DIN 912, grade 10.9.

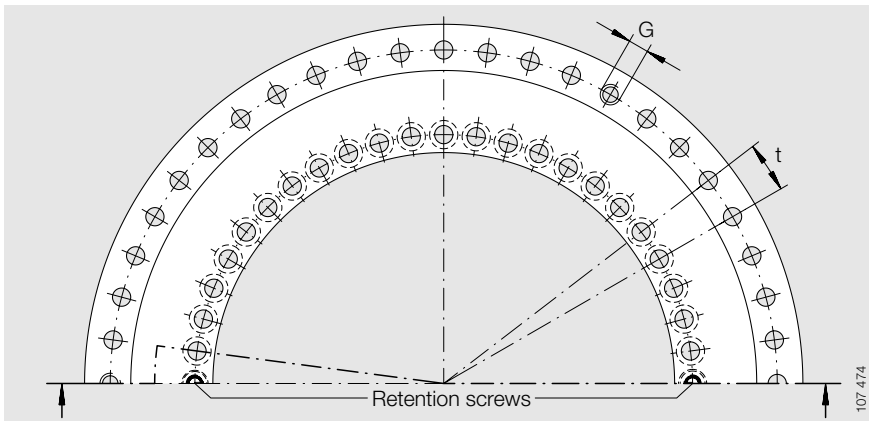
3)  For fixing holes in the adjacent construction. Note the pitch of the bearing holes.

4) Screw counterbores in the L-section ring open to the bearing bore (see Figure, page 3). The bearing inside diameter is unsupported in this area .

5) Planned delivery dates:
series YRTS 325 and YRTS 460 from 3rd quarter 2002.
series YRTS 260 and 395 from 4th quarter 2002.
series YRTS 200 from 1st quarter 2003.

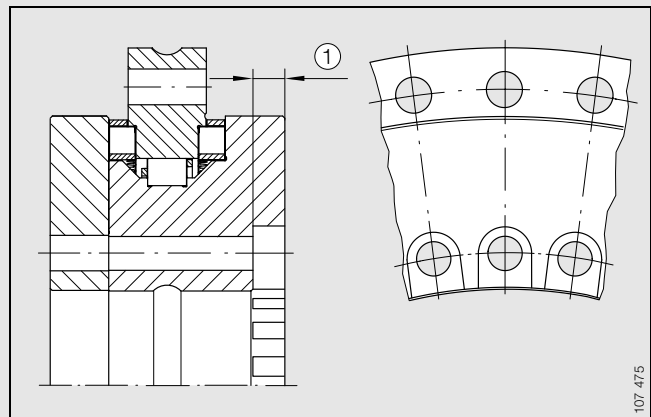


For information on accuracy, design and safety guidelines and fitting, please consult INA publication "High precision bearings, GKL" and INA Technical Product Information TPI 103, "High precision bearings for combined loads".



Hole pattern

Fixing holes						Pitch $t^{1)}$	Retention screws	Threaded extraction holes		Screw tightening torque $M_A^{2)}$ Nm	Basic load ratings				Bearing bore diameter
Inner ring				Outer ring				Quantity	Quantity		axial		radial		
d_1	d_2	a ①	Quantity ³⁾	d_3	Quantity ³⁾						G	Quantity	dyn. C kN	stat. C_0 kN	
7	11	6,2	46	7	45	$48 \times 7,5^\circ$	2	M 8	3	14	155	840	94	226	200
9,3	15	8,2	34	9,3	33	$36 \times 10^\circ$	2	M12	3	34	173	1050	110	305	260
9,3	15	8,2 ⁴⁾	34	9,3	33	$36 \times 10^\circ$	2	M12	3	34	191	1260	100	320	325
9,3	15	8,2	46	9,3	45	$48 \times 7,5^\circ$	2	M12	3	34	214	1540	121	390	395
9,3	15	8,2	46	9,3	45	$48 \times 7,5^\circ$	2	M12	3	34	221	1680	168	570	460



Screw counterbores open.
Bearing inside diameter unsupported ①

Application example

High speed NC machining centre

Rotary table bearing arrangement

The rotary table is used as the 4th axis in a high speed NC machining centre. It is connected to a direct drive and allows high accelerations. As a result, turning and milling operations with short running times can be achieved at speeds up to 400 min^{-1} .

In order to ensure high quality machining, the rotary table bearing arrangement must have high running accuracy as well as high moment and vertical rigidity.

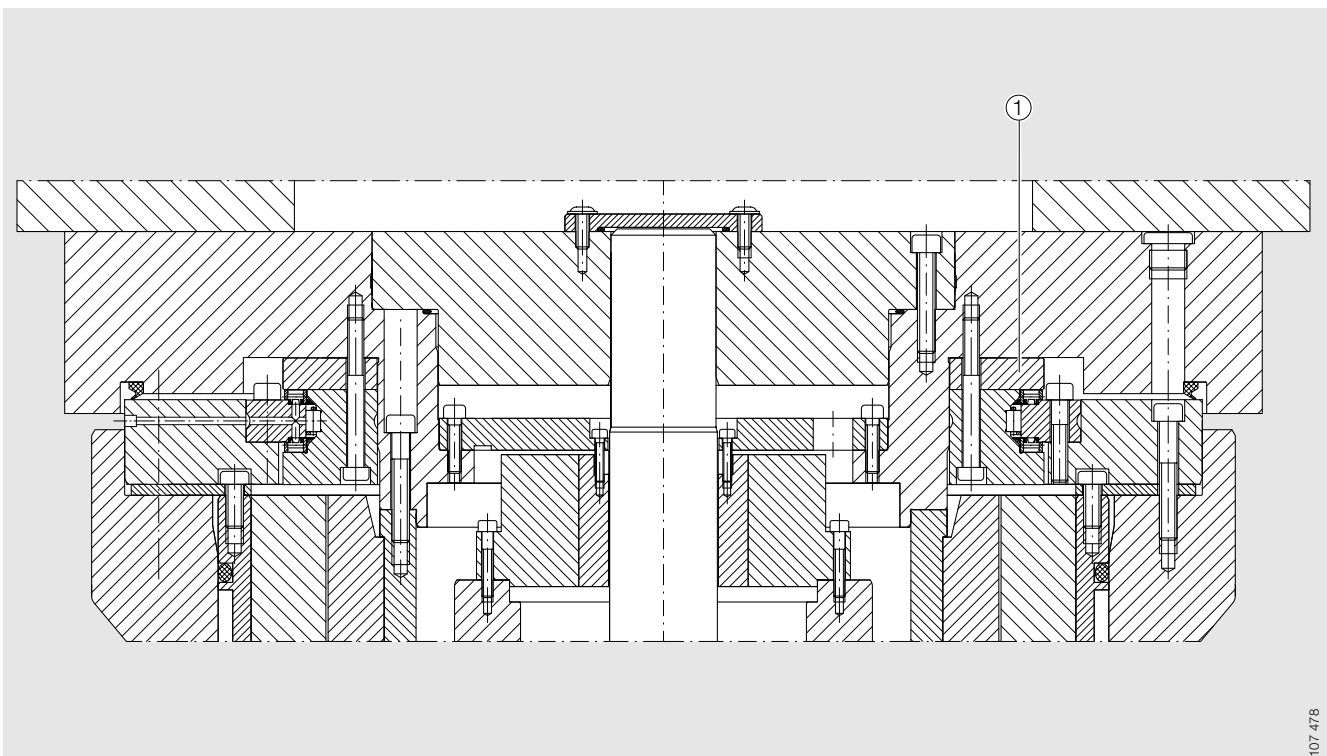
INA design solution

The rotary table is supported by an axial/radial bearing YRTS. This bearing can support axial loads from both directions as well as radial loads and tilting moments. The bearing is axially and radially preloaded after fitting. As a result, the bearing arrangement has high vertical and tilting rigidity. The running accuracy corresponds to P4 in accordance with DIN 620 and, in conjunction with the high rigidity, thereby ensures high quality machining of the workpieces. The ready-to-fit bearing unit is screw mounted on the adjacent construction.

A contact seal in the adjacent construction protects the bearing against contamination.

INA product used

- ① Axial/radial bearing YRTS



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Axial/radial bearings

Bearing friction

In series YRTS, the bearing frictional torque is significantly reduced. Figure 1 shows a comparison with a conventional axial/radial bearing YRT. The increase in frictional torque with increasing speed that is typical of this bearing type does not, however, occur with YRTS bearings. The frictional torque remains at an almost constant low level.

Speeds

The lower frictional torque leads to considerably lower frictional power in the bearing arrangement. In comparison with previous limiting speeds, the bearing location therefore undergoes significantly reduced heating. The bearing can be run at significantly higher speeds without reaching critical temperature ranges.

Figure 1 shows the results of a test run on bearing size YRTS 325. The bearing was run at a constant 500 min⁻¹. The equilibrium temperature reached was approx. +55 °C.

Rigidity

The rigidity of series YRTS corresponds to the rigidity values of series YRT. As a result, size YRTS 325 achieves tilting rigidity values of at least 80 kNm/mrad (for values for other series, please consult INA).

Lubrication

The bearings are greased with lithium complex soap grease to DIN 51 825-KP2N-25. These greases are compatible with lubricants with a mineral oil base. The values in Figure 1 are based on measurements carried out on bearings with their initial greasing.

Rolling bearings should only be lubricated while warm from operation and during slow rotation! Overlubrication of the bearing will have a strong influence on the bearing frictional torque!

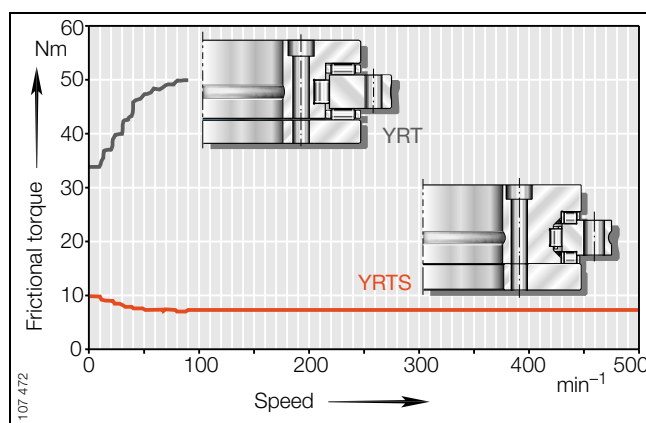


Figure 1 · Frictional torque comparison for size 325¹⁾

¹⁾ Measured at room temperature. Values are determined by measurement of one testpiece in each case. Values for production parts may vary from these values as a result of manufacturing tolerances and variations in environmental influences.



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